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First Evidence of Pleistocene Archaeology on the Neyshabur Plain and its Role in Reconstructing the Dispersal of Hominins on the Northeastern Iranian Plateau

The northeastern Iranian Plateau is considered a leading region in Paleolithic studies. The history of Paleolithic research in this region dates back to the mid-20th century. However, unlike the western and, to some extent, the central part of the Iranian Plateau, only a handful of sites have been identified in the northeastern part. Field studies conducted on the Neyshabur plain have provided some of the only Paleolithic evidence at four locations in the foothills of the Binalud Mountains: Dar Behesht, Mushan Tappeh, Ali Abad, and Qezel Tappeh. Our research aims to assess this evidence, provide a revised typology of Pleistocene artifacts from the Neyshabur plain, and also study the role of these and other finds in the area and analyze their significance in terms of the dispersal of Pleistocene hominin populations. We propose two main corridors on the northeastern Iranian Plateau assumed to have been influential in the dispersal of human ancestors.

Keywords: *Neyshabur plain, Pleistocene, northeastern Iranian Plateau, Paleolithic, hominin populations.*

Introduction

Looking at Southwest Asia, one can clearly perceive the importance of the Iranian Plateau in this geographical area. On the one hand, being located north of the Strait of Hormuz and the Arabian Peninsula, and along its coastline with the Indian subcontinent, it acted as a migration bridge for the southern parts of Asia; and on the other hand, by having a water barrier in its northern part, it has been indeed a really important passageway in the distribution of Pleistocene hominids to other parts of Asia. However, studies in this vast area have been, to a large extent, vague and unfocused.

In Kuldara, southern Tajikistan, an 800,000-year-old lithic industry has been recovered (Ranov, Carbonell, Rodriguez, 1995). On the other side of the Caspian Sea, one witnesses the presence of subspecies of *Homo erectus* in Dmanisi, Georgia, a place that is more than 1.8 million years old and presents one of the oldest human remains and chopper industries (Lordkipanidze et al., 2013). Evidence of the first human populations has also been found in Turkey (Slimak et al., 2008). In the Levant and in Ubeidiya, well-preserved archaeological and human remains from at least 1.2 million years ago are observed (Belmaker et al., 2002). In the site of Gesher Benot Ya'aqov (Israel), dating to ca 800 ka BP,

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we can probably identify the first evidence of the use of fire as well as the elephant butcher (Alperson-Aftil, Richter, Goren-Inbar, 2017). In Saudi Arabia, we can trace the presence of the first human populations and their possible displacement by the later ones (Shipton et al., 2018).

The Arabian Peninsula, located between the two key straits of Bab-el-Mandeb in its southwest and Hormuz in its northeast, has played a key role in expanding the territory of hominids to parts of South Asia (Rose, Petraglia, 2009: 10). This issue becomes much more important owing to its proximity to the eastern and southeastern parts of the Iranian Plateau. Nevertheless, the evidence presented to date from the early lithic industries in this area is uncertain, and a significant portion of our information from the Lower Paleolithic period is obtained from surface surveys (Biglari, Shidrang, 2006: 167). However, it should not be forgotten that a significant part of these studies is limited to the Zagros, Alborz, and the Central Iranian Plateau, and the eastern part of Iran has practically been unstudied.

Nonetheless, during the last decade or so, some evidence, albeit limited, from the northeast of the Iranian Plateau has been reported (Coon, 1951: 20; McBurney, 1964; Ariai, Thibault, 1975: 106). Also, some recent surface sites have been reported (Barfi, Soroush, 2014; Barfi, Zafaranlou, Soroush, 2014; Nikzad, Sedighian, Ghasemi, 2015, Sadraei, Mehne, Saburi et al., 2017; Sadraei, Mehne, Toghraei et al., 2018; Sadraei, Anani, 2018; Sadraei, Mehneh, Sheikh et al., 2019). In the Neyshabur plain survey project, open-air Paleolithic sites were found, including Dar Behesht, Ali Abad, Mushan Tappeh, and Qezel Tappeh. This study introduces the sampled lithic artifacts from these sites. The results of the typological analysis of the assemblages are presented. Comparative studies with adjacent sites are carried out, and the role of the above-mentioned Paleolithic sites in the reconstruction of patterns of hominids' dispersal is considered.

Geomorphology of Neyshabur plain

The northeast of Iran is formed by several inter-mountain plains, of which Neyshabur plain is considered one of the westernmost (Rokni et al., 2016: 25). It is limited to the Binalud heights from the north, the heights of Neizehband, Siah Kuh, and Namak mountains from the south, the Milajough and Yalpalang heights from the east, the Sabzevar plain catchment from the west, and to the Jovien plain from the northwest (Fotohi et al., 2013: 65).

Paleozoic formations in Iran are quartz sandstones (Lalun formation), dolomitic and dolomitic lime and shill (Mila formation), marly limestone (Niur formation), limestone and dolomite (Bahram formation), and crystallized quartzite, which have outcrops in the north of the plain in the Binalud heights. Mesozoic formations include phyllite, light gray and light buff limestone (Jurassic). Tertiary geologic formations include shale and sandstone, conglomerate along with volcanic cobbles, marly limestone, light green cobbles, volcanic cuts, conglomerates, andesite and gypsum (Ibid.: 66). These formations cover most of the mounds in the catchment basin of the Neyshabur plain. The Quaternary period consists of alluvial sediments, wind sediments, and fluvial sands, covering most of the course of flood routes and the plain surface. The quartz material has provided a high potential for the formation of raw stone material in the study area (Ibid.).

Methodology and findings

The surveying operation of Neyshabur plain covered mainly the northern parts of the plain and the southern foothill areas of the Binalud mountain range. Our study was conducted as an intensive survey, which is the most efficient method for maximal identification of archaeological sites. At first, we dealt with identifying artifacts, and then managed to specify their distribution on the surface. If the distribution of the artifacts was significant, the necessary strategy for the sampling job could be chosen. In the end, sites that had at least 7 to 10 pieces of artifacts, with their applied technology partially identifiable, were determined as open-air sites (Fig. 1).

Generally, 37 archaeological sites were identified in the Neyshabur plain. In four locations, which are formed along the southern parts of the Binalud foothills, dispersions of lithic artifacts were identified. The sites are located at an elevation of more than 1400 m above sea level, at the entrance to the straits leading to inter-mountain valleys, on the top of mounds, so that their sediments have been greatly protected against the erosion processes of the Holocene period. The study area, covering parts of the Binalud highlands, has actually made it difficult to establish Paleolithic settlements at high altitudes owing to the young age of the heights and the low snowline in different Pleistocene periods. Of the four identified sites, one site can be attributed to the Lower Paleolithic period, and the other three to the Middle Paleolithic era.

Stone raw material

In terms of the composition of the stone raw material used in the collections identified in the Neyshabur plain,

it can be stated that in all four assemblages the highest amount belongs to the flint group. Chert is the second raw material used in the knapping process of the artifacts. Quartz has the third frequency rate, and is most abundant in the Mushan Tappeh site. Jasper and tuff are other raw materials identified in the Paleolithic sites of Neyshabur plain. Jasper was identified only in Qezel Tappeh, and tuff was seen only in the Ali Abad site.

In the site of Qezel Tappeh and on the slopes of the hills, significant traces of chert were identified. Therefore, the accessibility of raw material seems to be the main factor in the formation of the Paleolithic industry at this location in the plain (Fig. 2, *c*). Also, at the edge of the site of Ali Abad, a large stone block of chert can be observed (Fig. 2, *b*). In addition, on the surface and adjacent parts of the site, chert cobble, as well as quartz and tuff pieces, can be seen in abundance.

Mushan Tappeh was another site where, owing to its location next to the geological conglomerate structures, there was a possibility of finding sources of stone raw material. Investigations showed the presence of quartz and flint among the natural cement textures of these structures (Fig. 2, *a*), a finding that becomes more important in terms of the composition of the stone raw material in Mushan Tappeh collection. Finally, despite the surveys carried out on the site of Dar Behesht, no evidence indicating the existence of outcrops was identified, and only low-quality flint and quartz cobble were found, located mainly in the water stream near the site. In order to obtain more reliable information, four lithic artifacts, as well as four samples of stone raw material, from Paleolithic sites were sent to the laboratory of the Restoration Research Center of the Research Institute of Cultural Heritage in Tehran for sampling and petrographic studies.

Two samples (artifact and stone raw material) from Qezel Tappeh site were made of chert, containing the skeletal remains of marine organisms (Fig. 3, *1*, *2*). The artifact from Dar Behesht site is made of quartz. (Fig. 3, *4*). The raw stone sample from this site is composed of cryptocrystalline quartz mineral and microcrystalline quartz. In this sample, the iron oxide mineral background still exists sporadically and limitedly. Another ingredient is calcite, which is present in relatively coarse granular

Fig. 1. Sites identified in Neyshabur plain.
1 – Dar Behesht; *2* – Qezel Tappeh; *3* – Ali Abad; *4* – Mushan Tappeh.

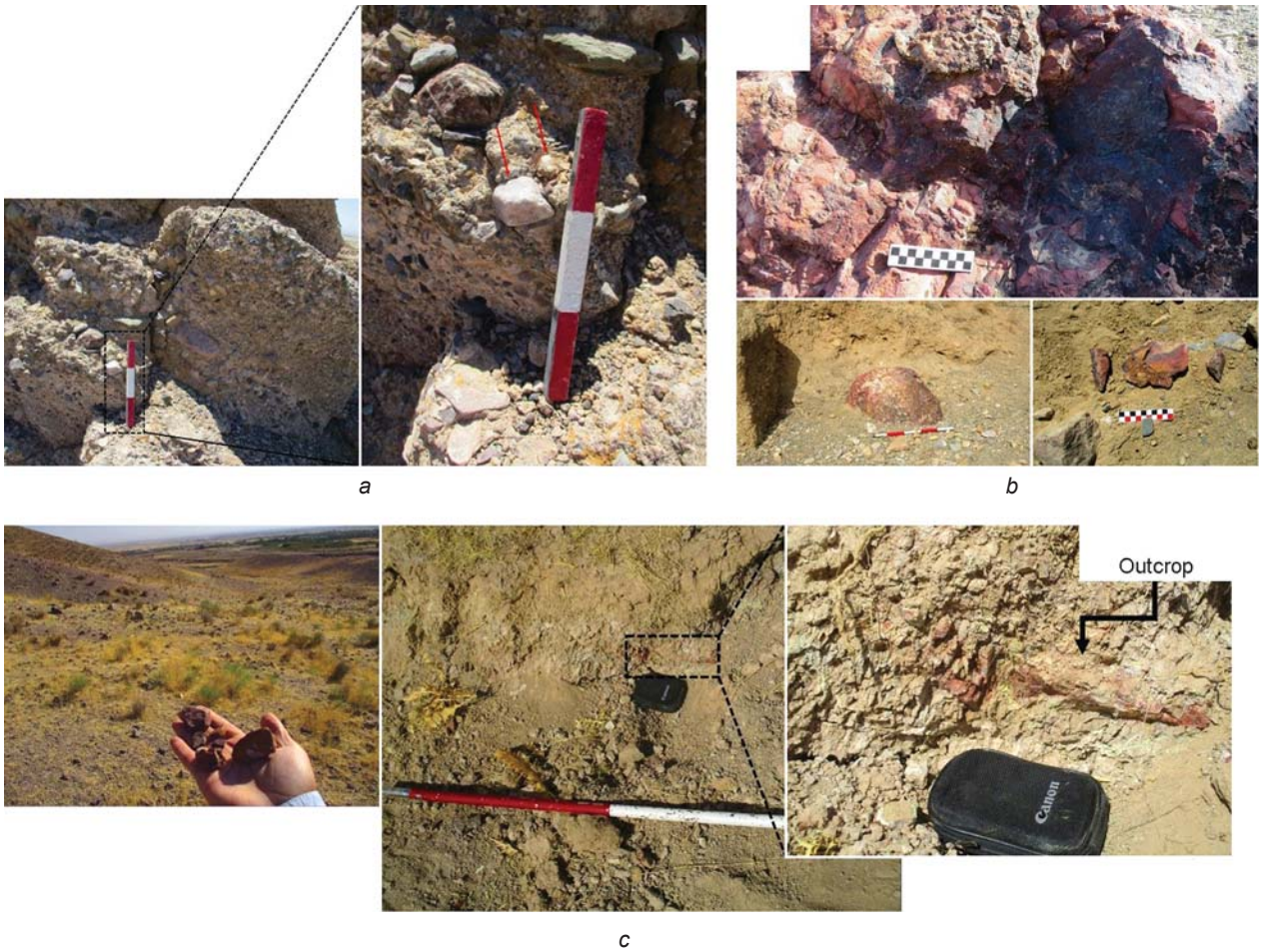

Fig. 2. Sources of stone raw material in Paleolithic sites of Neyshabur plain.
a – quartz and flintstone raw material among the cement texture of conglomerate parts; *b* – chert stone raw material identified in the vicinity of Ali Abad site; *c* – outcrops of chert at the Qezel Tappeh site.

form in silica paste. The frequency of calcite mineral makes up more than 10 % of the total sample volume (Fig. 3, *3*). The raw stone sample from the Ali Abad site is composed of chert. It consists of large and separate pieces of silica, which are joined together by a secondary cement, consisting of iron oxide, silica, and calcite. These parts have sharp and angled margins, and the original rock was probably crushed by tectonic processes and reconnected by secondary processes and exposure to the new environment (Fig. 3, *5*). The artifact from this site is made of chert, containing fine-grained silica sand (Fig. 3, *6*). The sample of raw stone from the Mushan Tappeh site consists of fine-grained quartz mineral and quartz cryptocrystalline. In this context, fine silica, large pieces of calcite mineral with various fossil remains can be seen. Lime and fossil pieces make up more than 50 % of the sample volume (Fig. 3, *7*). The artifact from this site (Fig. 3, *8*) is made entirely of quartz mineral. This example shows similarities with the two samples discovered in the Dar Behesht site.

The results of petrographic analysis, at least in the Qezel Tappeh site, show a completely similar stone raw material in the artifacts tested. Taking into account the existence of chert outcrop in the site, this largely reveals its main origin. The Ali Abad samples, considering the location of the site at the edge of the seasonal water flow, indicate the presence of the secondary bed here, which is evidenced by their components in the form of secondary cement. The similarity of raw stone samples from Dar Behesht and Mushan Tappeh suggests their common origin.

It can be argued that at Qezel Tappeh, Dar Behesht, and Mushan Tappeh, the source of raw material should be searched for in the sites themselves. Meanwhile, in the Ali Abad site, owing to its proximity to the seasonal flow, the probability of an external origin for raw material is high. This should be analyzed by conducting specialized lithological studies.

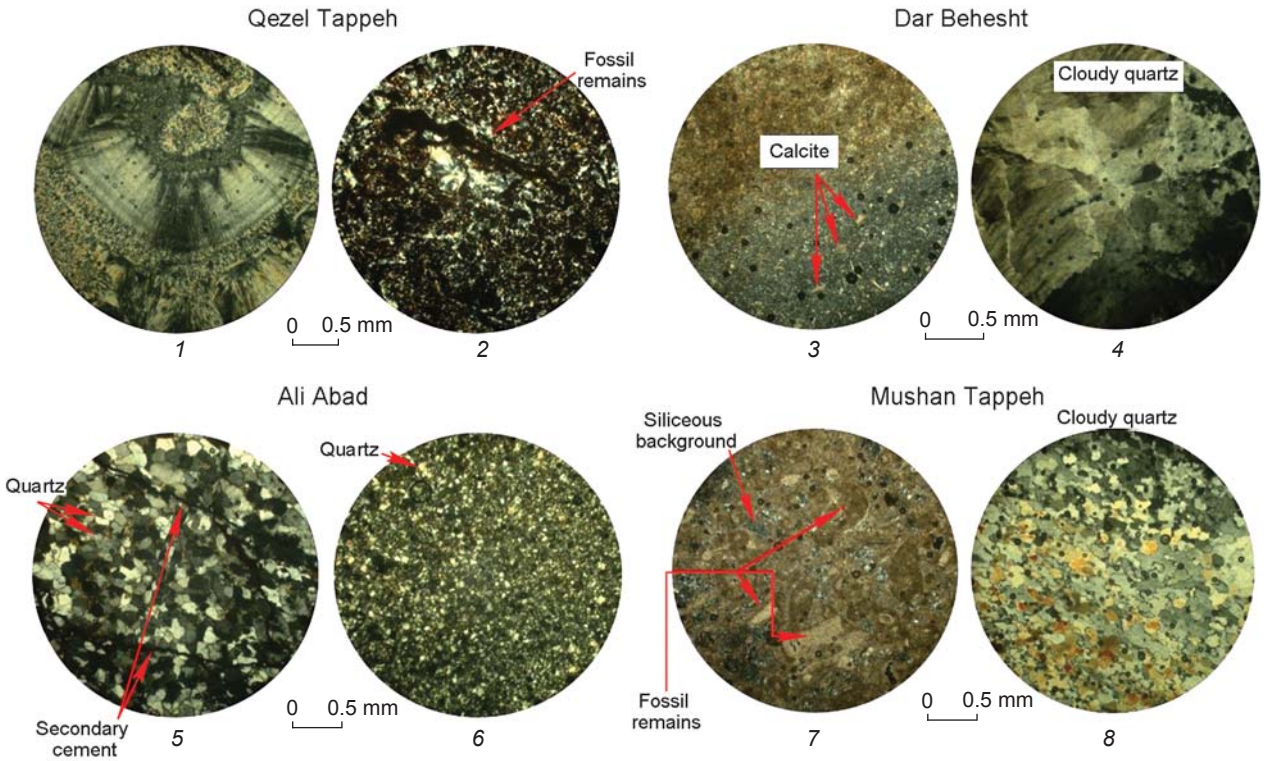

Fig. 3. Thin cross-sections taken from samples of studied stone raw material.

The Neyshabur plain in the Paleolithic era

The open-air site of Mushan Tappeh is located on the northern edge of the Neyshabur plain, on the mounds to the south of the Binalud chains. The artifacts identified in this site include 13 pieces: cores (n=5), tools (retouched pieces, n=4), and debris (n=5). In the group of cores, there are a broken core, a tested core, a unifacial core, and a core that has undergone cortex removal using the anvil technique, which is evidenced by the traces of corrosion and abrasion left on its lower part (Fig. 4). Retouched tools include three side-scrapers (incl. a double-side scraper and a heavy-duty scraper) (Fig. 5, *2*), and a chopper-core (Fig. 5, *1*). The stone raw material used is flint, chert, and quartz. The degree of erosion of edges in some pieces can contribute to the comparative chronology of the said artifacts. In terms of the knapping technique used at the Mushan Tappeh site, two possible methods can be identified: that with a hard hammer (the most widely used), and the anvil technique. This latter technique was also used in the samples from the Kuldara (Davis, Ranov, 1999: 186) and Kashafrud sites (Jami Al-Ahmadi, 2008: 125). The poor quality of the cores, which greatly affected the knapping process, caused them to be used mostly for tool making. The absence of bifacial tools in the collection reinforces the likelihood that its industries may have been different from those at the neighboring sites. Bifaces have been reported from Kashafrud (Ibid.: 122) and many open-air sites in Turkmenistan (Vishnyatsky, Lyubin, 1995).

The collections of lithic artifacts from the Middle Paleolithic sites of Ali Abad, Qezel Tappeh, and Dar Behesht are small: 9, 13, and 14 pieces, respectively. The artifacts obtained from the open-air site of Dar Behesht include cores and the related pieces (n=3), flakes (n=4), formal tools (n=5), including a déjeté scraper (Fig. 5, *12*), and debris (n=2). Ali Abad is another site with a higher proportion of formal tools (n=5) and retouched pieces (n=2). The Qezel Tappeh assemblage is dominated by flakes; cores are two, and formal tools are absent.

The general dimensions of cores were studied by two collections (Qezel Tappeh and Dar Behesht). Given the lack of some tool groups and the low density of the artifacts in these assemblages, drawing any conclusion with reference to the dimensions of the artifacts, their relation to the number of negative scars on the cores, or the presence of flakes would be impossible. The overall low dimensions of the artifacts indicate a lack of proper access to the raw stone material, and the cracks resulted from weathering show that the finds were not located *in situ*.

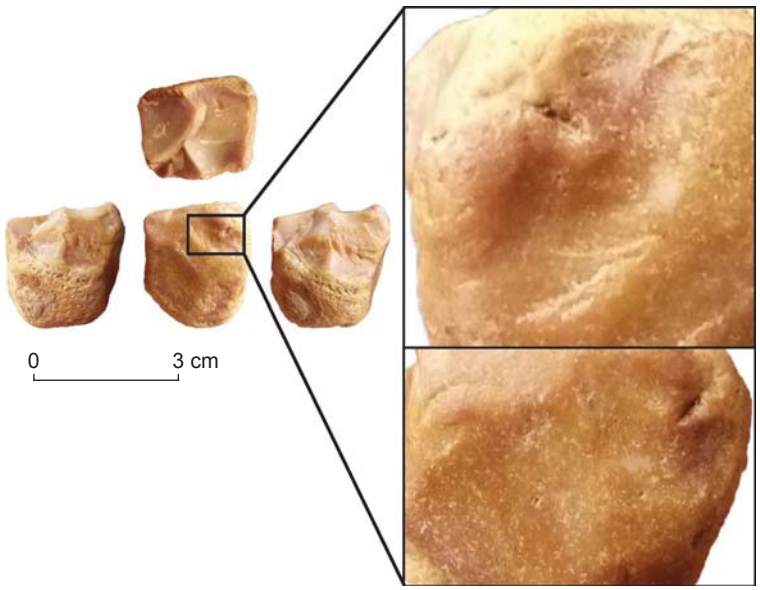

Fig. 4. Remains indicating the use of anvil, in the form of abrasion and corrosion on the surface of the core.

Knapping methods at the Paleolithic sites of the Neyshabur plain

The studies performed on the Lower and Middle Paleolithic representative cores of the Neyshabur plain indicate the use of four main knapping methods. A unidirectional method was mostly used in unifacial cores, as well as chopper-cores. In this method, the flakes were removed directly with a stone hammer. This method can be considered as one of the most primitive flaking methods in Lower Paleolithic industries (Shea, 2013: 52); a method that has been used extensively alongside other methods in various prehistoric periods. The bipolar method was used with an anvil. In this method, the flaking was conducted in a two-platform manner, in such a way that the flakes were removed by placing the core on an anvil, from two opposite platforms. The parallel method has been identified in at least two blade cores. It was used for obtaining elongated flakes with relatively parallel edges. The centripetal method can be seen in at least 3 pieces of cores (Fig. 5, *5*). In this method, which was one of the main techniques in knapping discoid cores, the flakes were removed from the outer edges to the central part of the core. This method was performed in both unidirectional and bidirectional manners.

Dispersal patterns of hominins and the role of the northeast of the Iranian Plateau

One of the most important purposes of Paleolithic studies has been to investigate possible patterns of hominin dispersal in the Pleistocene era, especially out of Africa (Bar-Yosef, Belfer-Cohen, 2001: 25). Meanwhile, the role of the Iranian Plateau cannot be ignored. The Iranian Plateau, being located between two water barriers (the Caspian Sea to the north and Persian Gulf to the south), owing to its high environmental potentials and its remarkable geography, could have played a significant role in attracting Paleolithic populations (Nasab, Clark, Turkamandi, 2013: 268). The majority of the research in Iran has focused mostly on Zagros and to some extent on Alborz regions, rather than the northeastern areas.

Excavations in Key Aram cave can be considered the only stratigraphic evidence from northeastern Iran. This cave is located at the eastern end of the Alborz Mountain chain, parallel to the Kopet Dag, at the altitudes where during the Pleistocene its inhabitants were likely to experience conditions of severe cold due to long glacial periods. The low snowline during glacial periods, access to specific types of hunting resources (not necessarily abundant), local raw stone material, and the mountainous nature of the region, which is very similar to Alborz and Zagros, have caused the types of artifacts and the production technique used to produce them to be comparable to the Mousterian of Zagros (McBurney, 1964: 395).

Some researchers have examined the migration corridors of hominins and the patterns of their distribution in the Iranian Plateau (Nasab, Clark, Turkamandi, 2013: 275). Of the three major corridors and dispersal routes, two routes possibly passed through the northeast part of the Iranian Plateau (Fig. 6, *B*). This conclusion can

Fig. 5. Some lithic artifacts found in Paleolithic sites of Neyshabur plain.
1 – chopper-core; *2* – massive scraper; *3* – unifacial core; *4* – anvil-made core; *5* – centripetal core; *6–7* – Levallois flakes; *8* – double-side scraper on Levallois blade; *9* – notch on blade; *10* – side-scraper; *11* – Levallois point with irregular retouch; *12* – déjeté scraper.

be partially supported by the evidence obtained from Kashafrud (Neyshabur plain) and Key Aram Cave. However, the eastern regions of Iran have been neglected in these patterns. Perhaps the most important reason is the particular geographical location of the northeastern and southeastern parts of the country, which may have played a significant role in the distribution of hominins in the more northerly parts of Asia on the one hand, and the southern part of Asia on the other hand.

The first possible route in the northeast of the Iranian Plateau was a corridor that is called "Hezar Masjed–Binalud" by the authors. This corridor encompassed extensive inter-mountain plains, where currently big cities such as Ashkhaneh, Bojnord, Quchan, and finally Mashhad are located. Its northern edge ends at the Hezar Masjed mountain chains, and its southern edge finally leads to the Binalud mountain range and its northern foothills. Its most important (but not the only) water

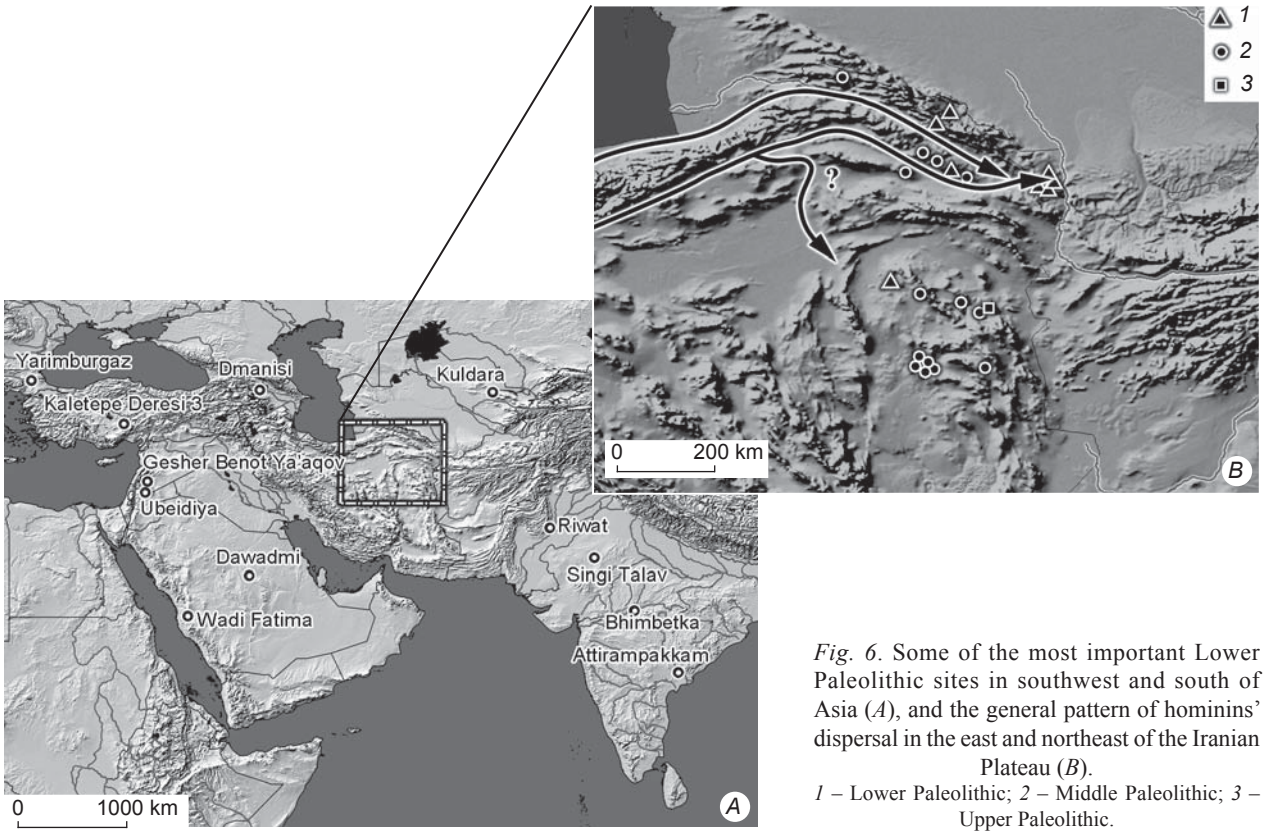

Fig. 6. Some of the most important Lower Paleolithic sites in southwest and south of Asia (*A*), and the general pattern of hominins' dispersal in the east and northeast of the Iranian Plateau (*B*).
1 – Lower Paleolithic; *2* – Middle Paleolithic; *3* – Upper Paleolithic.

source is Atrek River. Although very limited studies have been carried out in the northern parts of the corridor, scattered evidence can be provided from its southern parts, including the Tabarak site in Quchan plain and the open-air site of Kashafrud. Access to abundant water resources, relatively adequate access to raw stone material (river cobbles), and the geographical features of the region, which has acted as a natural corridor, have affected the migration patterns of wildlife (hunting resources) and, consequently, those of the hunter-gatherer groups.

The second corridor is divided into two possibly smaller corridors, encompassing the southern part of the Binalud Mountains and the Joghatai mountain range. The Jajarm-Esfarayen-Neyshabur plains are located in the northern part of this corridor, and the Sabzevar-Neyshabur plains in its southern part (Fig. 6, *B*). The western edge of the corridor can be seen along the northern side of the Central Iranian Plateau, where important Paleolithic sites, including Mirak, Chah-e Jam, and Sufiabad, are located. Its eastern edge passes through the Neyshabur plain and extends towards the Mashhad plain. Unlike the Hezar Masjed–Binalud corridor, this territory is relatively low in height and contains significant deserts and playas in its western part, for example in the Jajarm plain and western part of the Sabzevar plain. The presence of an ophiolite belt in this region has provided significant raw stone material, widely used until the post-agrarian period. The most important sites of this corridor can be seen in the Sabzevar and Neyshabur plains, from among which the evidence of the Lower Paleolithic period has only been identified in the Neyshabur plain; and other pieces of evidence are related to the Middle Paleolithic era, including three sites in the Neyshabur plain and one in the Sabzevar plain.

It should be noted that the two corridors have been considered here with regard to the environmental potential of the region, as well as the little evidence obtained. In order to achieve a much clearer picture, and to approve or rule out the existence of these two routes in the past, more purposeful research should be conducted in the future. In the meantime, the role of the eastern Iranian Plateau in these distributions has to be carefully investigated, an issue that has not been addressed so far owing to lack of evidence.

Conclusions

The northeast of the Iranian Plateau in prehistoric times, particularly in the Paleolithic, still remains unknown. To date, in this extensive and climatically diverse region, no referable sites can be mentioned that can be attributed

to one of the four Paleolithic periods. Looking at the location of the four open-air sites in the Neyshabur plain and other finds discovered in the northeast of the Iranian Plateau so far, two possible routes can be proposed that may have been influential in the distribution of hominins in the region. The first corridor, called Hezar Masjed–Binalud, includes the Ashkhaneh, Bojnord, Shirvan, Quchan, and Mashhad plains, and the second corridor includes the inter-mountain plains between the Binalud and Joghatai mountain ranges, beginning from Jajarm and Esfarayen plains and eventually ending in Neyshabur and Mashhad plains. Moreover, the southern route of the corridor includes the Sabzevar-Neyshabur plain in the southern part of the corridor. Most of the evidence obtained from these areas suggests the high potential of these two corridors for the attraction and dispersion of hominins, despite the fact that Paleolithic finds are only surface data. However, the role of eastern parts of Iran in tracking these patterns remains questionable. There are many uncertainties regarding this issue that can only be resolved by conducting further purposeful studies in the future.

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Materials from Dwelling 2 on Suchu Island, the Lower Amur (1977 Season, Excavation III)

This article presents the final results of excavations at one of the largest Neolithic sites in northeastern Asia—a settlement on Suchu Island on the Amur. Most of the rich collection (3967 spec.), owned by IAET SB RAS (stone tools, ceramics, ornaments, and artistic and ritual artifacts), has not been described before. This publication focuses on the analysis of artifacts from dwelling 2 (excavation III, 1977). We describe the construction of this semi-underground dwelling, circular in plan view. The typological analysis of the lithics indicates a complex economy. Many of them (arrowheads, projectile points, inserts, knives, plummets) relate to hunting and fishing, and to processing carcasses (end-scrapers, scrapers, burins, combination tools), others are chopping tools. The distinctive feature of the lithics is that some are bifacial. The analysis of the ceramics suggests that they belong to the Late Neolithic Voznesenovskoye culture. The use of binocular microscopy allowed us to assess the technological and constructive properties of the ceramics, as well as their morphological, decorative, and functional features. Non-utilitarian artifacts shed light on the worldview of the Suchu people. The collection dates to the mid-second millennium BC.

Keywords: *Amur River, Suchu, Neolithic, culture, dwelling, artifacts, analysis.*

Introduction

In 1977, excavations at the settlement of Suchu (Ulchsky District of the Khabarovsk Territory)* were carried out at a dwelling located on the western elevated end of the island. The working area was chosen in the part of the site that was opposite to the excavation areas of previous years (Okladnikov, Medvedev, Filatova, 2015; Medvedev, Filatova, 2016, 2017, 2018, 2019, 2020).

The excavation, measuring 15 × 15 m, enclosed a dwelling depression with a depth of slightly over 1 m and a diameter of ca 15 m. The northern edge of the dwelling depression extended slightly to the sloping part of the island. The working area, oriented to the cardinal points, was marked out in a grid (1 × 1 m), which was designated from west to east with numbers (1′–1–16), and from south to north with letters (A–P). There were two reference baulks, intersected in the center along lines 9 and И. The

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cultural layer, exposed from the sod to the virgin land on the floor of the dwelling, was subdivided into three arbitrary horizons (up to 60 cm deep, 60–150 cm, floor), for the convenience of find-recording on layer-by-layer plans (Fig. 1, *A–C*). Lithics, household ceramics, jewelry, and objects of art and cult were found in the dwelling. The total number of finds was 3967 specimens. It was the last excavation on Suchu in the 1970s.

Material and methods

The study materials include the archaeological collection (lithics, ceramics, jewelry, objects of art and cult) and field documentation (drawings, diaries, report) deposited at the Institute of Archaeology and Ethnography SB RAS. The methods used were stratigraphy and planigraphy (dwelling), morphotypology (lithics), binocular microscopy (ceramics), and cultural chronology (ceramics, objects of art and cult). The methodology of the analyses of stone tools and ceramics was based on the developments of Russian scientists (Derevianko, Markin, Vasiliev, 1994; Zhushchikhovskaya, 2004; Medvedev, Filatova, 2014; Molodin, Mylnikova, 2015).

Study results

Stratigraphy (Fig. 1, *E–G*) is determined according to the profiles of the baulks and walls.

Baulk profiles along lines 9 and И. Layer 1 is black sod 5–15 cm thick, in some areas up to 25–30 cm thick. Layer 2 is brownish and brownish-yellow loose sandy loam 18–20 cm thick. At the base of the layer (sq. 9/Б), there is a lens of carbonaceous earth. Layer 3 is light-yellow sandy loam up to 80 cm thick, interlain with thin curving stripes of brownish-yellow color. This layer is underlain with lenses of dark carbonaceous sandy loam (sq. 9/А, 9/Р). Layer 4 is dark gray sandy loam enriched with solitary small charcoal pieces and carbonaceous particles. Lenses of dark sandy loam were noted in the filling of the dwelling pit (sq. 3–5/И, 9/К, Л) and at the bottom of the layer (sq. 6–8/И, 9/Б). The virgin land is dense sand enriched with basalt gravel.

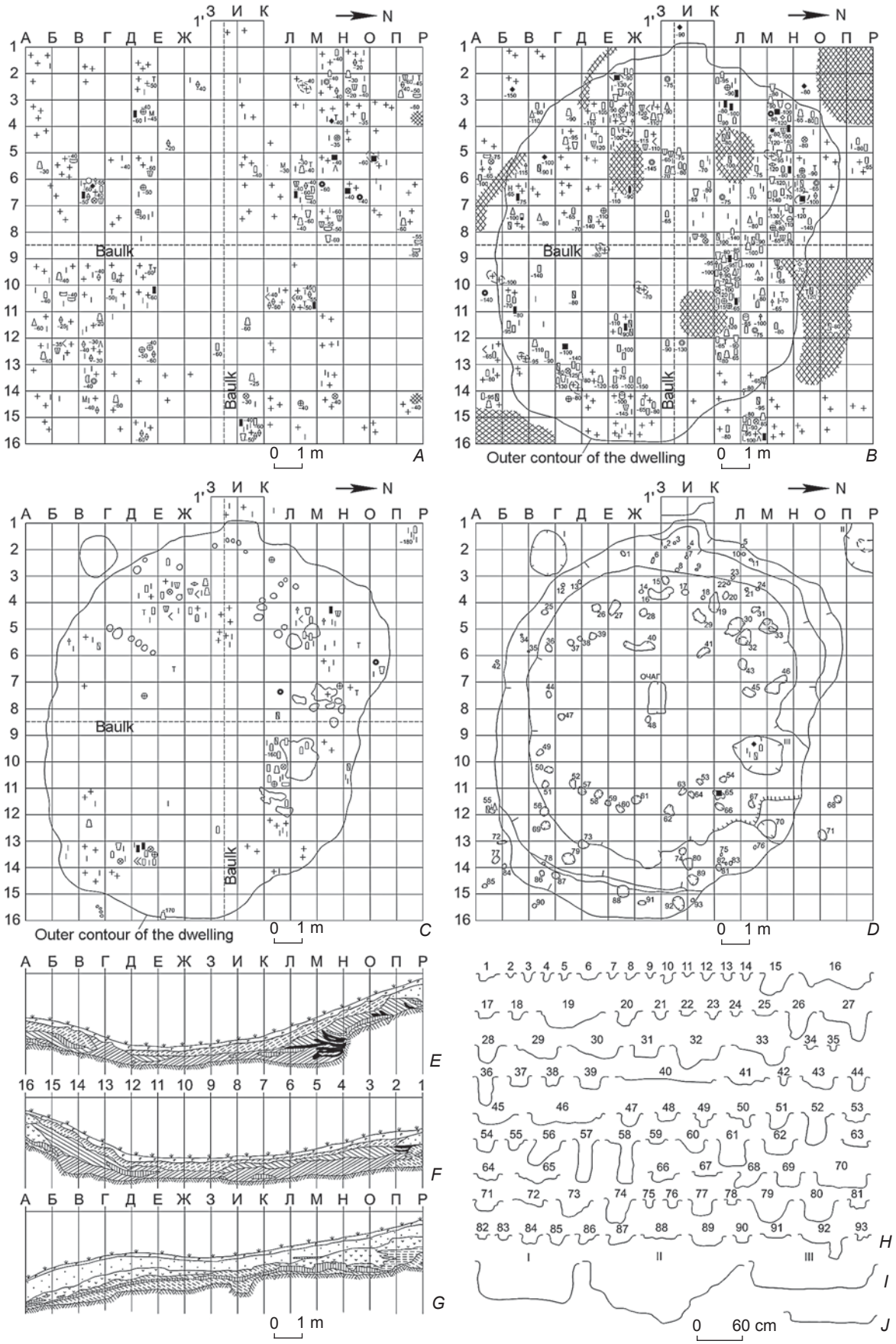
Wall profiles along lines P, 1, and 16. Layer 1 is loose, black sod 8 to 20 cm thick. Layer 2 is brown sandy loam 20–85 cm thick. Layer 3 is light gray sandy loam 25–40 cm thick. Layer 4 is light brown sandy loam up to 60 cm thick, with lenses of dark soil 8–40 cm thick (probably, the buried roof of the dwelling). The virgin land is sand with inclusions of basalt gravel.

Dwelling 2 (Fig. 1, *D*) has an elongated rounded foundation pit at the outer contour and another, almost rounded, at the floor outlines. The foundation is 13 m long along the N-S line, 14.5 m along the E-W line, and 12.4 m along NW-SE line. The floor diameter is ca 10 m. The depth of the pit varies: at the southern wall, it doesn't exceed 60–70 cm; at the eastern and western walls it is from 60 to 100 cm; at the northern wall (higher up the slope) 100–107 cm. The walls of the foundation pit are rather steep, with an angle of inclination from 60º to 70º.

Inside the dwelling, there are ledges—a kind of "couches". The first (lower) ledge, with an average height of 25–30 cm above floor level and width from 100 to 130 cm, runs along the foundation pit with relatively small breaks at the northern wall. The second ledge, rather a narrow "shelf", stretches in the eastern part of the dwelling. The third (top) ledge forms two strips. One of the strips, 100–150 cm wide and 9 m long is recorded in the eastern and southeastern parts of the pit; the other, 50–150 cm wide and almost 10 m long, in the northern, northwestern, and western parts. At the top of the western wall, there is a niche 90 cm wide and 120 cm long. The floor of the dwelling is relatively flat; a slight rise is noticeable in its western half. In the center of the dwelling, there was a hearth in a rectangular pit with rounded corners and a flat bottom 120 cm long, 60 cm wide, and up to 18 cm deep (Fig. 1, *J*). Therein, birch-bark pieces were found.

The excavation area revealed 96 pits, mainly within the dwelling, with only eleven pits (42, 55, 68, 71, 72, 77, 84, 85, 90, I, and II) outside the dwelling (Fig. 1, *D*). Most pits are rounded or oval in plan view; some of them are strongly elongated or eight-shaped. The pit diameters vary from 6–9 to 64–74 cm, on average 20–40 cm; depth from 6–10 to 59–62 cm, on average 30–40 cm (Fig. 1, *H*). The pit bottoms are often conical; less common

Fig. 1. Plans of excavation III (1977) at the levels of the upper layer (*A*), filling (*B*), and floor (*C*) of dwelling 2, virgin land (*D*), baulk profiles along lines 9 (*E*) and И (*F*), walls along line 1 (*G*), profiles of postholes (*H*), household (*I*) and hearth (*J*) pits.
1 – adze; *2* – chisel; *3* – scraper-knife; *4* – knife; *5* – insert; *6* – burin; *7* – knife-like blade; *8* – arrowhead/projectile point; *9* – notched tool; *10* – borer; *11* – end-scraper; *12* – side-scraper; *13* – "nosed" tool; *14* – combination tool; *15* – plummet; *16* – mace; *17* – grinder; *18* – grinding stone; *19* – hoe; *20* – sharpener; *21* – anvil; *22* – polisher; *23* – shaft straightener; *24* – combination tool; *25* – hammerstone-pressure stone; *26* – tool blank; *27* – core; *28* – core-like flake; *29* – flake; *30* – flaked pebble; *31* – lithic artifact; *32* – bead; *33* – button; *34* – spindle whorl; *35* – clay figurine; *36* – ceramic rod; *37* – ceramics; *38* – vessel (collapsed); *39* – pendant; *40* – depth from modern surface; *41* – pit; *42* – spot; *43* – sod; *44* – light brown sandy loam; *45* – dark, almost black soil, saturated with carbonaceous mass; *46* – yellowish-dark sandy loam; *47* – dark sandy loam with fine charcoal pieces; *48* – ancient buried soil layer; *49* – light gray sandy loam; *50* – yellow loam; 51 – brownish yellow sand; *52* – light yellow sandy loam; *53* – brown sandy loam; *54* – virgin land.


А Б В Г Д Е Ж З И К Л М Н О П Р
1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16
N
Baulk
0 1 m
A
B
Outer contour of the dwelling
C
D
E
F
G
H
I
J
0 60 cm
1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16
17 18 19 20 21 22 23 24 25 26 27
28 29 30 31 32 33 34 35
36 37 38 39 40 41 42 43 44
45 46 47 48 49 50 51 52 53
54 55 56 57 58 59 60 61 62 63
64 65 66 67 68 69 70
71 72 73 74 75 76 77 78 79 80 81
82 83 84 85 86 87 88 89 90 91 92 93
I II III
1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16
17 18 19 20 21 22 23 24 25 26 27
28 29 30 31 32 33 34 35
36 37 38 39 40 41 42 43 44
45 46 47 48 49 50 51 52 53
54 55 56 57 58 59 60 61 62 63
64 65 66 67 68 69 70
71 72 73 74 75 76 77 78 79 80 81
82 83 84 85 86 87 88 89 90 91 92 93
I II III
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are flat, cup-shaped, or stepped bottoms. The walls are steep or vertical, a few walls are sloping. Most of the pits were used as postholes. These were located mainly along the walls of the foundation pit. Three depressions (Fig. 1, *I*) are attributed to household or storage pits. Pit I adjoined the dwelling on the southwestern side. It is oval in shape, measuring 164 × 140 cm, and 50 cm deep (in virgin land). Pit II, 100 cm deep, was cleared in the northwestern corner of the excavation area, at a distance of 1.4 m from the dwelling. Its bottom is uneven and stepped. The pit was filled with dark, almost black soil, saturated with a carbonaceous mass; above and below it there were laminations of light brown sandy loam. Pit III is almost rounded, ca 150 cm in diameter. It was located in the northern part of the dwelling, in the place where the first ledge broke off. It was filled with dark soil, with an admixture of coal, containing solitary potsherds and flakes.

Dwelling 2, uncovered in excavation III in 1977, with a total area of 140 m^2; doesn't generally differ in its design features from other dwellings of the Voznesenovskoye culture that were later found on Suchu Island (Derevianko et al., 2003; Medvedev, 2005).

The stone inventory numbers 837 items. Various rocks were used, mainly small (5–10 cm) and large pebbles (10–15 cm); more rarely medium-sized (15–25 cm) and large boulders (25–35 cm**)**.

The toolkit (54 spec., 6.5 % of the lithic collection) includes 26 grinding stones (14 intact and 12 fragments), 4 polishers, 2 hammerstones, an anvil, a tool for sharpening blades, and a fragment of shaft-straightener, as well as combination tools: 13 grinding stone-anvils (7 intact and 6 fragmented), 3 grinder-anvils-hammerstones (1 intact and 2 fragmented), anvil-polisher, pressure stone-polisher, and a fragment of an anvil-hammerstone. These artifacts were found in the uppermost layer (n=20), in the filling (n=18), on the floor (n=14) of the dwelling, and outside (n=2) the dwelling. Working surfaces of abrasive stones show signs of tool grinding and straightening; anvils show use-wear signs in the form of small pits and dents. The working ends of the hammers are chipped and worn out; those of polishers are smoothed and polished. The blanks were usually sandstone tablets and siltstone pebbles of various shapes and sizes.

The category of core-like forms (34 spec., 4.1 % of the lithic collection) includes 22 micronuclei and 12 core fragments; these were found in the uppermost layer (n=13), in the filling (n=9), on the floor (n=9) of the dwelling, and outside (n=3) the dwelling. Microcores are narrow-faced (n=17), wedge-shaped (n=4), and one conic-shaped. Five narrow-faced cores have two platforms, the rest are single-platform. The bases are often sharpened, some are backed; the platforms are mainly natural and plain; some platforms show longitudinal rejuvenation and faceting. The narrow sides bear negative scars of flake removal, including lamellar flaking; the lateral sides bear scars of detachment of knife-like blades, flakes, and chips. The sizes of micronuclei are from 1.9 × 2.2 × 1.3 to 4.3 × 3.2 × 1.5 cm. Core-like fragments are narrow-faced (n=6), wedge-shaped (n=5), and one sub-prismatic. The vast majority are single-platform (n=9); some bear two (n=2) or three (n=1) platforms. Sizes of core-like fragments vary from 1.3 × 2.3 × 0.4 to 5.0 × 2.2 × 1.6 cm. Microcores were mainly fashioned on jasper, less often chalcedony or siliceous pebbles.

The industry of spalls (435 spec., 51.9 % of the lithic collection) is represented by flakes, blades, and by-products. Flakes (332 spec., 39.6 % of the lithic collection, 76.3 % of the spall industry) were found in the uppermost layer (n=111), in the filling (n=150), on the floor (n=55), in pits (n=4) of the dwelling, and outside (n=12) the dwelling. The majority of the spalls are medium-sized (66.7 %*). The most numerous are elongated spalls (50.6 %). Residual striking platforms are mainly straight (52.7 %) or convex (25 %), less often mid-convex (22.3 %). They are mainly punctiform (25.3 %), natural (22.7 %), or faceted (18.3 %), less often plain (15.0 %), with a longitudinal rejuvenation (11.7 %), or dihedral (6.3 %); few linear platforms were also recorded (0.7 %). Dorsal faceting of the flakes is predominantly irregular (23.0 %) or longitudinal unidirectional (22.7 %), less often orthogonal (15.7 %), bidirectional (15.3 %), radial (10.0 %), or dorsal-plain (9.7 %). The share of intact flakes retaining natural crust all over the surface is 8.3 %; those with partial natural crust 37.0 %.

Blades (19 spec., 2.3 % of the lithic collection and 4.4 % of the industry of spalls) were found in the uppermost layer (n=8), in the filling (n=6), on the floor (n=4) of the dwelling, and outside (n=1) the dwelling. They are medium-sized (3.4 %) or small (0.9 %), mainly with the punctiform (73.7 %) residual striking platform. Dorsal faceting is mainly longitudinal unidirectional (42.1 %) or irregular (26.3 %). There are specimens (42.1 %) retaining natural surface.

By-products (84 spec., 10.0 % of the lithic collection and 19.3 % of the industry of spalls) include 17 knapped pebbles, 12 spalls, and 55 fragments; these were recovered from the uppermost layer (n=35), from the filling (n=25), on the floor (n=15), in the pit (n=1) of the dwelling, and outside (n=8) the dwelling.

The toolkit comprises 312 specimens (143 intact, 61 fragments, 105 blanks, and 3 fragments of blanks, which is 37.3 % of the lithic collection). The artifacts were found in the uppermost layer (n=82), in the filling (n=159), on the floor (n=47), in the pits (n=4) of the dwelling pit, and outside (n=20) the dwelling.

*Hereinafter (including blades) – percentage of the industry of spalls.

Projectile tools (projectile points and arrowheads) were found in the uppermost layer (n=1), in the filling (n=4), in the pit (n=3) of the dwelling, and outside (n=1) the dwelling. The blanks were mainly jasper and siliceous pebbles, more rarely flakes of the same rocks. Projectile points (2 spec.: an intact one and a blank fragment; 0.6 %) are bifaces with willow-leaf shape in plan view and lenticular in cross-section, with stemmed base. The flat surfaces were prepared by flattening flaking and flattening invasive retouch, the edges with subparallel and parallel semi-steep retouch. The dimensions of the intact product are 7.2 × 1.7 × 0.7 cm. Arrowheads (7 spec.: 4 intact, 3 fragments; 2.2 %) are bifaces elongated subtriangular in plan view, lenticular in cross-section, with notched base, and bifaces foliate in plan view, lenticular in cross-section, with stemmed base, as well as tools on flakes—subtriangular (with slightly concave or convex lateral sides) in plan view, flattened in cross section, with notched base. The bifaces are characterized by flat sides fashioned with flattening flaking and covering retouch, the edges were prepared by bilateral parallel flat or semi-steep retouch. The sides of the arrowheads on flakes were fashioned with parallel and subparallel flat retouch, the edges with fine marginal retouch. The dimensions range from 2.0 × 1.3 × 0.3 to 4.3 × 1.5 × 0.5 cm.

Cutting tools (knives and inserts) were found in the uppermost layer (n=16), in the filling (n=38), on the floor (n=9), in the pit (n=1) of the dwelling, and outside (n=3) the dwelling. Jasper and chalcedony, less often siliceous and silty pebbles and flakes, were used as blanks. Knives (34 spec.: 21 intact, 9 fragments, and 4 blanks; 10.9 %) are bifaces of leaf-shaped, elongated-suboval or subrectangular shape in plan view, and lenticular in cross-section ("meat knives"); and asymmetric cranked in plan view, and flattened-lenticular in cross-section ("fish knives"); as well as tools made on flakes or spalls, leaf-shaped, asymmetric rhomboid or cranked in plan view, lenticular or flattened sub-triangular in cross-section (Fig. 2, *20–24*). The flat sides of the bifaces were fashioned with flattening flaking; with covering, extended and invasive, parallel and subparallel, semi-steep or flat retouch; the edges with marginal, parallel and sub-parallel, invasive or distributed, semi-steep or flat bifacial retouch. The back is usually worked with bifacial spall removals. The edges and handle of the knives made on flakes bear signs of marginal, subparallel, contiguous retouch on the dorsal and ventral faces. The sizes of intact items range from 2.3 × 2.1 × 0.2 to 5.5 × 1.1 × 0.4 cm. Inserts (23 spec.: 16 intact, 6 fragments, and a blank; 7.4 %) are bifaces, rectangular in plan view and lenticular in cross section (Fig. 2, *7–19*). Their flat sides are worked with covering, extended, parallel and subparallel, flat or semi-steep retouch, the edges with fine, marginal, invasive, and subparallel flat retouch. Sizes range from 1.1 × 0.8 × 0.2 to 4.9 × 1.3 × 0.5 cm.

Chopping tools and woodworking tools (adzes, a chisel and a scraper-knife) were found in the uppermost layer (n=13), in the filling (n=17), on the floor (n=4) of the dwelling, and outside (n=3) the dwelling. Adzes (35 spec.: 12 intact, 22 fragments, and a blank; 11.2 %) are elongated subtrapezoidal in plan view and in cross-section, subrectangular in plan view, rectangular or lenticular in cross section, elongated subtriangular in plan view and lenticular in cross section (Fig. 2, *25–29*). These are fashioned with trimming, grinding, and sharpening. The backs are pointed or beveled. Asymmetrically sharpened working edges mostly show signs of wear; few tools do not show use-wear signs. The sizes of intact products vary from 5.2 × 3.4 × 1.2 to 19.0 × 6.1 × 4.1 cm. These tools were made on siltstone pebbles. The chisel (0.3 %) was made of a siltstone pebble (13.8 × 3.4 × × 2.2 cm), leaf-shaped in plan view and subrectangular in cross-section. There are dents on the dorsal and ventral surfaces; lateral edges show negative scars and indentations. All the surfaces are polished, the sides are sharpened. The back is asymmetrically narrowed and sharpened with stepped spall removals. The scraper-knife (0.3 %) is a bifacially flaked jasper pebble (4.2 × 2.2 × × 0.5 cm), semicircular in plan view and lenticular in cross-section, with a slightly concave working edge fashioned with subparallel semi-abrupt retouch.

Adze-side-scraper-like tools (2 spec., 0.6 %) were found in the uppermost layer. They were made on siltstone pebbles (9.3 × 5.7 × 2.8 and 9.2 × 6.6 × 2.8 cm), sub-oval in plan view and lenticular in cross-section. The tools show signs of trimming. Their working edges have use-wear signs and indentations.

Scrapers, side-scrapers, and a core-side-scraper-like tool were found in the uppermost layer (n=21), in the filling (n=58), on the floor (n=19) of the dwelling, and outside (n=10) the dwelling. End-scrapers (97 spec.: 27 intact, 70 blanks; 31.1 %) vary in shape: end variety, beveled, lateral, angular; double-ended; end-lateral, end-angular, end-beveled; double-ended beveled, double-ended lateral; and angular lateral varieties. Their working edges were formed with transverse and stepped, parallel and subparallel, vertical, steep and semi-steep flaking, and with marginal, stepped, covering and invasive, parallel and subparallel, less often discontinuous retouch. The sizes of the intact tools range from 2.1 × 2.2 × 0.8 to 5.8 × 3.9 × 1.0 cm. These tools were fashioned on pebbles, flakes, or spalls (including lamellar), less often blades. The rocks used were mainly siliceous (jasper, flint, and chalcedony); siltstone, sandstone, granitoid, and quartzite. Side-scrapers (10 spec.: one intact tool and 9 blanks; 3.2 %) include the following types: simple transverse straight and convex, longitudinal convex, and longitudinal-transverse straight; these are suboval or subtrapezoidal in plan view, lenticular, subtriangular, or rectangular in

Fig. 2. Lithics.
1–4 – retouched flakes; *5*, *6* – retouched blades; *7–19* – inserts; *20–24* – knives; *25–29* – adzes; *30* – digging tool; *31* – grinder fragment.

cross-section. Their working edges are prepared with marginal, stepped, longitudinal or transverse, vertical and steep removals. The tools were made on siltstone, granitoid, and sandstone pebbles and tablets, often on whetstones fragments. The size of the intact tool is 9.3 × 5.7 × 2.8 cm. The core-side-scraper-like tool (0.3 %) is sub-oval in plan view and sub-triangular in cross-section. It was made on a siltstone pebble (6.5 × 4.5 × 2.1 cm). The ordinary longitudinal side-scraper with opposing blades shows signs of wear. The lateral sides were prepared by bifacial, marginal retouch.

Borers (16 spec.: 10 intact, 6 blanks; 5.1 %) were found in the uppermost layer (n=3), in the filling (n=9), on the floor (n=3) of the dwelling, and outside (n=1) the dwelling. They were made mainly on flakes and spalls of siliceous rocks and siltstone. There are median, angular, double median, and mid-angular, as well as triple mid-angular borers, mainly leaf-shaped and sub-triangular in plan view, sub-triangular, sub-trapezoidal, and lenticular in cross-section. The tips were fashioned mainly with bilateral, marginal, subparallel and parallel, semi-steep and flat retouch. Sizes range from 2.0 × 0.7 × 0.5 to 4.7 × 2.5 × 0.9 cm.

Combination tools (17 spec.: 11 intact, 6 blanks; 5.4 %) were recovered from the uppermost layer (n=4), filling (n=11), and from the floor (n=2) of the dwelling. There are combinations of two (scraper-borer, scraper-burin, scraper-notched tool, knife-borer) and three (knife-borer-notched tool, knife-insert-saw, scraper-notched tool-"nosed" tool, scraper-knife-burin, scraper-borer-burin) types of tools. Blanks were mainly jasper, chalcedony, and flint pebbles, flakes, and spalls.

Miscellaneous tools (37 spec.; 11.9 %) (8 grinding stones in fragments, 2 grinders, 4 digging tools, 8 mace pommels (1 intact, 5 fragments, 2 blank fragments), a notched tool, a plummet, and a "nosed" tool blank, as well as 7 blanks and 5 fragments of tools of indeterminate purpose) were found in the upper layer (n=20), in the filling (n=10), on the floor (n=5) of the dwelling, and outside (n=2) the dwelling. Fragments of grinding stones are sandstone tablets (sizes range from 3.8 × 2.9 × 2.6 to 13.0 × 9.5 × 2.7 cm) with broad smoothed sides, on which thin trace-like scars are observed. Grinder is a basalt pebble, rounded in plan view and lenticular in cross section (11.1 × 10.2 × 7.0 cm). Its entire surface was carefully leveled up. A fragment of the grinder is a sandstone slab, segment-shaped in plan view and sub-rectangular in cross-section (Fig. 2, *31*). Digging tools are made of granite and sandstone tablets (10.4 × 6.8 × × 1.7 cm), elongated, subrectangular or subtrapezoidal in plan view and flattened-subrectangular in cross-section. The blades bear traces of use-wear (Fig. 2, *30*). The basalt and granitoid mace pommels (sizes range from 8.3 × 5.3 × 5.2 to 15.0 × 7.8 × 7.0 cm) are subovoid or semicircular in plan view, subovoid in cross-section, with smoothed and polished surfaces and biconical holes. The notched tool is fashioned on a flint flake (4.4 × 3.7 × 0.4 cm); it is diamond-shaped in plan view and flattened sub-triangular in cross-section. The notch was made by stepped retouch on the edge opposite of the striking platform.

Retouched flakes (24 spec.: 7.7 % of the lithic collection) were found in the uppermost layer (n=11), in the filling (n=9), and on the floor (n=4) of the dwelling. Intact specimens are mostly elongated (3.4 %*), medium-sized (4.6 %) items made of jasper, chalcedony, and flint, less often of siltstone (Fig. 2, *1–4*). In most cases, fine, marginal, discontinuous, parallel or stepped retouch is located on the longitudinal or distal edge of the piece.

Retouched blades (spec. 5, 1.6 % of lithic collection) were found in the uppermost layer (n=1), in the filling (n=3), and on the floor (n=1) of the dwelling. These are medium-sized (0.5 %) and small (0.7 %) items made of jasper; few siltstone items were also recorded (Fig. 2, *5*, *6*). Residual striking platforms are plain (40 %), punctiform (40 %), and faceted (10 %). Faceting of the dorsal surface is longitudinal unidirectional (40 %), bidirectional (20 %), radial (20 %), and irregular (20 %).

The main techniques of secondary working were retouching, grinding, polishing, and sharpening. The main types of retouch used were: marginal (59.2 %)**, steep (5.4 %), semi-steep (8.5 %), and flat (9.2 %); parallel (40.8 %) and sub-parallel (17.7 %), covering (13.8 %) and invasive (3.8 %), stepped (9.2 %) and continuous (3.1 %), discontinuous (19.2 %) and sharpening (6.2 %); bifacial (11.5 %), contiguous (6.2 %) and alternate (4.6 %); small- (32.3 %), medium- (3.1 %) and large-faceted (5.4 %).

The set of typologically clear items is dominated by the tools associated with capture and processing of hunting and fishing products: knives and inserts (6.8 %), projectile points and arrowheads (1.1 %), mace pommels and plummets (1.1 %); end-scrapers and side-scrapers (12.8 %), combination tools (2.0 %), and borers (1.9 %). In addition, there are quite a large number of chopping tools and wood-working tools (adzes, chisels, and scraper; 4.4 %), as well as digging tools (0.5 %) and tools for grain processing (grinding stones and grinders; 1.2 %). These data taken together testify to the complex nature of the economy of the inhabitants of the dwelling. The main activities were hunting, fishing, and gathering.

The lithic tool collection also includes two disc-shaped spindle whorls made of siltstone and fine-grained

*Hereinafter (including blades), in the industry of spalls.

**Hereinafter, of the total number of retouched items (n=226) in the collection.

sandstone through grinding. One of these was found in the uppermost layer, the other in the filling of the dwelling (Fig. 3, *8*).

Household ceramics include 3110 specimens. The overwhelming majority (3028) is attributable to the Voznesenovskoye culture (Fig. 4). These are clay vessels (3) and their parts (244 upper, 22 lower, an upper and a lower of a single item, 8 side pieces, 165 rim fragments, 2451 walls, and 126 bottoms), and spindle whorls (three intact and five fragments), of which one shows a carved linear pattern. Slightly more than a third of the samples (1,326 specimens, 43.8 %) do not bear ornamentation. The Voznesenovskoye ceramics were found in the uppermost layer (n=1035), in the filling (n=1295), on the floor (n=215), in the pits (n=56) of the dwelling, and outside (n=427) the dwelling.

Examination with a binocular microscope showed the presence of freshwater mollusk (shells and body) in the paste; in some samples, additives of sand (22), grus (31), and chamotte (4) were also recorded. The inorganic additives suggest experiments with the paste composition aimed at improving the properties of ceramic products.

Vessels were predominantly formed by the bottom-to-body coiling technique. The rim coils are 1.0–1.5 cm wide, the body coils are 5–7 cm wide, and the bottom ones are 3–4 cm wide. The inner and outer surfaces were rubbed, smoothed, polished (rarely), and covered with engobe. There are mainly medium and large closed vessels with well-profiled necks. The diameter of the rim (mouth) of medium-sized vessels is in the range from 10 to 15 cm, that of large vessels from 20 to 30 cm; the body diameters are 15–20 and 20–30 cm, respectively; bottoms from 5–10 to 15 cm. The medium-sized items are from 10 to 15 cm high, large ones from 20 to 30 cm. The rims are 0.8–1.0 cm thick; walls 0.5–0.8 cm; bottoms 0.8–1.2 cm thick. There are also three miniature vessels, ranging in height from 2.3 to 6.7 cm. The rims are most often bent outward, straight rims are less common; the mouth edge is sharpened or rounded. The bottoms are flat.

The vessels are ornamented with vertical and horizontal zigzags; horizontal, vertical or oblique lines; angles, triangles, a grid of comb imprints, cogged wheels, and pricks. The motif of arcs and circles made with carved lines and grooves was also recorded. The bodies of some vessels are plain. The rims were formed with appliqué coils, decorated with comb imprints, pricks and incisions on top. The rims with cannelures were also noted.

Firing was carried out with the use of redox baking mode (650–700 °C). This is evidenced by the color of the sherds: light gray, yellowish-gray, yellow-brown, gray-brown, light and dark orange on the outside; and light brown and brown, gray and dark gray on the inside and in fractures. Fragments and intact vessels are often covered with soot and carbon deposits.

In general, the Voznesenovskoye ceramics form a consistent complex, correlated with the late stage of the culture's development.

The collection also contains 82 vessels from other cultural traditions: the Mariinskoye of the Early Neolithic

Fig. 3. Clay (*1–7*, *9*) and lithic (*8*) artifacts.
1–6, 9 – small vessels; *7* – ring fragment; *8* – spindle whorl.

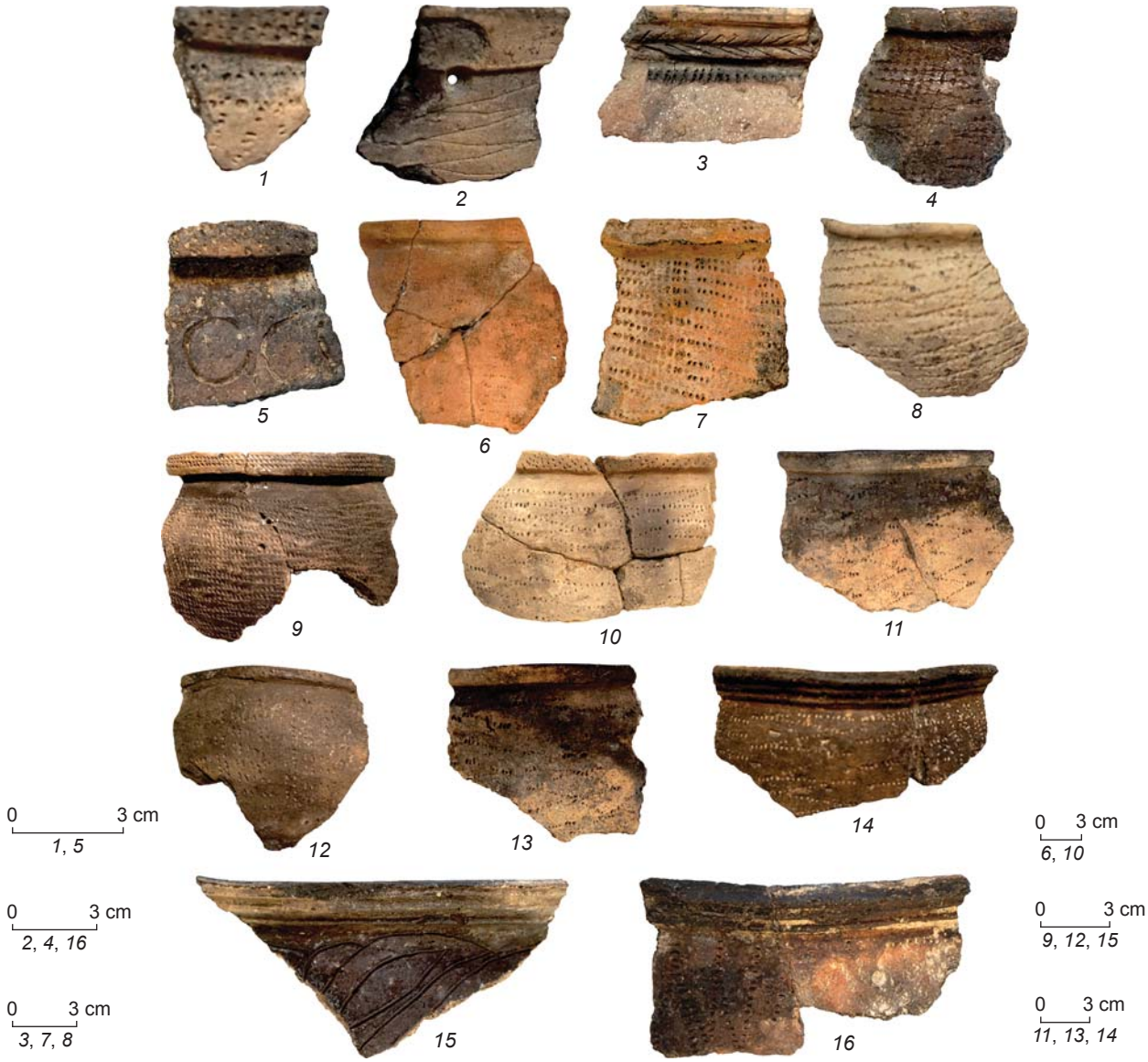

Fig. 4. Voznesenovskoye ceramics.

(2 rim fragments) (Medvedev, 2008), the Kondon (10 walls and 2 bottoms), and the Malyshevo (7 rims, 46 walls, 3 lower parts, and 5 bottoms) cultures (Medvedev, 2006, 2017), the Belkachi cultural type of the Middle Neolithic (fragment of the vessel wall), the Sedykh Late Neolithic culture of Sakhalin Island (2 fragments), and the Poltse culture of the Early Iron Age (4 fragments). These were found in the uppermost layer (n=22), in the filling (n=30), on the floor (n=12) of the dwelling, and outside (n=18) the dwelling.

After disposal of ceramic vessels, their fragments could have been used for various purposes. The ceramic collection contains scrapers (n=22), a polishing scraper, blanks for scrapers (n=1137) and their fragments (n=2), and blanks for spindle whorls (n=4). Most of these (94.6 %) belong to the Voznesenovskoye culture. End-scrapers, beveled scrapers, and flake scrapers; beveled end-scrapers, flake end-scrapers, beveled flake scrapers; double-beveled, double-ended, and double-ended beveled varieties were identified. The working edges of the scrapers show use-wear signs.

Personal ornaments, objects of art and cult make up a group of 20 specimens: clay items—eight fragments of sculptures, a fragment of a rod, a part of a ringlet, eight small vessels; stone items—a figurine of a seal (presumably), a button and two beads, and a fragment of a pendant made of mother-of-pearl. These items were found in the uppermost layer (n=7), in the filling (n=9), in the utility pit III (n=1) of the dwelling, and outside (n=3) the dwelling.

Of the eight fragments of clay sculptures, only one fragment was definitely identified as the lower part

of a female figurine, sub-trapezoidal in plan view and subtriangular in cross section. One of its wide surfaces is plain; the opposite side shows a grid of incised lines. A part of a ceramic rod is sub-rectangular in plan view and in cross-section; its dimensions are 3.2 × 3.4 × × 1.65 cm. A little less than half of a ring, with a diameter of 3.0 cm and a thickness of 0.7 cm, was found (see Fig. 3, *7*). The cult objects include five almost intact miniature flat-bottomed vessels, with an average height of 2.0–3.0 cm (see Fig. 3, *1–4*, *6*), a vessel with a slightly protruding handle (see Fig. 3, *9*), and two items with paired containers, one of which is practically intact (see Fig. 3, *5*), and the other has preserved only one container. The first item shows a round hole in the crosspiece, 0.4 cm in diameter, made before firing. This unique find could be classified as scales.

The relatively few non-utilitarian items, including miniature vessels, apparently associated with certain rituals, reflect the features of the spiritual and intellectual sphere of the inhabitants of this dwelling, and in general, the bearers of the Voznesenovskoye culture.

Conclusions

The analysis of the spatial distribution of dwelling 2 indicates the main features of its design: large dimensions (ca 15 m in diameter), a rather deep foundation pit, the presence of ledges-"benches", "shelves" and niches in the pit walls, a circular arrangement of postholes in the floor of the dwelling. Externally, the dwelling had a shape that most likely resembled a truncated pyramid.

The lithic collection includes tools associated with hunting, fishing, and processing of the game, as well as with digging works and processing plant fruits; this suggests that the inhabitants of the dwelling were engaged in a complex economy, in which the main activities were hunting, fishing, and gathering—traditional economic activities in the Amur Neolithic. A distinctive feature of the lithic collection is a significant number of bifacial tools.

The results of the analysis of the ceramics indicate their cultural and chronological affiliation to the late stage of development of the Neolithic Voznesenovskoye culture, as well as the influence of the traditions of population of the northern mainland and eastern island regions, starting from the Middle Neolithic (late 5th to early 4th millennium BC) and up to the terminal stages of the culture's existence. Notably, binocular microscopy has shown the likelihood of experiments with pastes to improve the quality of ceramics.

Personal ornaments, objects of art and cult, although relatively few in number, nevertheless represent certain aspects of the spiritual and intellectual life of the inhabitants of the dwelling and the bearers of the Voznesenovskoye culture in general.

This publication concludes our series of papers describing the excavations of Neolithic settlements on Suchu Island in the 1970s. We believe that the presented results of the study of dwelling 2 in excavation III, its lithic collection, ceramics, personal ornaments, and objects of art and cult noticeably supplement scientific knowledge about the Late Neolithic of the Lower Amur Region and contiguous territories. The derived data suggest the age of the dwelling as mid-2nd millennium BC.

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Results of Radiocarbon Dating of Early Burials in the Firsovo Archaeological Area, Barnaul Stretch of the Ob

An especially noteworthy part of the Firsovo archaeological area is a group of early burials at the flat-grave cemeteries Novoaltaisk-Razvilka, Firsovo XI, and Firsovo XIV. Nine radiocarbon dates have been generated for those cemeteries at various laboratories: two by the liquid-scintillation (LSC) method and seven using the accelerator mass spectrometry (AMS) method. The dates were calibrated using OxCal version 3.10 software. Dates for the Chalcolithic Bolshoy Mys culture burials at Novoaltaisk-Razvilka and Tuzovskiye Bugry-1 burial 7 match the previously suggested ones (around 3000 BC). Certain Neolithic burials in the Altai differ from others in the position of the bodies (flexed on the side). They were dated to the late 5th to the early 4th millennia BC by the AMS method. Burials belonging to the "cultural core" of Firsovo XI, then, fall within the Early Neolithic (68 % interval, 5710–5460 BC; 95 % interval, 5740–5360 BC). The date 9106 ± 80 BP (GV-02889), obtained for Firsovo XI burial 18, may be somewhat accurate, pointing to the Final Mesolithic or Early Neolithic. Both the date and the cultural characteristics of this burial (sitting position, abundant ocher) are accompanied by the craniometric distinctness of the male cranium (huge total size).

Keywords: *Flat-grave burial ground, Final Mesolithic, Early Neolithic burial, Middle Neolithic, Chalcolithic.*

Introduction

The Firsovo archaeological area (hereafter, the FAA) is located on the right bank of the Ob River, opposite the city of Barnaul. It stretches out in a narrow strip along the low bedrock bank of the Ob for about 15 km from the southern outskirts of Novoaltaisk to the village of Lesnoye. The village of Firsovo, around which the majority of the known sites in the district are concentrated, is in the center of this area, located between two woodlands on the main part of the right bank region of the Ob River. A steppe section joints the Ob River in that area, optimally combining conditions favorable both for appropriating (hunting and fishing) and producing (cattle breeding and agriculture) economies. The bank of the Ob River in this place is a

wide (up to 7 km) swampy floodplain with many oxbow lakes, which are interspersed with low wooded ridges and residual hillocks of the valley wall. The vegetation is of the meadow type, with thickets of shrubby willows, aspens, and birches. During floods, the water in the Ob River rises by 1.5–3.0 m, almost completely flooding the floodplain and coming close to the valley wall upon which the sites are located.

In the late 1970s to early 1980s, A.L. Kungurov, V.B. Borodaev, and A.B. Shamshin discovered over twenty sites in the main core of the FAA (Kungurov, 2006: 346). From 1984 to 1997, excavations at several reference archaeological sites were conducted by Shamshin, which allowed him to sum up the information on the Bronze Age of the area (Ibid.: 347–352). The FAA is unique because of the concentration of over twenty sites from the Neolithic to the Middle Ages in a limited area. Nine large sites, many of which are multi-layered complexes of different periods, have been excavated over large areas. A group of Stone Age and Chalcolithic burials at the flat-grave cemeteries of Novoaltaisk-Razvilka, Firsovo XI, and Firsovo XIV is of particular interest (Fig. 1).

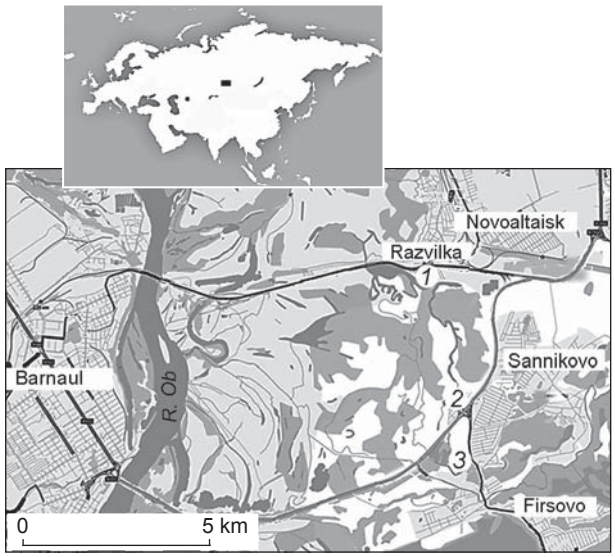

Fig. 1. Flat-grave cemeteries of Novoaltaisk-Razvilka (*1*), Firsovo XI (*2*) and XIV (*3*).

Research results

The **Novoaltaisk-Razvilka** flat-grave cemetery was discovered in 2005 in Novoaltaisk, on Repnina Street, in the precipice of the floodplain terrace on the right bank of the Ob River. Burial 2 was found at a depth of 0.42 m from the present-day surface. The grave spot was not visible. In the course of excavations, an incomplete skeleton of a 15–16-year-old boy buried in an extended supine position (with arms along his body), with his head to the north, was unearthed. The grave goods included stone and bone items: a pendant made of a badger tusk with a hole drilled in the root, a bird bone, a ribbed spall, a flake, rectangular ornaments made from shells of large river mollusks, a polished stone chisel, an animal vertebra, beaver incisors, and an ornamented needle-case made of radial bird bone. Trace analysis of the bird bone revealed that ornamentation was made with a metal knife used as burin (Kiryushin et al., 2006: 224). During the unearthing, a fragment of Bolshoy Mys pottery decorated with imprints of a smooth rocking stamp (Ibid.: Fig. 1, *6*) was found at the level of the grave spot to the east of the skeleton. Two radiocarbon dates were obtained from the bones of the person from burial 2. The date of 5000 ± 150 BP (Le-7425) was obtained in the Radiocarbon Laboratory at the Institute for the History of Material Culture of the RAS (IHMC RAS), and the date of 4525 ± 95 BP (SOAN-6863) was obtained in the Laboratory of Cenozoic Geology and Paleoclimatology at the Institute of Geology and Mineralogy of the SB RAS (IGM SB RAS).

At **Firsovo XI**, eight burials were discovered, which were originally attributed to the Bolshoy Mys culture of the Chalcolithic (Kiryushin, 2002): five single, two paired, and one collective. The depth of the graves ranged from 0.4 to 1.7 m. The deceased were placed with their heads to the north and northeast. This study analyzes four burials, from which samples for radiocarbon dates were taken (see *Table*).

Grave 14 was the richest burial at this necropolis. It partially disturbed burial 15. The grave spot was not visible. The bones of two people placed "shoulder to shoulder" were found at a depth of 0.8 m from the present-day surface. Skeleton 1 belonged to a male (age 20–30), and skeleton 2 presumably to a young female (age 18–20). The skeletons were poorly preserved. Both of the deceased were buried in an extended supine position, with their heads to the north, with their right hand palms down lying along the bodies, and the left hand palms up over their pelvises. The grave goods included numerous bone and stone items. Sewn-on animal teeth with holes drilled in the roots covered most of the skeletons (Shmidt, Shamshin, 2018: 60–63). The date of 7222 ± 82 BP (GV-02887) was obtained from the fragment of the ulna of skeleton 1 at the Center for Collective Use of the Accelerator Mass Spectrometry (AMS) Complex at the Novosibirsk State University, Novosibirsk Scientific Center (hereafter, CCU AMS NSU–NSC). The radiocarbon age of the samples with the GV index was established using the AMS complex of the Budker Institute of Nuclear Physics of the SB RAS.

The grave spot of burial 15 was not visible. A collective burial of three individuals placed in a supine extended position, with their heads to the east-northeast,

Radiocarbon dates of the samples from early burials at flat-grave cemeteries of the Firsovo archaeological area

Site	Dating method	Sample code	Radiocarbon age, BP	Calendar date, BC		Laboratory
				1σ	2σ	
Novoaltaisk-Razvilka, burial 2	LSC	SOAN-6863	4525 ± 95	3370–3080	3550–2900	IGM SB RAS
	"	Le-7425	5000 ± 150	3960–3650	4250–3500	IHMC RAS
Firsovo XIV, burial 267	AMS	NSKA-01942	6166 ± 96	5230–4980	5320–4840	CCU AMS NSU–NSC
	"	IGAN-5831	6100 ± 25	5055–4980	5080–4930	IG RAS
Firsovo XI, burial 15, skeleton 1	"	UBA-22954	6684 ± 39	5640–5605 5595–5569	5670–5520	^{14}Chrono Centre
Ditto, skeleton 3	"	GV-02888	6723 ± 68	5710–5610 5590–5560	5740–5510	CCU AMS NSU–NSC
Ditto, burial 42, skeleton 1	"	GV-02890	6534 ± 72	5570–5460	5630–5360	"
Ditto, burial 14, skeleton 1	"	GV-02887	7222 ± 82	6210–6130 6120–6010	6250–5970	"
Ditto, burial 18	"	GV-02889	9106 ± 80	8440–8240	8600–8200	"

at a depth of 0.8 m from the present-day surface, was explored. It was partially destroyed by burial 14. The anatomical order of the bones in skeletons 1 and 3 was disturbed.

Skeleton 2 (male, age 45–55) was located in the center. The left hand of the buried person almost completely covered the right hand of individual 1. The bones of the forearm and of the hands of both arms were placed on the pelvic and femur bones. Skeleton 1 (far right) was incomplete: the skull and left humerus had been lost. For this reason, and because of poor preservation of bone substance, the sex and age of that individual have not been established. Skeleton 3 (male, age 55–65 (?)) was on the far left. The elbow joint of the left arm lay on top of the bones of the right arm of skeleton 2; the forearm was placed on the pelvic bones. The grave goods included one arrowhead found on the left femur of skeleton 2. That artifact had triangular shape and a notch at the base (Shmidt, Solodovnikov, 2019: 388–389).

Two radiocarbon dates were obtained from the bones of burial 15. The date of 6684 ± 39 BP (UBA-22954) (Motuzaite Matuzeviciute et al., 2016: Tab. 1) was obtained from the sample of skeleton 1 at the ^{14}Chrono Center for Climate, Environment, and Chronology at the Queen's University in Belfast (Great Britain), and the date of 6723 ± 68 BP (GV-02888) was obtained from the sample of skeleton 3 at the CCU AMS NSU–NSC.

Grave 18 occupied the extreme southeastern position in the second row. The deceased (male, age 35–45) was buried in a sitting position, with his back towards the north. His skull with the occipital bone upward was at a depth of 0.5 m from the present-day surface. The bottom of the burial was unearthed to the level of –1.0 m. The legs of the deceased were bent at the knees and piled on the left side; his feet were joined together; his arms were bent at the elbows; the left forearm rested on the stomach, and the right forearm was extended along the wall of the grave with the hand towards the feet. The grave goods included one microlithic blade found near the bones of the left hand. The burial was abundantly sprinkled with ocher. The date of 9106 ± 80 BP (GV-02889) was obtained from a fragment of the ulna of the skeleton at the CCU AMS NSU–NSC.

The remains of two people buried in an extended supine position, with their heads to the north-northeast, were found at a depth of 0.7 m from the present-day surface, during unearthing of grave 42. The arms of the deceased were extended and placed on the torso; the knees were brought together. Skeleton 1 belonged to a male (age 45–55). The grave goods included artifacts made of stone and bone, as well as sewn-on animal teeth with the holes drilled into the roots. Skeleton 2 belonged to a female (?) (age 40–50). Its grave goods included eight arrowheads made of stone, two small stone axes, and a bracelet made of the split incisor of a large beaver. From the fragment of the ulna of skeleton 1, the date of 6534 ± 72 BP (GV-02890) was obtained at the CCU AMS NSU–NSC.

The **Firsovo XIV** flat-grave cemetery is located 1 km north of the village of Firsovo, on the promontory ledge of the terrace, rising 3 m above the level of the Ob River floodplain. An oxbow of the Ob River is nearby. Since 1987, archaeological excavations under the supervision of Shamshin have been carried out there for several years.

During the years of research, over three hundred burials of the Middle Bronze Age and Early Iron Age have been studied at that site.

A single Neolithic burial (burial 267) was excavated at the necropolis in 1996. The grave spot was not visible. The bones were found at a depth of 0.4 m from the present-day surface, in yellow sandy loam. The skeleton lying in anatomical order belonged to a male (age 55–60). The deceased was buried in a flexed position on his right side, with his head towards the northeast. A bone point, a small horn spatula, fragments of horn rod and bone harpoon, flake, an abrasive tile, and a stone polished knife were found in the grave (Kiryushin, Shamshin, Shmidt, 2013).

Sample preparation of bone evidence from burial 267 for radiocarbon analysis was carried out in the Center for Collective Use "Laboratory of Radiocarbon Dating and Electron Microscopy" at the Institute of Geography of the Russian Academy of Sciences (IG RAS); the measurement of the evidence was performed at the Center for Applied Isotope Studies at the University of Georgia, USA (outsourcing). The date obtained was 6100 ± 25 BP (IGAN-5831). Another date of 6166 ± 96 BP (NSKA-01942) from a sample of the same bone was established in the CCU AMS NSU–NSC.

Discussion

As is known, the discrepancies between the radiocarbon age of burials and their calendar age are associated with the selection of samples for dating (human bone, animal bone or horn, coal, carbon deposits on pottery, etc.). For the burials under consideration, all measurements were made using human bones, which makes it possible to minimize the possible scatter of the dates. Nine radiocarbon dates have been obtained in different laboratories from the samples taken in the early FAA burials: two dates using the LSC method and seven dates using the AMS method. For establishing the calendar age, they were calibrated using the OxCal software (version 3.10) created in Oxford (see *Table*).

Finding a pottery fragment decorated with imprints of smooth rocking stamp (Kiryushin et al., 2006: Fig. 1, *6*) at the level of the grave spot has made it possible to attribute burial 2 of the Novoaltaisk-Razvilka cemetery to the Bolshoy Mys culture (Ibid.: 223). The radiocarbon dates for this burial were 4525 ± 95 BP (SOAN-6863) and 5000 ± 150 BP (Le-7425) and showed a relatively large spread. The intervals of the calendar age established by calibration were 3370–3080 BC (1σ) and 3350–2900 BC (2σ) in the former case, and 3960–3650 BC (1σ) and 4250–3500 BC (2σ) in the latter case, and did not have the overlapping chronological ranges (Fig. 2). This certainly raises doubts about the objectivity of the dating and requires explanations, which may be several. It has already been mentioned in the literature that "no correction for isotopic fractionation was made during analyzes in the laboratories of St. Petersburg (Le) and Novosibirsk (SOAN). In modern AMS laboratories, this correction is mandatory; it usually results in an earlier date, which can be observed in the evidence of the Afanasyevo culture of the Altai" (Polyakov, Svyatko, Stepanova, 2019: 185).

Studies demonstrate that even the use of the AMS method does not make it possible to reach definitive conclusions on the age of the burials of the Bolshoy Mys culture. The most illustrative example is the results of the dating of burial 7 at the Tuzovskiye Bugry-1 flat-grave cemetery using this method. The filling of the grave contained the fragments of a thin-walled vessel decorated with the "stepping comb" pattern typical of the pottery from the habitation complexes of the Bolshoy Mys culture in the Barnaul-Biysk Ob region (Kiryushin Y.F., Kiryushin K.Y., 2015: 61, Fig. 6, *1*). Two AMS dates were obtained from a fragment of the radius of the person buried in this grave, and had a relatively wide scatter: 5005 ± 25 BP (IGAN-5832) and 5409 ± 93 BP (NSKA-01943). The following intervals of calendar age were established: 3800–3710 BC (1σ) and 3810–3700 BC (2σ) in the former case, and 4350–4220 BC (1σ) and 4450–4030 BC (2σ) in the latter case.

Two out of four of the above dates (two dates were obtained by the LSC method, and other two using the AMS method) had overlapping intervals, which made it possible to establish the radiocarbon and calendar age of the above-mentioned burials of the Bolshoy Mys culture as the boundary between the 4th and 3rd millennia BC (3800–3700 BC). The results obtained closely match the previously proposed chronological framework of this culture (Kiryushin Y.F., Kiryushin K.Y., 2019: 106).

The calibration of the two AMS dates for burial 267 of Firsovo XIV—6166 ± 96 BP (NSKA-01942) and 6100 ± 25 BP (IGAN-5831)—gave similar intervals of calendar age: 5230–4980 BC (1σ) and 5320–4840 BC (2σ) in the former case, and 5055–4980 BC (1σ) and 5080–4930 BC (2σ) in the latter case. Thus, that burial can be dated to the late 5th millennium BC, and its calendar age is 5055–4980 BC according to 1σ, and 5080–4930 BC according to 2σ. It can be concluded that the chronological gap between that burial and the Bolshoy Mys burials was at least a thousand years (Fig. 2).

Specific features of the funeral rite (position on the right side, legs bent at the knees and pressed to the body, arms bent at the elbows and pressed to the body) distinguish burial 267 at Firsovo XIV among other early burials of the FAA and the Barnaul-Biysk Ob region as a whole. Its parallels can be found among the evidence from the Solontsy-5 flat-grave cemetery (burials 2 and 3) (Kungurova, 2005: 97). The radiocarbon date

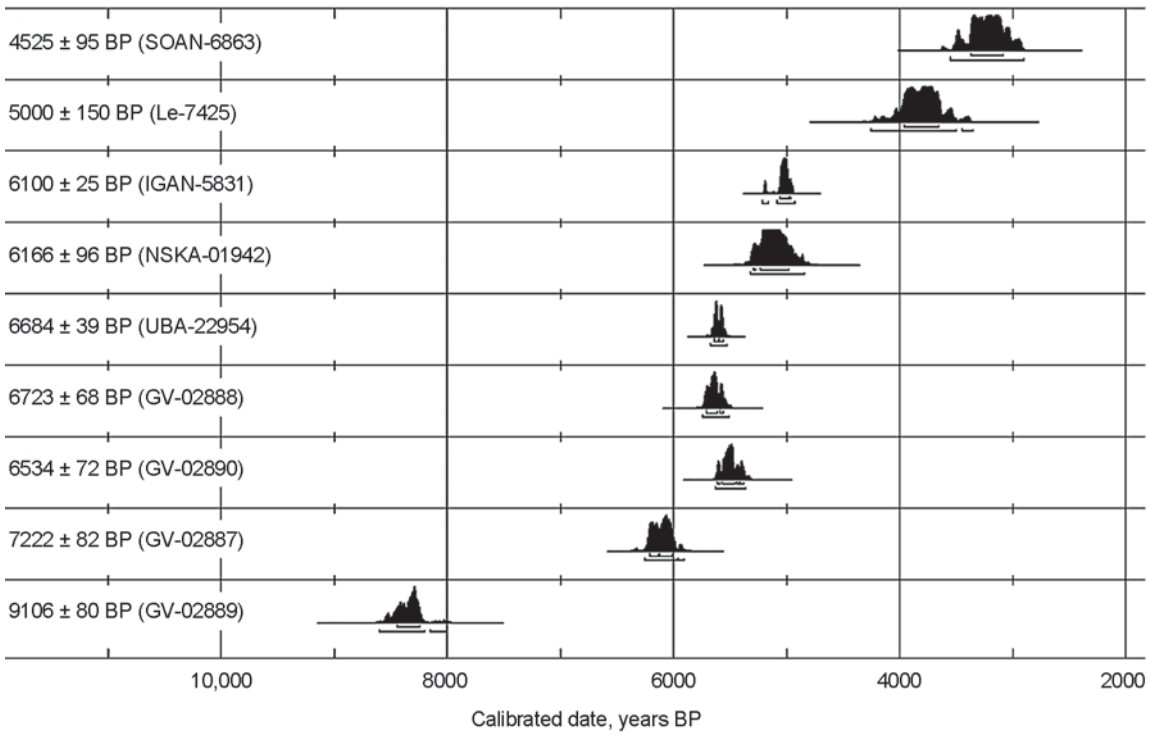

Fig. 2. Summarized radiocarbon dates for the early burials of the FAA flat-grave cemeteries.

of 5810 ± 110 BP (COAH-4947) was obtained for burial 3 (Ibid.: 57), which is quite close to the results of burial 267 at Firsovo XIV. The calibration of that burial gives the intervals of the calendar ages of 4800–4530 BC (1σ) and 4950–4350 BC (2σ). Although the evidence at our disposal is extremely fragmentary, it seems that we can still speak about identifying a small group in the composition of the early Altai burials, which differs from the general number of burials in the features of funeral rite and radiocarbon age. There are reasons to believe that this group may become more numerous over time. Fourteen burials were explored at the Ust-Isha burial ground; eleven burials were attributed to the Neolithic, and one to the Scythian period (Kiryushin, Kungurova, Kadikov, 2000: 9). The cultural and chronological affiliation of two graves without funeral inventory has not been established. One of the graves contained the skeleton of a male buried in a flexed position on his left side, with his head towards the north-northwest (Ibid.: 10; Fig. 3, *2*); in another grave, the deceased was placed on his back with his legs bent at the knees and head towards the west-northwest. The funeral rite of the former individual shows some similar features (flexed position on the side) and differences (orientation of the deceased) with burial 267 at Firsovo XIV. The radiocarbon dating of these burials at the Ust-Isha cemetery is needed. The results obtained will make it possible to confirm or refute the suggestion of their Neolithic age.

Burials 14, 15, and 42 from Firsovo XI are included in the so-called core of the site, and the results of their radiocarbon dating should be considered separately from grave 18. Three out of four dates of these burials were almost the same: 6723 ± 68 BP (GV-02888), 6684 ± 39 BP (UBA-22954), and 6534 ± 72 BP (GV-02890). The fourth date of 7222 ± 82 BP (GV-02887) falls out of the general range and contradicts the planigraphic observations made during the excavations (burial 14 cut through a part of burial 15 and therefore should be dated to a later time). A representative complex of items found in burial 15 (Shmidt, Shamshin, 2018: 60–62), leaves no doubts about its cultural sameness with evidence from burials 16, 17, 41, and 42, which constitute the "cultural core" of the site. Some traditions are very distinctive (processing of animal teeth in manufacturing personal adornments), and their preservation for almost a thousand years is unlikely. At this stage of the study, the date of 7222 ± 82 BP seems to be somewhat too early. The reasons for the discrepancy (specific features of the diet of the buried person or the imperfection of the dating method) still remain to be clarified.

Thus, we can conclude that the burials that constitute the "cultural core" of the site belong to the Early Neolithic (mid fifth millennium BC), and their calendar age fits into a very narrow chronological interval of several decades (5570–5560 BC according to 1σ and 5630–5510 BC according to 2σ) or centuries (5710–5460 BC according

to 1σ and 5740–5360 BC according to 2σ). Even the maximum values give a very short period of three and a half centuries (see *Table*). It can be unambiguously concluded that these burials are among the earliest at the Neolithic burial grounds not only in the Altai, but also in the entire south of Western Siberia. The chronological gap between them and burials similar to those explored at Firsovo XIV (burial 267) and Solontsy-5 (burials 2 and 3) is about 300–500 years (Fig. 2).

On the basis of calibration of the date obtained for burial 18 of the Firsovo XI cemetery (9106 ± 80 BP, GV-02889), the intervals of the calendar age—8440–8240 BC (1σ) and 8600–8200 BC (2σ)—have been established. Thus, the radiocarbon age of that burial is the early 7th millennium BC, while the calendar date makes it possible to attribute it to the mid–second half of the 9th millennium BC. Judging by the results obtained, burial 18 at Firsovo XI belongs to the Mesolithic and it is one of the earliest Holocene burials in Russia and the neighboring countries. Unfortunately, only one date is presently available for that burial, which certainly does not allow for any final conclusions.

Grave 18 at Firsovo XI was one of a few Early Holocene burials on the territory of Russia, where the deceased was buried in the sitting position. Similar Neolithic burials have been found in the Transbaikal region, as well as eastern and southern Cis-Baikal region (Lbova, Zhambaltarova, Konev, 2008: 105, 222) and Eastern Mongolia (Derevianko, Okladnikov, 1969: 151–152; Lbova, Zhambaltarova, Konev, 2008: 131–133). The radiocarbon date of 5590 ± 120 BP (Gif-10949) was obtained for the Tamtsag-Bulak burial (Eastern Mongolia), and 6090 ± 100 BP (SB RAS-5701) for the burial from Petropavlovka (southern Cis-Baikal region) (Lbova, Zhambaltarova, Konev: 133–134, 222). Burials in the sitting position, densely covered with ocher, have been found during the study of the Karavaikha site (the Kargopol archaeological culture) (Bryusov, 1952: 131–132). There is a representative series of dates for the Mesolithic sites of the taiga belt of Western Siberia. It has been observed that "the chronology of the Mesolithic sites… is established as the period of 9500–6700 BP, while the dates earlier than 7000 BP can be considered controversial" (Molodin et al., 2018: 48).

Natural scientific research may reveal some information on the relative chronology of the burials at Firsovo XI. A special study has focused on paleoanthropological evidence from the early graves of that cemetery (Solodovnikov, Tur, 2017). Statistical analysis has revealed the main trends in the intragroup morphological variability of the population that left that necropolis. According to the first main component, the cranium of a male from burial 18 at Firsovo XI stands out among the skulls of other adults buried at that cemetery owing to large total dimensions of its brain case. The second main component distinguishes two male skulls found in grave 15 from the main group according to the structure of the brain capsule and overall size of the face (Ibid.: 65–66, fig. 6).

In a study on stable isotopes of carbon and nitrogen in paleoanthropological and osteological evidence of the Neolithic and Bronze Age from the basins of the Upper Ob and Tobol Rivers (Motuzaite Matuzeviciute et al., 2016), the $\delta^{13}C$ and $\delta^{15}N$ values in the collagen of bones of adults from different Neolithic and Chalcolithic cemeteries of southwestern Siberia were analyzed (Ibid., SOM 1b, available online). In the context of the chronology of Firsovo XI, the observations such as consolidation of a group according to the shares of heavy carbon and nitrogen isotopes in comparison with samples from other cemeteries, absence of sex differences, similarities in the isotope profiles of individuals from a single grave, and the lowest $\delta^{13}C$ values among other Altai populations are important (Fig. 3). The reasons for the latter are probably associated with manifestations of the isotopic background and changes in the share of vegetation of types C_3 and C_4 in the feeding landscape (forest – northern forest-steppe – southern forest-steppe), differences in the content of carbon isotopes in the procured animals resulting from the canopy effect, as well as variation in the share of plant foods. In this regard, a decrease in $\delta^{13}C$ values in anthropological evidence from the Neolithic–Chalcolithic cemeteries of the Altai in the direction from south to north can be observed. The exception is the Ust-Isha burial ground located to the south of the remaining cemeteries: its samples also exhibited higher $\delta^{15}N$ values as compared to most other samples (Fig. 3). The reason

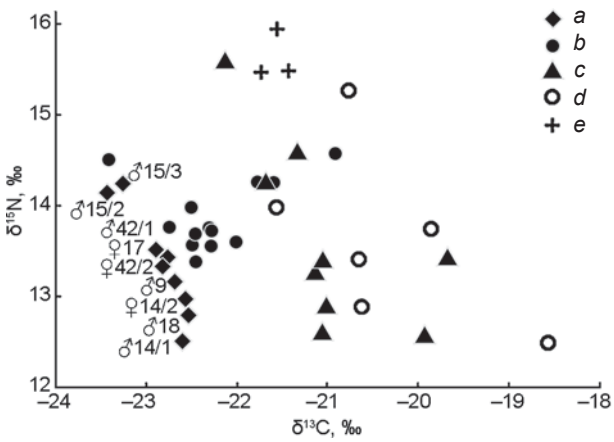

Fig. 3. Individual values of carbon ($\delta^{13}C$) and nitrogen ($\delta^{15}N$) stable isotopes in anthropological evidence from the Neolithic–Chalcolithic cemeteries of the Altai.
a – Firsovo XI (sex of the deceased, as well as numbers of graves and skeletons, are indicated); *b* – Tuzovskiye Bugry-1; *c* – Itkul (Bolshoy Mys); *d* – Solontsy-5; *e* – Ust-Isha.

for the disruption of this geographic regularity may be specific economic, climatic, and geographic conditions for the habitation of the human group that left the site.

A noticeable excess in the share of nitrogen isotopes in the collagen of two males from grave 15 at Firsovo XI relative to the main group (Fig. 3) probably indicates the dominance of fish in the diet and/or the origins of these individuals in other regions. Specific features of the isotopic profile of these individuals, who are also distinguished according to craniological data, might have affected the establishment of the radiocarbon age of grave 15. However, it should be mentioned that the impact of the "freshwater reservoir effect" associated, among other things, with the predominance of fish in the diet (Motuzaite Matuzeviciute et al., 2016), on anthropological evidence from the southwestern Siberia in the Chalcolithic and Bronze Age, with the exception of individual cases, has not yet been proven (Marchenko et al., 2015; Svyatko et al., 2017).

Conclusions

1. The results obtained make it possible to establish the radiocarbon age of the burials of the Bolshoy Mys culture (Novoaltaisk-Razvilka, burial 2 and Tuzovskiye Bugry-1, grave 7) as the turn of the 4th–3rd millennium BC, which is consistent with the previously proposed chronological framework of this culture (Kiryushin Y.F., Kiryushin K.Y., 2019: 106).

2. The question of isolating a group of burials (Firsovo XIV, grave 267 and Solontsy-5, graves 2, 3) in the Neolithic and Chalcolithic cemeteries of the Altai, which differ from the general number of burials by the specific features of their funeral rite (in a flexed position on the side) and radiocarbon age (Middle Neolithic, late 5th to early 4th millennium BC) should be possibly posed.

3. The burials that constitute the "cultural core" of the Firsovo XI cemetery (graves 14, 15, and 42) belong to the Early Neolithic, and their calendar age falls within a very narrow interval of several decades or centuries (1σ – 5710–5460 BC; 2σ – 5740–5360 BC).

4. As a working hypothesis, it may be suggested that the date obtained for burial 18 at Firsovo XI was not accidental (9106 ± 80 BP, GV-02889), and this burial actually belonged to the Final Mesolithic or Early Neolithic. The chronological and ritual distinctiveness of this burial is also emphasized by very large total dimensions of the skull of the buried man, which distinguishes him from the rest of those buried at the cemetery.

5. A diet with a predominance of fish consumption might have had an impact on the results of the collagen dating of the bones of individuals from early burials of Firsovo XI.

Acknowledgments

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A Mortuary Complex with Animal Skulls at Khankarinsky Dol, a Scythian Age Cemetery in the Northwestern Altai

This article presents a description of Khankarinsky Dol mound 34 on the left bank of the Inya River, 1–1.5 km southeast of Chineta, Krasnoshchekovsky District, Altai Territory. Excavations revealed a cist with a supine burial of a male, whose head was oriented to the east. Beyond the eastern wall of the cist, a horse cranium and three crania of sheep were placed. Features of the burial rite suggest that the burial belongs to the Korgantass type, which is distributed over the Altai-Sayan and Kazakhstan, with certain parallels in northern China. Principal categories of offerings are analyzed, including those associated with the horse. On their basis, the horse harness is reconstructed. On the basis of the typology of artifacts and radiocarbon analysis, the burial was dated to the 5th to 4th centuries BC (possibly late 5th to early 4th centuries BC). The Korgantass burials at Khankarinsky Dol and elsewhere in the Altai Mountains indicate a migration from the eastern part of the nomadic world, apparently from northern China or the Trans-Baikal region.

Keywords: *Altai, burial rite, artifacts, horse harness, Scythian-Saka period, Korgantass-type burials.*

Introduction

For twenty years, the Krasnoshchekovo archaeological expedition of the Altai State University under the leadership of the author of this article has been studying sites of the Chineta archaeological area located in the vicinity of the village of Chineta, in the Krasnoshchekovsky District of the Altai Territory (Northwestern Altai). Sites from the Upper Paleolithic to the Middle Ages have been discovered. Special research has been conducted on burials at the Khankarinsky Dol cemetery, located on the eastern part of the second terrace above the floodplain, on the left bank of the Inya River (a left tributary of the Charysh River), 1.0–1.5 km southeast of Chineta (Fig. 1). Currently, over thirty artifacts of the Scythian-Saka period have been studied there. This article describes the results of cultural and chronological attribution of artifacts and reconstruction of the horse harness on the basis of the results of excavations performed in 2019 at mound 34 at the Khankarinsky Dol cemetery.

Description of the burial rite

Burial mound 34 is located in the northern part of the cemetery. The mound had an unusual sub-square shape with sides of 4.5 m (Fig. 2). The structure was oriented to the cardinal points and was made of small and medium-sized stones in one or two layers. Its height reached 0.45 m; with the soil layer it reached 0.65 m. A subrectangular grave with rounded corners oriented along the NW-SE axis was discovered under the mound.

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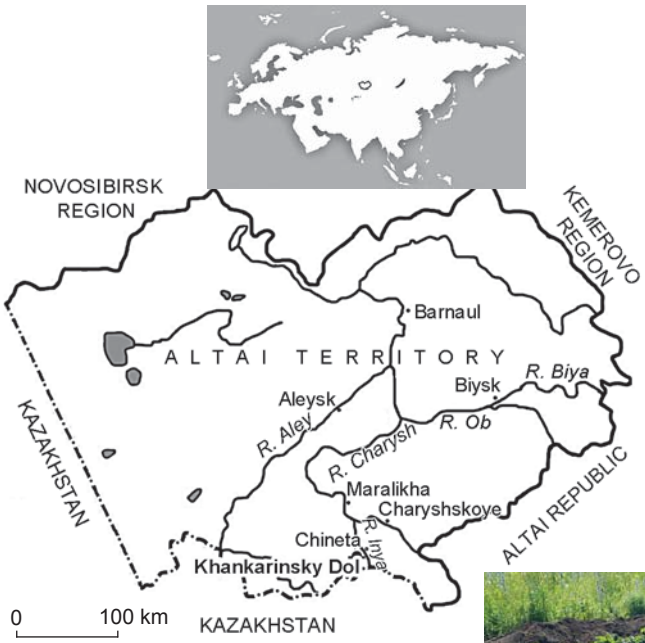

Fig. 1. Location of the Khankarinsky Dol cemetery.

Its size at the level of the ancient horizon was 2.40 × 1.45 × 1.84 m (depth from the zero benchmark). A stone cist was discovered in the grave (Fig. 3). Two large (78 and 90 cm long, 8–18 cm wide) and two small (30 and 38 cm long, 5–10 cm wide) stone slabs were placed on their edge along the southern wall; two large stone slabs (96 and 62 cm long, 5–11 cm wide) and three medium-sized stones in the northwestern corner were set along the northern wall, and one medium-sized stone slab (40 and 50 cm long, 7–9 cm wide) was placed along each of the eastern and western walls. On top, at a depth of 1.24–1.38 m, the cist was covered with eleven cut stone slabs and stones from 40 to 90 cm long and up to 37 cm wide. Three steles, probably of the Early Scythian period, served as cover slabs, that is, in this case, earlier stone items were reused. Similar steles, with a distinctive slanted cut in the upper part, have also been found at the sites of Chineta II and Inskoy Dol, although Early Scythian mounds have not yet been identified within the Chineta archaeological area.

The burial turned out to have been plundered. Skeletal bones were in a chaotic state in the stone cist at a depth of 1.70–1.84 m. Only the tibia and two fibula survived in their original position. The deceased was probably buried in an extended position, with his head towards the east (Fig. 3). In the middle part of the southern wall of the cist, at a depth of 1.67 m, a bronze quiver hook (Fig. 4, *4*) was found; 0.35 m to the west of the hook, in the area where two slabs joined, there was a bone arrowhead. A second bone arrowhead was found 0.4 m to the northeast at the opposite, northern, wall of the stone cist (Fig. 4, *6*, *7*).

The skull of a horse and three skulls of sheep, oriented eastward, lay at a depth of 1.26–1.35 m,

Fig. 2. Burial mound 34 after unearthing the tumulus.

Fig. 3. Grave in mound 34.

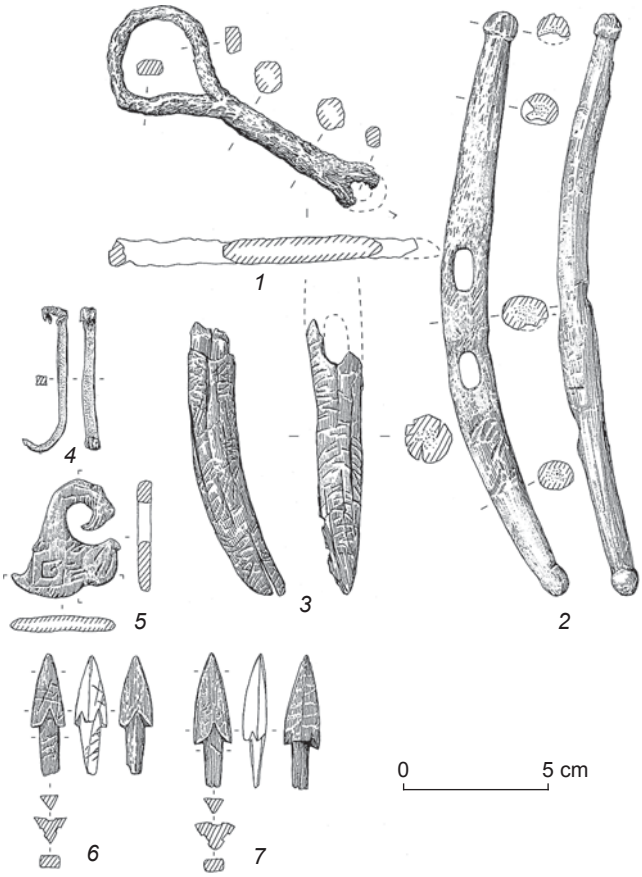

Fig. 4. Inventory of the burial.
1 – fragment of an iron bit; *2*, *3* – horn cheekpieces; *4* – bronze hook; *5* – bone pendant; *6*, *7* – bone arrowheads.

behind the eastern wall of the stone cist, parallel to it, on a ledge of the sterile soil. Elements of a horse harness were found with the horse skull, including browband and noseband bone plaques (Fig. 5, *7*, *8*), eight bone doublers in the form of a figure-eight (Fig. 5, *1–6*), three bone terrets each with five holes (Fig. 5, *10–12*), a halter unit (Fig. 5, *9*), the link of an iron bit (see Fig. 4, *1*), as well as a bone pendant in the form of a stylized bird (see Fig. 4, *5*).

Cultural and chronological attribution of the burial

Burial goods from mound 34 at Khankarinsky Dol included various types of items. The finds included a bronze hook 5 cm long, with a maximum width of 0.5 cm in the upper part (see Fig. 4, *4*). According to the classification of such items proposed by Y.F. Kiryushin and N.F. Stepanova (2004: 68), it belongs to section 2, type 1, variant 1. A hook of this type was made from a bar, sub-rectangular in cross-section, one end of which was bent into a ring or loop. The ring of the item from mound 34 was not closed. It might have been unbent (or not fully bent) still in ancient times. Hooks of that type generally have a wide number of parallels among the evidence from the sites of the Pazyryk period in the Altai. For example, similar bronze hooks, only with a closed loop, have been found at the burial grounds of Saldam (mound 5), Tytkesken VI (mound 6, 48/2), and Kaindu (mound 5) (Ibid.: Fig. 28, *4*, *9*, *10*; 29, *19*). A quiver hook with similar morphological features (a ring not completely bent on top), although two times longer than the hook under consideration, was found in burial 4 at the Obskiye Plesy II cemetery. That site belongs to the Staroaleyskoye culture of the Upper Ob region, and was dated to the 5th to early 4th centuries BC (Vedyanin, Kungurov, 1996: 104, 114, fig. 16, *2*).

Another category of inventory includes two bone, tanged, trihedral arrowheads with spikes (barbs) and triangular cutouts at the bases (see

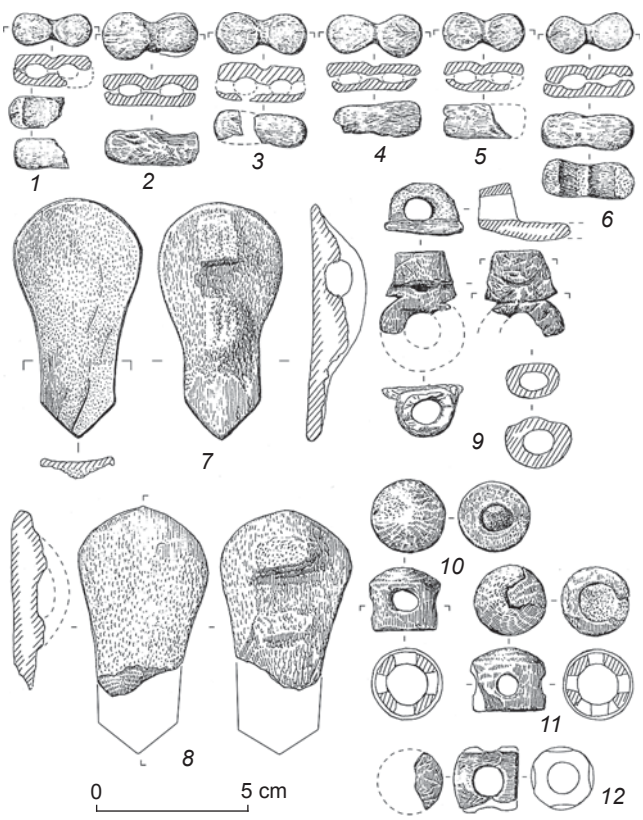

Fig. 5. Elements of horse harness.
1–6 – doublers; *7*, *8* – browband and noseband plaques; *9* – halter unit; *10–12* – terrets.

Fig. 4, *6*, *7*). Their lengths are 4.2 and 4.6 cm. In the Altai region, bone trihedral arrowheads with spikes have been known since the Late Bronze Age, although the main period of their existence was the 7th–3rd centuries BC. They widely appear in the Pazyryk burial mounds (Kiryushin, Stepanova, 2004: 64). Tanged, trihedral arrowheads have also been found in the Bystryanka, Staroaleyskoye, and Kamenka cultures of the Upper Ob region (Zavitukhina, 1966: 63, Fig. 2, *24*, *25*; Vedyanin, Kungurov, 1996: Fig. 17, 18; Kiryushin, Kungurov, 1996; Ivanov, 1987: 13; Mogilnikov, 1997: 55–57, fig. 46, 23; and others), the Tagar culture of the Minusinsk Basin (Kulemzin, 1976: Fig. 10, *2*, *9*), as well as the Aldy-Bel and Sagly (Uyuk) cultures of Tuva (Grach, 1980: Fig. 32, *14–16*). They show fairly broad parallels outside the Altai-Sayan (Stepnaya polosa…, 1992: Pl. 119, *33*; 122, *68*). Gradual decrease in length has been observed in tanged, trihedral arrowheads with spikes found in the Altai Mountains over the Scythian period. For example, the typical length was 7–8 cm in the 7th–5th centuries BC, and 4.5–5.5 cm in the 4th–3rd centuries BC (Kiryushin, Stepanova, 2004: 64–65; Shulga, 2002: 56; and others).

Despite the fact that the burial was plundered, the burial rite revealed during the excavation of mound 34 at Khankarinsky Dol is of interest. The deceased was oriented with his head towards the east, which is typical for the sites of the Pazyryk culture. However, he was probably buried in an extended supine position, which is atypical for the Pazyryk culture; although Pazyryk burials where the deceased were placed in such a manner are known from the middle reaches of the Katun River (Kiryushin, Stepanova, 2004: 127–128; Tishkin, Dashkovskiy, 2003: 165) and in the northwestern Altai, including the neighboring burial ground of Chineta II (Dashkovskiy, 2017). Although burial structures in the form of a stone cist were not predominant in the Pazyryk culture, they occurred relatively often, especially in the central Altai (Surazakov, 1989: 124–130; Tishkin, Dashkovskiy, 2003: 159–168). Notably, mound 34 was located in the northern part of the Khankarinsky Dol cemetery, at some distance from the chain of mounds of the Pazyryk culture.

A rather interesting feature of the funeral rite is the presence of horse and sheep skulls behind the eastern wall of the stone cist. This feature has been observed at several cemeteries in the central and southeastern Altai, including Elangash, mound 2 (Kubarev, Grebenshchikov, 1979: 70), Ker-Kechu, mound 9 (Mogilnikov, 1988: 68), and Kyzyl-Tash, mounds 20–22a, and 25 (Soenov, Ebel, 1998). The tradition of placing the heads of animals in a human burial has been known from sites in Tuva, Mongolia, and Kazakhstan synchronous to the Pazyryk culture, which has allowed scholars to distinguish the so-called Korgantass type of burials (Poltoratskaya, 1966: 83; Kushakova, Chugunov, 2010; Aseev, 1975: 183–184; Beisenov, 1995: 225; Tairov, 2006; Kubarev, Shulga, 2007: 17–18; and others). This custom was also widespread in northern China in the Scythian period. In particular, it occurs in the burials of the 5th–3rd centuries BC at the cemeteries of Maoqinggou, Taohongbala, Gangsuhao, and Xigoupan (Polosmak, 1990; Minyaev, 1991: 124; and others). In addition, the results of the studies carried out in recent decades indicate that this tradition existed in northern China starting in the Early Scythian period (Shulga, 2015a: 34–35; fig. 36, *A*). Subsequently, it became widespread among the Xiongnu of the Trans-Baikal region (Konovalov, 1976: 161–162).

The problem of the appearance of burials with this distinctive feature of the burial rite in the Altai Mountains has been repeatedly addressed by scholars. For example, V.A. Mogilnikov noted that the tradition of placing the heads of animals in the compartment for ritual food, appearing in the Late Pazyryk mound 2 at the Elangash cemetery, was associated with the influence of the Xiongnu (1988: 73–74). A.S. Surazakov also associated that burial with the influence of some other culture (1989: 123). N.V. Polosmak came to the conclusion that mound 2 at Elangash was similar to the sites of the Scythian period in northern China, and to the burials of the Xiongnu in the Trans-Baikal region. She associated the appearance of burials with animal skulls in the Altai with migrations of the carriers of the Tasmola culture from Kazakhstan (Polosmak, 1990: 104–106, fig. 3, 5, 6). A little later, Polosmak clarified that this was associated with infiltration of the Ordos population, which was close to the Pazyryk people "in their way of life and culture" (1994a: 143).

The idea about the penetration of population groups from northern China into the Altai in the Late Pazyryk period was further elaborated after the study of five burials of the late 4th–early 3rd centuries BC at the Kyzyl-Tash cemetery, where the skulls of horses and small ruminants were found (Soenov, Ebel, 1998: 92). In addition, discussing the Korgantass-type sites in the Altai Mountains, A.D. Tairov made a conclusion about two waves of migration from northern and northwestern China: in the second half of the 5th–4th centuries BC, which was reflected in the burials of the Sibirka I and Ker-Kechu cemeteries, and in the

3rd century BC, which led to the appearance of burials with animal skulls at the Altai cemeteries of Elangash and Ak-Alakha I, as well as Korgantass-type sites in central Kazakhstan (2006: 188, 193–194). According to G.Y. Peresvetov, the emergence of these burials was associated with migration of some population groups in the 4th century BC not from northern China, but from Mongolia and the Trans-Baikal region (2006: 205–206).

P.I. Shulga drew attention to the fact that burials with such a feature of the burial rite were typical of the eastern historical and cultural community of the Mongoloids, whose representatives moved from the China or Trans-Baikal region in small groups to the west. The earliest burials of the Korgantass type (second half of the 6th century BC) have been found in Tuva. In the 5th–4th centuries BC, similar burials appeared in the Altai Mountains and Kazakhstan (Kubarev, Shulga, 2007: 17–18; Shulga, 2015a: 14).

The results of studying mound 34 at Khankarinsky Dol, where a human burial in a stone cist with the skulls of horse and sheep was discovered, additionally testifies to possible penetration of a specific group of population from northern China or the Trans-Baikal region to the Altai during the Pazyryk period. It is also important to keep in mind that interaction of the nomads of the Altai Mountains and the population of China at that time was relatively stable. Among other things, this is manifested by Chinese imported objects found first in "royal" burial mounds of nomads in central Altai, and in recent years by the study of the sites of the Pazyryk culture in the northwestern Altai, including mounds 21 and 31 at Chineta II (Dashkovskiy, Novikova, 2017) and mound 30 at Khankarinsky Dol. These finds come from burial mounds dated to the second half of the 4th–3rd centuries BC. There is information about discovering a lacquer item in the Kolgantasa-type burial in mound 1 at the Sibirka cemetery (Polosmak, 1990: Fig. 3, *11*), which additionally indicates cultural and historical interaction with China in the Scythian period.

Radiocarbon dating

A ^{14}C-date of 2413 ± 170 BP was obtained from the human bone found in mound 34 at Khankarinsky Dol, at the Analytical Center for Isotope Research at the Institute of Monitoring of Climatic and Ecological Systems of the Siberian Branch of the Russian Academy of Sciences (Tomsk). The intervals of the calibrated calendar age of 797–372 BC according to 1δ (68 %) and 898–55 BC according to 2δ (95 %), with an average probability value of 527 BC, were established using the CALIB REV 8.2 software by G.V. Simonova.

These results indicate a rather early date within the chronology of the sites of the Scythian period in the Altai Mountains, and supplement the available evidence of radiocarbon dating of mounds at Khankarinsky Dol and Chineta II in the Chineta archaeological area (Dashkovskiy, 2018, 2020; and others). Taking into account all the results of comprehensive dating, Khankarinsky Dol mound 34 can be attributed to the second half of the 5th to 4th (probably, the early 4th) century BC.

Reconstruction of the horse harness

The set of horse harness found in mound 34 at Khankarinsky Dol includes the link of an iron, ringed bit (see Fig. 4, *1*), two bone plaques from the noseband and browband (see Fig. 5, *7*, *8*), three terrets made of horn (see Fig. 5, *10–12*), a halter unit (see Fig. 5, *9*), a bone pendant in the form of a bird (see Fig. 4, *5*), two cheekpieces of horn (see Fig. 4, *2*, *3*), and eight doublers in the form of a figure-eight made of bone (see Fig. 5, *1–6*). These items make it possible to reconstruct the bridle (Fig. 6).

The iron bit was obviously a two-piece implement with one-ringed links. In the item under consideration, the end of the link corresponds rather to a loop than a ring (see Fig. 4, *1*). The length of the surviving fragment is 10.1 cm; the diameter of the loop is 4 cm. Bits of this type have been found in fairly large quantities both at the Khankarinsky Dol and Chineta II cemeteries and at other Altai sites of the Pazyryk period (Dashkovskiy, 2016, 2017; Kubarev, 1991: 42–44; Kubarev, Shulga, 2007: 270, fig. 4, *11–18*; Shulga, 2015b: 93–97; Kiryushin, Stepanova, 2004: 94; and others). In the Altai Mountains, they appeared in the 6th century BC and continued to be used throughout the entire period of the Pazyryk culture. Scholars have observed that bits with sub-quadrangular cross-section of the rod and loop-shaped end of the link dominated at a later stage, while the earlier bits had a round rod and ring-shaped outer end (Surazakov, 1989: 25; Kubarev, 1992: 32). However, bits with these features can be found in the burials of both early and late stages of the Pazyryk culture (Shulga, 2015b: 96).

Three out of four terrets made of horn were of the same type (see Fig. 5, *10–12*); the fourth was a 1.6 cm high cylinder with annular end 2.5 cm in diameter with a hole on one side. No direct parallels

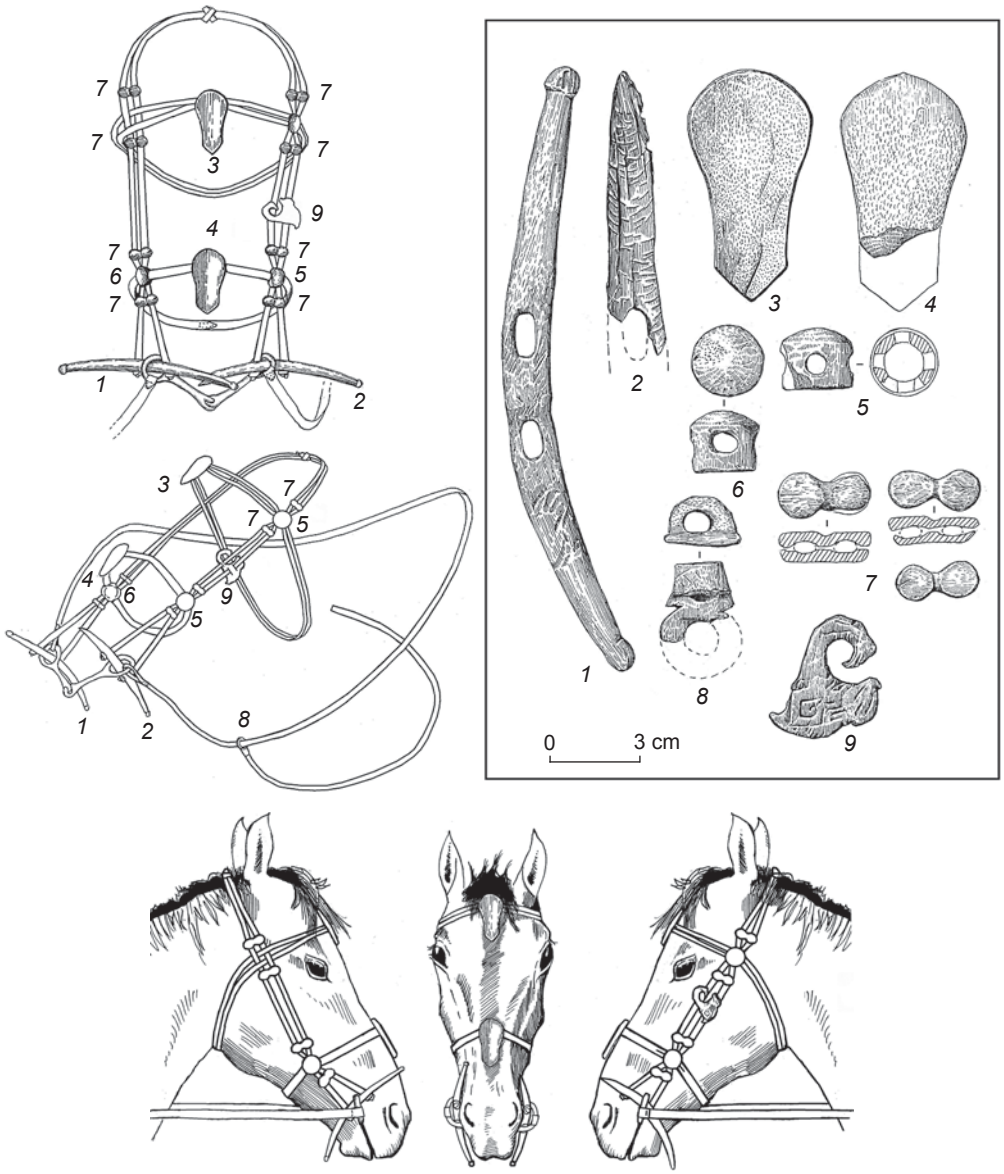

Fig. 6. Reconstruction of the bridle and location of its elements in the burial.

to the latter item are known so far. Three flattened cylindrical terrets with hemispherical shields had the height of 2 cm and diameter of 2.0–2.2 cm. Their parallel is a find from mound 5 at the Taldur I cemetery (Mogilnikov, Elin, 1982). Terrets of this type are more typical of the early stage of the Pazyryk culture (second half of the 6th–5th centuries BC) (Shulga, 2015b: 111, fig. 15, *3*). Earlier, so-called low cylindrical horn terrets with overlapping holes were found at Khankarinsky Dol in mound 25, which was located next to mound 34. Taking into account various data, including the set of the horse harness, mound 25 was dated to the second half (possibly end) of the 6th to early 5th century BC (Dashkovskiy, 2020: 99). Two horn cylindrical terrets from mound 9 at the Ker-Kechu cemetery (Mogilnikov, 1988) are also noteworthy. Such terrets are considered to be a separate type; their distinctive feature is equal height and diameter of the cylinder (2.5 × 2.5 cm) (Shulga, 2015b: 102, fig. 19, *8*). This parallel is of particular importance, since such items come from a burial where animal skulls were also found near the eastern wall of the grave. Moreover, mound 9 at Ker-Kechu also belongs to sites dated to a time no later than the Bashadar period (about the second half of the 5th century BC) (Kubarev, Shulga, 2007: 17).

The two browband and noseband plaques of horn have the same elongated shape and measure 7.2 and 7.4 cm in length, respectively (see Fig. 5, *7*, *8*). One

end of them is pointed, 2.4 cm wide, and the other is rounded, 3.8 cm wide. The plaques were fastened one under the other on the browband and noseband in their middle parts. Wood and bone head plaques are well known from the evidence of elite burial mounds of the Pazyryk culture at the cemeteries of Pazyryk, Bashadar, Tuekta, etc. (Rudenko, 1953: 154–156; 1960: 125; Shulga, 2015b: 54, fig. 27, *1*; 33, *1*; and others). Two bone browband and noseband plaques were found in the Early Pazyryk mound 25 at Khankarinsky Dol (Dashkovskiy, 2020: 94, fig. 7, *2*, *3*). A head-plate made of gold foil attached to a wooden or leather base was found in mound 31 at Chineta II. These elements of the horse bridle were fastened with two thin straps. The same principle of fastening in most cases occurs in the complexes of horse harness from the elite burial mounds of various stages of the Pazyryk culture (Shulga, 2015b: 54, 64, fig. 33, *1*).

Two cheekpieces with two holes each were made of deer antler prongs (see Fig. 4, *2*, *3*). Both are rounded in cross-section and have elongated holes. One cheekpiece is of a satisfactory degree of preservation, 19.5 cm long, with spherical pommels at the ends; the other is a 9.5 cm fragment with a pointed end. An item somewhat similar to the first cheekpiece was found in a burial in a stone cist at the Chemal-Karier I site. The cultural identity of that site is not entirely clear, but it was dated quite accurately to the Early Pazyryk period (the second half–late 6th to mid-5th century BC) (Ibid.: 29, 44, fig. 17, *1*). That burial also contained two low cylindrical bone terrets, two doublers in the form of a figure-eight, and an arrowhead (Borodovsky, 2006: 6), that is, the same types of things as in Khankarinsky Dol mound 34. Spherical pommels appear on bronze and wooden cheekpieces from burial mounds dated to the Early Pazyryk period, for example, mound 5 at the Aragol cemetery (Marsadolov, 1997: 40, fig. 15; 1998: Fig. 1, *40*), mound 82 at the Borotal I cemetery (Kubarev, Shulga, 2007: 34, fig. 36, *4*, *5*), and others. In addition, two cheekpieces, round in cross-section and made of deer antlers, were found in mound 1 at Sibirka I, which was re-dated to an earlier period of not later than the mid 6th century BC (Ibid.: 17). One end of them is pointed as in the second cheekpiece from Khankarinsky Dol mound 34.

Only six out of eight doublers in the form of a figure-eight have survived in satisfactory condition (see Fig. 5, *1–6*). In shape, they resemble bronze and bone doublers in a form of a figure-eight known from the Pazyryk sites of the Altai, which were mainly dated to the second half of the 6th–5th centuries BC. It is possible that in some cases they could have also been used in the late 4th century BC (Shulga, 2015b: 97–98, fig. 10; 20, *2*). The bridle set usually had two doublers. In our case, eight such items were found. Double leather head straps were passed through them.

Another element of the horse harness is a bone pendant in the form of a stylized bird, possibly a swan. The use of hanging plates of various types, including those representing animals and birds, has been observed in a whole series of mounds of the Pazyryk period: Pazyryk, mound 1; Bashadar-2, mound 2; Kuturguntas mound; Ak-Alakha I, mounds 1 and 3; Berel, mound 11, etc. (Ibid.: 112–113; Rudenko, 1960: Pl. XXXV; Polosmak, 1994b: 87, fig. 108; Samashev, 2011: 145; and others). In addition to zoomorphic pendants, a pendant in the form of a cruciform symbol is known from mound 1 at the Pazyryk cemetery (Gryaznov, 1950: 56, fig. 21).

Conclusions

Analysis of the burial rite has revealed that mound 34 at the Khankarinsky Dol cemetery can be attributed to the so-called Korgantass type of sites. Human burials where animal skulls were found in the eastern part of the graves, appeared in the Altai Mountains in the 5th–4th centuries BC as a result of the penetration of some group of population from the eastern area of the nomadic world, probably from northern China or the Trans-Baikal region. Taking into account specific features of the burial rite and goods, primarily the elements of horse harness, as well as results of radiocarbon analysis of human bone samples, mound 34 at Khankarinsky Dol can be tentatively dated to the second half of the 5th–4th (possibly, the early 4th) century BC. The interaction of the nomads from the Altai Mountains and population of China was relatively stable in the Scythian period. Among other things, this is confirmed by the results of the study of mound 34 at Khankarinsky Dol and the presence of Chinese imported items in the burial mounds of the Pazyryk culture in central and northwestern Altai. Further research at the Khankarinsky Dol site will expand our understanding of cultural and historical processes in Central Asia in the Scythian period.

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A Monumental Horse Burial in the Armenian Highlands

Here we report on the unprecedented discovery of the complete skeleton of a ritually interred adult stallion with a bronze ring in its mouth. The horse was buried in a unique 15-meters diameter monumental stone-built tomb excavated in the Aghavnatun necropolis located on the southern slopes of Mt. Aragats, in the northern fringes of the Ararat Depression, Republic of Armenia. The tumulus was roughly circular; the horse's remains were found in situ, in an inner oval-shaped structure. Our methodological procedure included a detailed description of the burial, a taphonomic study of the bones, and meticulous morphometric observations and measurements, and thus we could provide a taxonomic definition and an age estimate. Direct radiometric dating of the horse's skeleton provided a date of 2130±20 BP. The morphological characteristics of the horse, with its tall stature and slender feet, suggest that it was a large individual, similar to the extinct breed of Nisean horse previously known mainly from textual and iconographical sources. The metal ring found in the mouth of the horse suggests that it likely served as a breeding stallion. This discovery presents a unique combination of zooarchaeological evidence for the importance of the horse in the Parthian-Hellenistic worlds, and advances our understanding of the broad social significance of the past breeding of equids in the Armenian Highlands.

Keywords: *Armenia, horse burial, Classical archaeology, Nisean horse, Ararat Depression.*

Introduction

The Armenian Highlands were well-known in the Achaemenid and Hellenistic worlds as the breeding land for large numbers of high-quality horses, which were in continuous demand for cavalry forces. The natural conditions of the country were very suitable for livestock-raising, and herding was one of the main economical components. Strabo (a 1st century BC Greek historian and geographer) explicitly stated that horses were among the main herding domesticates in the Armenian Highlands ("Armenia is an exceptionally good horse-pasturing country"; Strabo, VI. 13. 7). He further emphasized that Armenian horse-breeding relied on raising the well-known and nowadays extinct breed of the Nisean horse. This horse was greatly valued for military purposes by the Parthian kings, "because they were the best and the largest" (Ibid., 14. 9). For example, the king of Great Armenia (Armenia Mayor) Tigranes I of the Artashesid Dynasty (123–95 BC) is said to have had, in addition to his cavalry, six thousand horses in full armor as a reserve for his cavalry power (Ibid.).

The Nisean horse was one of the most valuable breeds of horses in the ancient world. Its first occurrence is in the early 6th century BC, when it becomes the imperial horse of Persia. Historical accounts indicate that it was a large breed, higher than any other horse of its time, with distinctive characteristics, such as a ram-headed skull with two bumps on its forehead, a strong neck, and a long mane. Some of these typical features were also documented in depictions and reliefs, showing mainly its large size. The horse's color was mainly chestnut. The rare occurrences of black and white colors were considered to be a representation of the horse-god in the Achaemenid Empire. They were prestige horses also in Hellenistic times. Following the conquest of Persia, Alexander the Great demanded a tribute of thousands of Nisean horses from the captured cities. Those horses were also seen later by Strabo, who describes them as the most elegant riding horses. Later written descriptions of this breed report on its dispersion by various rulers across Eurasia. It is believed that the Nisean horse became extinct in the Late Hellenistic period; most probably owing to hybridization and crossbreeding with the Arab horse (Davis, 2007).

Despite its certain historic and pictorial descriptions, the Nisean horse has been hardly documented zooarchaeologically. This is due primarily to significant overlap of phenotype between most horse breeds, which complicates its identification. Of special interest are those landrace horse breeds that were selected and bred within a limited geographic region. Therefore, the most likely area to find the Nisean horse is the highlands of Armenia, where it was supposedly bred.

The lack of direct evidence that the Armenian Highlands were the breeding grounds for the Nisean horse also stems from the seeming absence of archaeological installations to support the vast scale and extensive horse-breeding as described in the historical records. The recent discoveries of numerous large curvilinear stone-built enclosures that are scattered across the Armenian Highlands provide important information regarding the traditional husbandry system, which involved livestock-keeping through gathering of free-ranging animals from the pasture into corrals where they could be separated, bred, and selected (Malkinson et al., 2018). These large Armenian enclosures, also generally termed desert kites, were made to capture and tame in semi-free conditions the desired animals. Some of the enclosures have funnel-shaped features that lead to isolated pens or cells where animals can be separated and manipulated by the herders. These enclosures provide an excellent means for the taming of large herds of the highly-valued and constantly demanded Armenian horses as suggested by the historical sources. The construction of each of the large enclosures necessitated a pre-planned and controlled investment of at least 150 work days, likely reflecting a central organization for such endeavors (Ibid.).

In recent years, there has been growing archaeological evidence to support the notion of the sharply increased demand for horses during the Armenia-Achaemenid satrapy, and the idea that the region was a major source of horses for the empire. The majestic tombs of elite nobles in the Armenian Highlands, with assorted horse-gear and chariots, further support these accounts (Mnatsakanyan, 1960, 1961; Devejyan, 2006; Badalyan, Avetisyan, 2007: 51–54; Simonyan, Manaseryan, 2013; Badalyan, Smith, 2017; Castelluccia, 2017). Furthermore, scenes focusing on horses are commonly portrayed on pottery, monarchic crowns, scepters, and various jewelry items, which indicates that horses were among the most highly valued possessions (Bocchieriyan, 2016: 15, 53, 83).

Here we report of a unique ritual horse burial in a monumental structure found adjacent to ancient herding enclosures in the area of Aghavnatun, western Armenia (Fig. 1). This discovery enables us for the first time to connect between the enclosures and the horse burial, and provide new evidence regarding horse-breeding in the Armenian Highlands. The apparent geographical association of the ritual burial with the many nearby corralling pens further demonstrates the economic importance of the horse and reflects on the ways the landscape was traditionally used.

The Aghavnatun equid burial (tumulus AGH72)

The Aghavnatun archaeological complex is situated west of the modern village of Aghavnatun, at the fringe of the Ararat Depression, in Armavir Region (western Armenia). It covers an area of >100 ha, on the slopes of Mount Aragats, 900–1300 m above sea level. The local landscape is characterized by slopes that are currently almost entirely barren, covered by basalt outcrops and boulders, with annual grass. The lower parts of the slopes, just above the arable land of the valley below, are abundant with a variety of archaeological sites, of which the most visible and common are several large graveyards, massive stone-built cultic structures and towers, settlements, corrals and enclosure pens, as well as rocks with petroglyphs. This rich and varied cultural landscape has been only partially studied, and the dating and associating of different archaeological sites are yet to be established (Gasparyan et al., 2013; Barge et al., 2015; Nadel et al., 2015). The nearest stone-built enclosures (reported in (Malkinson et al., 2018)) are located less than 500 meters away.

Here we focus on the Aghavnatun burial (tumulus AGH72), which was excavated in 2008 in the necropolis

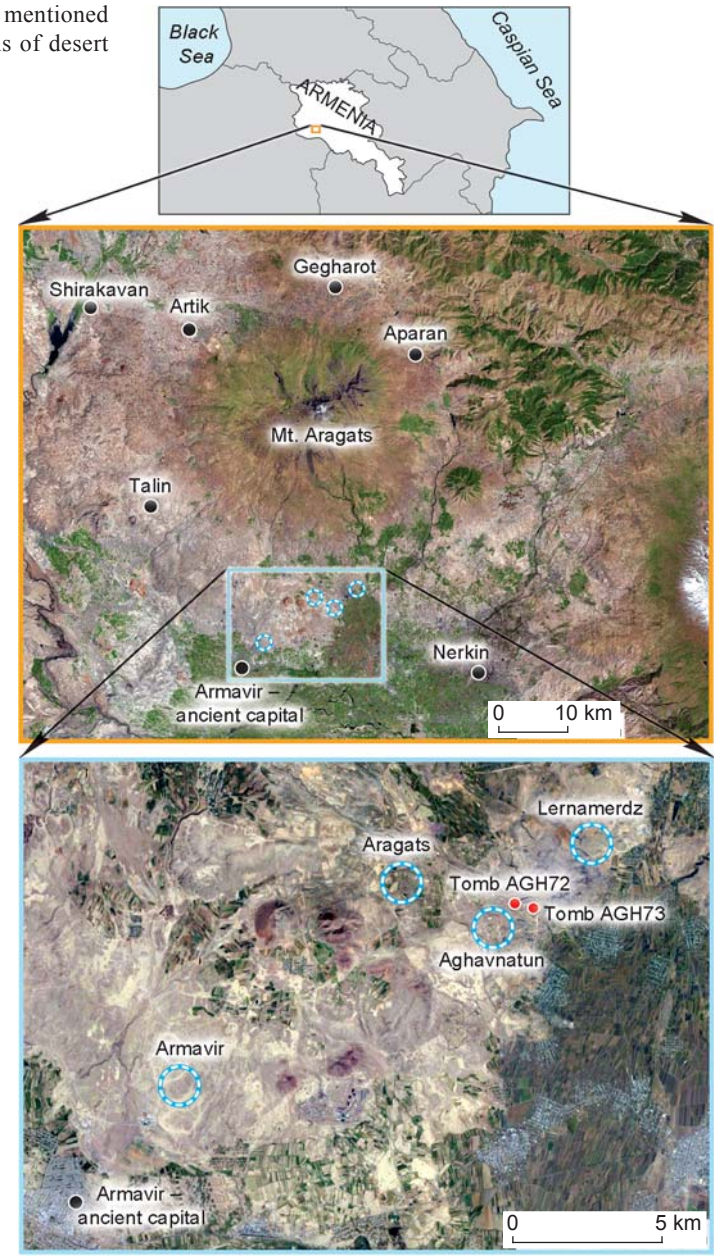


Fig. 1. Map of location of the study area and other sites mentioned in the text. Light blue circles represent concentrations of desert kites.

of the same name by archaeologists L. Petrosyan and F. Muradyan under the direction of B. Gasparyan, exposing a ritual burial of an equid (Fig. 2). The tumulus is roughly circular and symmetrical (14 m in diameter and at least 1 m high). The perimeter and inner walls were constructed from large undressed basalt stones, while the fillings were made of stones of various sizes. The center of the tumulus is divided by a ca 0.65 m wide corridor, with possibly two entrances. The northern entrance was sealed, while the southern part was not preserved. The equid was found *in situ*, in an inner oval-shaped structure, measuring ~1.60 × 2.20 m (Fig. 3).

The animal was placed complete in the center of a specially constructed chamber. It was found in articulation, with its forelegs flexed below the lower part of the skull and its hind limbs flexed under its chest. The horse was buried with a metal ring in its mouth (Fig. 4, 5). The ring was placed in the diastema between the incisors and the molar teeth of the mandible. Other grave goods were entirely missing. A handful of non-indicative pottery sherds and a ventilation pipe, together with three obsidian implements, were discovered during the cleaning of the cover or the shield of the burial (Fig. 6, *a*). The obsidian artifacts are most probably a random addition entering the grave with the sediment used for the construction and cover.

Direct radiometric dating of the horse's skeleton (first phalanx, Lab. No. IAA171298, Institution of Accelerator Analysis, Japan) provided a date of 2130 ± 20 BP, calibrated to 349–96 BC (± 2σ). Thus, the obtained date falls with 95 % confidence within the range of the 4th–1st centuries BC.

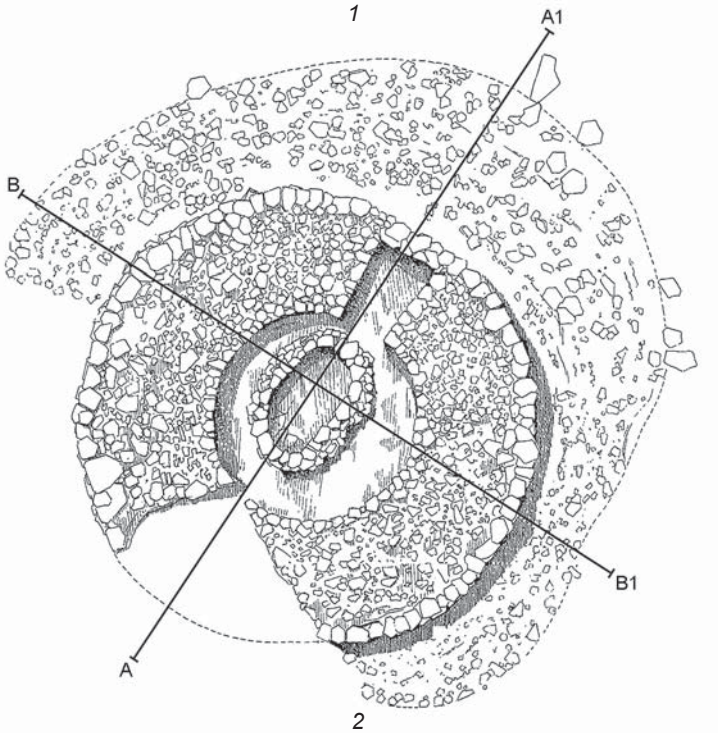
Adjacent to the equid burial, another small tumulus was also excavated (AGH73), which was possibly a ritual addition to the above burial. The structure was composed of a pile of undressed stones, with no inner walls or chambers, and poor in material remains. The most important among the finds was a fragment of a ceramic bowl with a painted ornament, which may tentatively be used to date the structure to the 4th century BC (Fig. 6, *b*). Thus, the dates of both tumuli fall within the same time period, when the Armenian Highlands were ruled by the Orontid (Yervandid) dynasties, which were independent kingdoms and allies of the Achaemenid Empire.

Research methods

The bones of the excavated equid were fragile and badly preserved. Most of the long bones, the pelvis, vertebrae, and the skull were heavily crumbled and broken *in situ*. The maxillary teeth were collected as isolated specimens, while most of the mandible was retrieved intact.

Following excavation, the bones were kept at the Institute of Zoology, National Academy of Sciences of the Republic of Armenia, in Yerevan. Our inspection of the bones was carried out in 2017. Each of the equid bones was examined under a magnifying lens (×5) for bone

1



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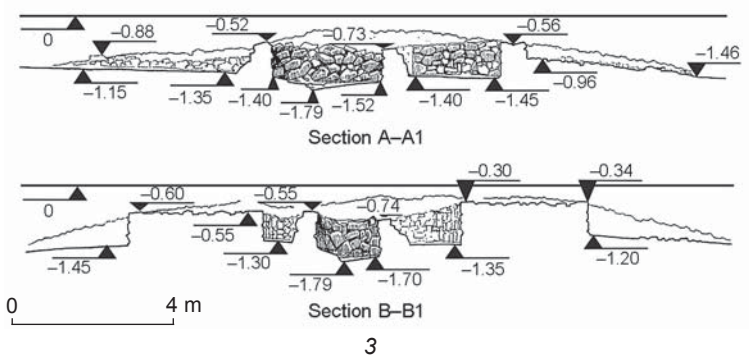

3

Fig. 2. Tumulus AGH72.
1 – field photo, *2* – plan, *3* – side view.

surface modifications (butchery, burning, carnivore puncture, scoring, and digestion) and pathological bone alteration.

Identification of the excavated skeleton of the equid was based on the enamel patterns of cheek teeth, and size and proportions of limb bones (Johnstone, 2004). Bone measurements followed the method developed by von den Driesch (1976). The age of the specimen was determined according to tooth wear (Levine, 1982).

Results

The retrieved bone assemblage of the equid from tumulus AGH72 is heavily fragmented. Complete long bones are entirely absent, and the remains belong to a single equid individual (NISP = 80, MNI = 1). The assemblage includes isolated teeth, bone epiphyses, limb-bone shaft fragments of varying lengths, and most of the carpal, tarsal, and phalanx bones, which were retrieved complete. In addition, most of the axial skeleton was encountered.

A detailed examination of bone surface modification of each of the retrieved bones revealed no evidence of butchering. Similarly, we found no evidence of burning nor any type of percussion marks, including pits, micro-striations and conchoidal notches that could indicate any sort of bone processing, butchery, or consumption of the carcass prior to its deposition. In addition, tooth marks of carnivores are entirely absent, indicating that the carcass was protected from post-depositional and post-burial destruction.

The Aghavnatun horse bones from tumulus AGH72 lack any evidence for pathological modification. Absence of pathology in the lower legs suggests that the equid was not exploited as a draft animal. The low preservation of the axial skeleton does not allow a similar inspection, and we could not search for skeletal abnormality that could have been caused by intense riding. In addition, the absence of excessive wear on the lower and upper premolar and molar teeth suggests that the horse was not ridden with a bit. This tentatively supports the

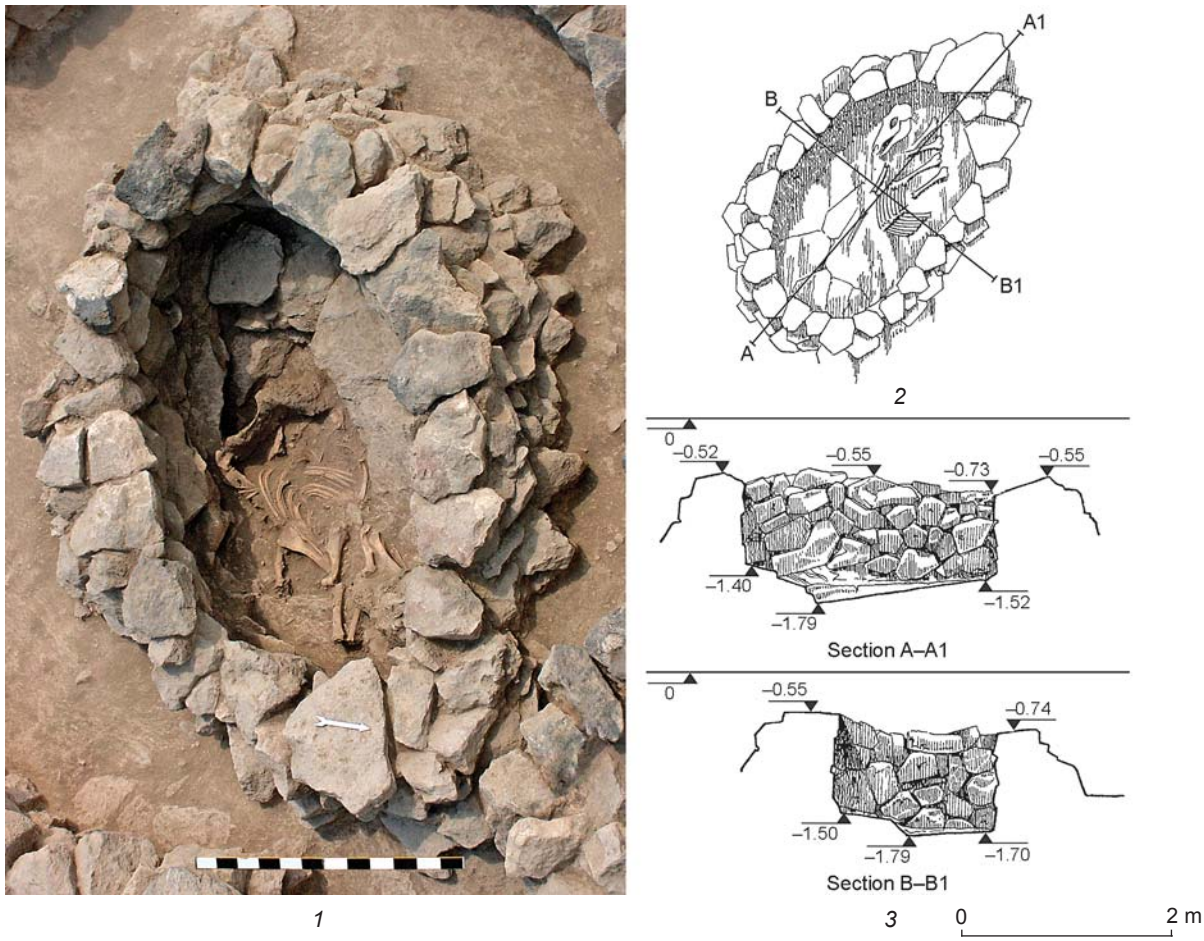

Fig. 3. The horse interment inside the oval installation.
1 – field photo, *2* – plan, *3* – side view.

Fig. 4. The horse's skeleton *in situ* with the ring in its mouth.

Fig. 5. The ring found in the horse's mouth.

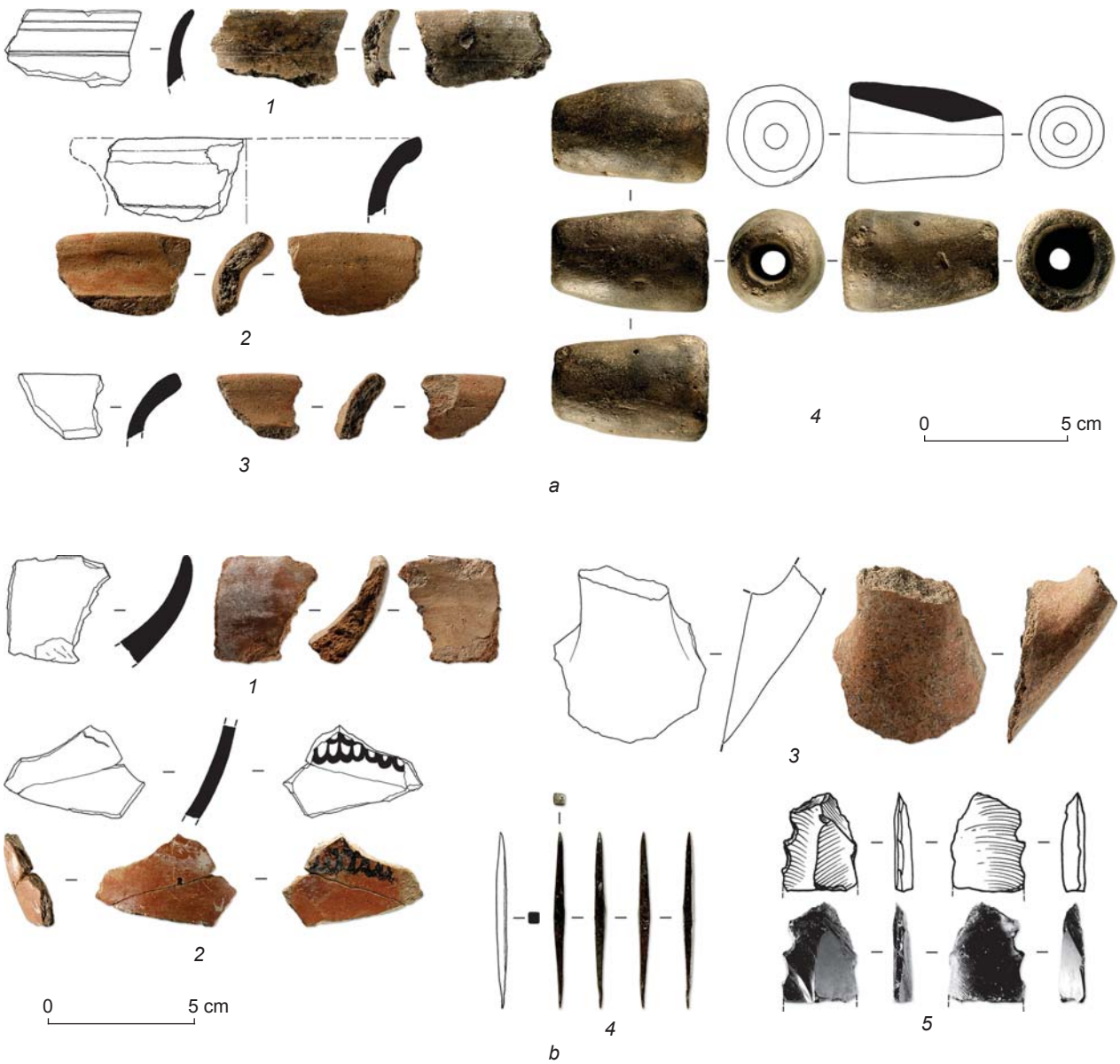

Fig. 6. Finds from tumulus AGH72 (*a*) and AGH73 (*b*).
a: *1–3* – pottery sherds; *4* – ventilation pipe.
b: *1–3* – pottery sherds; *4* – metal needle; *5* – obsidian artifacts.

hypothesis that it was not exploited for riding during its lifetime (Bendrey, 2007).

The taxonomy of the equid is based on several morphological and metrical criteria of bone and teeth. The morphological characteristics of the first phalanges, with their low slenderness, and position of palmar muscle scars (Johnstone, 2004: Fig. 4.13) identify the specimen as a horse (*Equus caballus*). The average measurements of the greatest length of the first phalanges (n = 4; GL = 89.4 mm) versus the shaft diameter (SD = 35.8 mm) tentatively support this observation. The large size of the phalanx falls within the cluster of the horse and is somewhat larger than the mule (Johnstone, 2004: Fig. 4.15). The identification of the specimen as *Equus caballus* is also supported by measurements of the metacarpal (Ibid.: Fig. 4.14). The ratio of the metacarpal's greatest length average (GL = 238.5 mm) to its shaft diameter (SD = 38.92 mm) indicates that it falls within the higher range of measured horses.

The identification of the Aghavnatun equid as a horse is further suggested by applying the log-ratio technique to metacarpal measurements following Johnstone (Ibid.: Fig. 4.18). This comparison reveals that the horse of Aghavnatun is larger than the Prezwalski horse and that it fits the size of a large and tall horse breed (Bökönyi, 1968).

The morphological identification of the horse as *Equus caballus* is also tentatively supported by taxonomic markers of the mandible and maxillary molar teeth (Johnstone, 2004: Fig. 4.2, Tab. 4.1). Given these results it seems plausible to conclude that the combination of the enamel patterns of the mandible and maxillary molar teeth and the size and proportions of the limb-bones suggest that the equid of Aghavnatun can be safely distinguished as a domestic horse (*Equus caballus*) rather than a donkey or a mule. Furthermore, measurements of the long bones and the morphology of the first phalanges indicate that it had long and slender legs.

In order to calculate the shoulder height of the specimen we used the equations based on the length of the long bones. Using the different measurements of complete long bones, we employed the methods of Boessneck and von den Driesch (1974) and Johnstone (2004). The range of the horse's height at the withers is estimated between 149.7 to 159.7 cm, and its average height at the withers is 153 cm (see *Table*). These results indicate that the Aghavnatun horse was a high specimen, especially as compared to other horse breeds known at that time, as usually their height at the withers did not exceed 130 cm (Bökönyi, 1968).

Measurements of the first phalanges suggest that it had slender limbs (calculated slenderness index is 16.3). Slenderness index is calculated as follows: SD × 100/GL, and in AGH72 metacarpal is 38.52 × × 100/239 = 16.3. This observation, together with its tall withers height, tentatively suggest that the Aghavnatun horse had morphological traits similar to those of a Hellenistic horse that was excavated in a Greek sanctuary (the Chora Horse), and identified by Bökönyi (2010) as a Nisean horse.

The age of the Aghavnatun horse was estimated by the crown height of the right and left mandible first molars, as illustrated in Levine (1982: Fig. 2). The obtained crown-height of the measured teeth plotted against teeth of known age gave an estimated age of 17 years for the first right molar (42.1 mm) and 19 years for the first left molar (34.7 mm). Thus, the buried horse was an adult individual in its prime.

Unfortunately, owing to post-excavation deterioration of the skull, which led to the severe disintegration and crumbling of most bones, the canine teeth were not saved and could not be found. Nevertheless, the canine of the mandible can be seen in the excavation photos documenting the exposure of the skeleton (Fig. 4). Therefore, we can safely determine that this specimen was a male stallion.

The metal ring that was found in the horse's mouth is slightly oval (Fig. 5) and has an outer diameter of 11.5 cm and an inner diameter of 9.9 cm. The ring is approximately 8.0 mm thick. The insertion point of the ring is uneven and has a depression in its center, which seems to have been created when the ring's ends were connected. Parts of the ring seem to be eroded, probably as a result of friction. According to the excavator's report, a piece of rope was found tied to the ring. Unfortunately, this piece did not survive for further inspection. The XRF results indicate that the ring is composed of lead and tin bronze alloy.

Discussion

From the end of the 3rd until the 1st millennium BC horses played a significant role in the cultural history of the Armenian Highlands (Mnatsakanyan, 1960, 1961; Devejyan, 2006; Badalyan, Avetisyan, 2007: 51–54; Simonyan, Manaseryan, 2013; Badalyan, Smith, 2017). The resilient human-horse relationship reached its peak in the Van (Urartian) kingdom, whence a wealth of items and archaeological finds of horse related artifacts, including harnessing equipment both for chariot bridling and horseback riding, numerous majestic jewelries with depiction of horses, figurines, metal helmets and shields, gold belts, bowls, and plaques have been discovered (Donaghy, 2014; Samashev, Zhumatayev, 2015; Tumanyan, 2017). Many of these finds were found in royal burials. Horses were occasionally buried in these graves, usually accompanying high-ranking individuals (Khudaverdyan, Khachatryan, Eganyan, 2016). Horse bones are common in the zooarchaeological records of these sites (for NISPs of horses, see (Mizoryan, Manaserian, 2008)). Bridles and bits are commonly associated with the buried horses (Castelluccia, 2017; Jakubiak et al., 2018).

The importance of the Armenian Highlands for large-scale horse-breeding as evidenced in the archaeological

Horse height at the withers, estimated using the method by Johnstone (2004: Tab. 3.3.)

Bone	Measurement, cm	Multiple factor	Height at the withers, cm
Humerus, right	32.8	4.9	159.7
Radius "	34.5	4.3	149.7
Metacarpus "	23.9	6.4	153.1
Metacarpus, left	23.8	6.4	152.6

record is well supported in the broad historical context. The importance of horses in the Achaemenid Empire can be well demonstrated by the god status given by the imperial kings to the Nisean horse (Charles, 2015: 18). In the proceeding Parthian Empire, which was at the time one of the superpowers, there was much emphasis on a well-trained cavalry force (Adalian, 2010: 28). Looking at the scripts of ancient historians, the Armenian region is described as the land of excellent horse-breeding, and of vast meadows dedicated to horse-breeding (Strabo. IV. 9. 14; Polybius. IV. 12. 17–21; Diodorus. VIII. 17. 32–35; Plutarch. VII. 20). The Armenian Highlands are described as one of the biggest sources for horses for the Achaemenid Empire and later also for the Hellenistic and Roman armies. As an Achaemenid satrapy, Armenia was very well known in the Parthian-Hellenistic worlds encompassing wide meadows dedicated for horse-breeding; the Armenians were considered as the best horsemen of the era and the Armenian satrapy offered every year a tribute of 20,000 young male horses to the Achaemenid Empire (Xenophon, IV.V. 34; Strabo. V. 11.14). The quality of the Armenian horses was of the highest. As mentioned above, these historical descriptions are well supported by the large assemblages of horse-related artifacts found in archaeological excavations in the highlands of Armenia.

The horse burial from the Aghavnatun tumulus AGH72 joins the rich archaeological, historical, and iconographic representations and further demonstrates the centrality of the horse and its pivotal economic role in the Armenian Highlands. Thus far, this horse is the only known example in the Caucasus of a ritual burial dedicated only to a horse (for a close example of donkey burial from the southern Levant, see (Bar-Oz et al., 2013)). The location of the tumulus at a short walking distance (~500 m) from several large enclosures and traps and close to the capital of the Hellenistic period Armenian kingdom, Armavir, lead us to suggest that there is a cultural affinity between the nearby enclosures and the horse burial (see Fig. 1). The presence of Bronze Age and Iron Age burials with horses and horse-related artifacts on the fringes of Mount Aragats (e.g., Aparan II, Artik, Gegharot, Nerkin, Naver, Talin, Shirakavan), all of which are spread along the same ecological niche as tumulus AGH72, strikingly manifest the long tradition of horse-breeding in the region (Khachatryan, 1975: 258; 1979; Badalyan, Avetisyan, 2007: 51–54; Simonyan, Manaseryan, 2013; Badalyan, Smith, 2017).

Strabo describes the Armenian Highlands as the land of horses owned by the king; 50,000 Nisean mares were kept here for breeding. These horses were apparently kept in the open meadows, under the king's watch (cf.: (Johnstone, 2004: 53)). The young horses were kept in the open until they reached the age of three years (Donaghy, 2014: 151). A common method of corralling horses in the Asian steppe was by chasing on foot (Rolle, 1989: 106). Such management fits the nearby enclosures that facilitated gathering of horses into the large corral-heads of the kites without stressing them, simply by maneuvering them along the corral guiding walls (Malkinson et al., 2018).

The Aghavnatun tumulus was built to fit a prestigious and respected horse. The morphological characteristics of the skeleton suggest that it was a large male stallion in its prime. No notable injury or any bone trauma were noted. Furthermore, the skeleton was found in articulation and it lacked any evidence of cut-marks on its bones, suggesting that it was not butchered after its death. Its height at the withers indicates that it was a high and robust horse with somewhat slender legs. These characteristics are also found in the Nisean horse. A horse with similar size and morphological traits was reported from the Greek sanctuary Chora Pantanello in southern Italy, and was recognized by Bökönyi (2010) as the Nisean horse.

Noteworthy is the bronze ring that was found in the horse's mouth. Use of a ring as a horse-bit is a well-known practice, first depicted in the standard of Ur, dated to approximately 2450 BC (Clutton-Brock, 1992). However, unlike the Aghavnatun horse burial, in the standard of Ur the rings are located on the upper lip, or on the nasal septum, in the method still commonly used today to control bulls. Such rings are only effective to control the animals when they are used from the front of the animal. The Aghavnatun horse, on the other hand, was found with a bronze ring on its lower jaw. The use of a lower-jaw ring long after the widely common use of mouth-bits in the Armenian region (Castelluccia, 2017; Medvedskaya, 2017) suggests that this particular horse was not ridden but rather led from the front with a rope tied to the ring, which is a common method when leading a stallion to the mare for copulation. Still today, a metal ring on the lower jaw is a preferred bit for stallions while studding rather than any other bit in many breeding farms (Darling, Giffin, 2014).

An interesting mouth ring analogous to that of the Aghavnatun horse was found in the Nabataean site of Umm el-Jimal, Jordan (1st–3rd centuries AD). There too, a metal ring of similar dimensions was found in the mouth of a buried stallion. The size of the Jordanian stallion is nearly the same as that of the Aghavnatun horse (Deckinga, 2013).

Looking carefully at the function of the Armenian enclosures reveals that unlike the hunting installations that are built downhill, to allow driven animals to gain speed until they reach the killing traps and fall into them (Bar-Oz et al., 2011), the Aghavnatun enclosures are built in an opposite, uphill direction (Malkinson et al., 2018: Fig. 1). Clearly, these are not killing traps and it seems that they were operated to catch and corral a herd, and then separate

selected individuals within the large enclosure. The fact that these were built in an uphill setting further supports our reconstruction that the herders meant to cause no injuries to the culled animals.

It is tempting to suggest that this type of enclosure in Armenia, in particular those that are located in the historically acknowledged breeding-grounds of the Armenian horse, were very common in the locations where the breeding of the famous Nisean horses was taking place. The economic importance of Armenian horse-breeding, and the high value of the Nisean horses, could have been the incentive to build large installations serving the industry of high-quality horse-breeding.

To conclude, the unique burial dedicated solely to one adult horse within a monumental structure, as well as the morphological characteristics of the horse and the bronze ring in its mouth, are outstanding within the cultural landscape of the Armenian Highlands. This is also the area where hundreds of large stone-built enclosures are found, many constructed uphill and with sophisticated annexed cells and installations (Ibid.; Nadel et al., 2015). The finds seem to support the historical texts that this is the region where the Nisean horse was bred. We hope that this interpretation will be further reinforced in additional studies and that future research will also address specific genetic traits that will allow the rejuvenation of the ancient and now lost breed of the Nisean horse.

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Scarab Amulet-Beads from 1st–2nd Century Children's Burials at a Necropolis on the Iluraton Plateau, Eastern Crimea

We describe a group of Egyptian faience scarabs unearthed from the necropolis on the Iluraton Plateau, Eastern Crimea, by the expedition from the State Museum of the History of Religion (St. Petersburg) in 1987–1990. Artifacts made of so-called Egyptian faience were found in eight of the sixty-two burials—those of girls aged below 1.5, dating to the 1st to early 2nd centuries AD. The most numerous among the faience items were beads in the form of scarabs. The analysis shows them to fall into three groups in terms of presence and nature of images on the reverse side: those without images (3 spec.), those with abstract images (3 spec.), and those with anthropo-zoomorphic images (2 spec.). In two cases, representations point to specific Egyptian workshops. Scarabs in girls' burials of the Roman period elaborate on the thanatological imagery, which originated among the Scythian-Saka tribes of Eurasia in the mid-1st millennium BC.

Keywords: *Necropolis, Iluraton Plateau, children's burials, Egyptian faience, amulets, scarabs.*

Introduction

This article describes a group of Egyptian faience scarabs discovered during the archaeological study of a necropolis on the Iluraton Plateau (Eastern Crimea) by the Expedition of the State Museum of the History of Religion (GMIR, St. Petersburg) under the leadership of V.A. Khrshanovsky. Sixty two burials from the 1st–2nd centuries AD, including 36 children's burials, were discovered at that necropolis in 1986–1993. In eight of these burials were found items made of so-called Egyptian faience, which are the most important examples of Egyptian imported items for this necropolis (finds of 1987–1990). The finds included scarab beads and various pendants-amulets numbering, in total, 13 artifacts* and 20 beads**.

Penetration into the Northern Black Sea region of the Egyptian (primarily faience) items*** made in

*For the catalogue and typological analysis of the finds from the Northern Black Sea region, see (Alekseeva, 1972, 1978). For the study summarizing the evidence from the Crimea, see (Stoyanova, 2006).

**Some glass items were obviously also Egyptian in origin, but their attribution is a topic for a special study.

***For general information on the Egyptian items found in the Northern Black Sea region, see (Touraïeff, 1911; Korostovtsev, 1957; Piotrovsky, 1958; Hodjash, 1992b); in the

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Naucratis began in the 6th century BC and is known from the finds on Berezan Island, Olbia, Tyras, and Chersonesus (Turaev, 1911; Matthieu, 1926; Bolshakov, Ilyina, 1988; Boriskovskaya, 1989; Levina, Ostroverkhov, 1989; Hodjasch, 1992a; Okhotnikov, Ostroverkhov, 1993; Hodjash, 1999: 193–198; Chepkasova, 2011; Ostroverkhov, Nazarov, 2013). On the Bosporus, these appeared in large numbers only in the Hellenistic period*, which was initially associated with strong economic and cultural ties between the Bosporan Kingdom and the Ptolemaic Kingdom in the 3rd century BC (Treister, 1985; Edakov, 1990; Litvinenko, 1991; Skrzhinskaya, 2010: 88–95). In addition to numerous archaeological finds, onomastic evidence also testifies to the Egyptian influence on the Bosporus (Matkovskaya et al., 2009: 312–314). In Egypt, the "Black Sea footprint" can be seen in the legend about the origin of the cult of Serapis from Sinope (Plutarch, *De Iside*, 27–28; Tacitus, *Historiae*, 83–84), although today this is considered unlikely (Zelinsky, 2010: 360, 451, n. 39–41).

In the Roman period, connections between Egypt and the Northern Black Sea centers resumed with new intensity, although the range of products imported from Egypt to the Bosporus at that time was somewhat less diverse than in the Early Hellenistic period. Quantitatively, imports significantly increased, and Egyptian products found new markets in the nomads of both the Northern Black Sea region and more remote forest-steppe regions (Piotrovsky, 1958: 24–25). At the same time, if in the pre-Roman period, the items made of faience were of Egyptian origin, in the Roman period there were already several production centers of the "Egyptian faience", for example, in Egypt, Iran, and even China (Ibid.: 25–26). Some scholars believe that such centers could have also existed directly in the Northern Black Sea region (Korovina, 1972: 111; Vysotskaya, 1994: 127). However, in that area, production of items in the Egyptian style was clearly not on a mass scale (Piotrovsky, 1958: 26). It is curious that on two occasions, the faience amulet-beads found in the burials on the Iluraton Plateau show features that link them precisely with the Egyptian center of production: first is an image of a ram (*Ovis platyra aegypticus*) lying on a pedestal, which has no direct parallels (cf. (Alekseeva, 1978: Pl. 11–13))** from burial 98 (Fig. 1); second is a scarab-bead from burial 114 (find of 1990, inv. No. A-1255/33-II) with an incused figure of a jackal (Anubis?) on its reverse side, which also has no pictorial parallels in the Northern Black Sea region (cf. (Ibid.: Pl. 9–10, 13))*. On the one hand, this quite definitely indicates the Egyptian production of the items; on the other hand, the choice of these images for the purposes of the funeral rite can be explained by the religious and eschatological ideas of the Iranian-speaking nomads. For example, the ram was associated among the Iranian peoples with the idea of *hvarno* (Vertiienko, 2015: 92–95), while the dog played an important role as a guide to the afterworld**.

A significant number of the Egyptian faience items of the Roman period from various regions of the Northern Black Sea region and Ciscaucasia have already been described***, but the group of finds from the Iluraton necropolis, despite their value, have remained practically unstudied until now—although this topic has been touched upon in a number of papers (Gelfman, 1994; Tarasenko, 2013; Vertiienko, Tarasenko, 2014; Vertiienko, Tarasenko, 2018) and articles (Khrshanovsky, 2010). We will focus on scarab beads and consider them against the background of broader territorial, cultural, and chronological parallels.

All the items under consideration from the Iluraton necropolis were found in children's burials (children under 1.5 years of age), which have been dated according to their grave goods to the period from the 1st to the early 2nd century AD. It is not possible to establish the sexes of the buried persons accurately, but in all likelihood these were girls. This assumption is also supported by the comparison with other contemporaneous children's burials in the Crimea, with a similar composition of grave goods; for example, the burial grounds of Tiramba, Phanagoria, Opushki, etc. (Korovina, 1972: 105; Stoyanova, 2012: 74–75).

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context of their penetration into the steppe zones of the region, see (Parmenter, 2019), cf.: (Vertiienko, Tarasenko, 2018).

*Although it should be mentioned that images of scarabs dated to the 7th–5th centuries BC have been found in Kerch (Piotrovsky, 1958: 23–24).

**An animal with horns bent downwards, corresponding to the iconography of the sacred ram of Amun of Thebes (Kees, 1977: 78−81).

*In the late 1980s, a scarab figurine with the inset image of an ibis (Thoth) was found at the Sarmatian burial ground of Sady (1st–2nd centuries AD), in the vicinity of Voronezh (Medvedev, 2008: 186, fig. 35, *10*).

**In the Iranian Zoroastrian representations, dogs accompany the gatekeeper of the afterlife Daena (Videvdat, 19.30) or act as independent guards of the Chinvat Bridge (Videvdat, 13.9). Dogs played an important role also in the ritual realm of the Scythian tribes (see, e.g., (Vertiienko, 2017: 9, n. 7)).

***See (Symonovich, 1961; Vinogradov, 1968; Alekseeva, 1972; Korovina, 1972; Korpusova, 1973; Anfimov, 1982; Burkov, Mirzoyants, 1987; Gushchina, Zatseskaya, 1994: 20–21, pl. 31, 33, 34, 41, 46; Vysotskaya, 1994: 125–127; 125, fig. 39; pl. 6, 9, 14, 15, 19–23, 28, 30, 31, 45, 46; Pyankov, 1996; Medvedev, 2008: 45–46; 114, fig. 23, *11–46*; 184, fig. 33, 8; 186, fig. 35, *7*, *10*; 200, fig. 49, *1–10*; pl. 2, *a*, *b*; Khrapunov, Muld, Stoyanova, 2009: 16–17, fig. 25–27, 29–31, 34; Mosheeva, 2010; Voronyatov, 2011; Stoyanova, 2012: 74–75; Dzneladze, 2013, 2016; Burkov, 2013, 2015, 2016; Burkov, Gadalrab, 2017); cf. also (Saenko, 2018).

Fig. 1. Faience bead in the form of a ram from burial 98 (1.8 × 0.6 cm, find of 1989, inv. No. A-1253/50-II). © State Museum of the History of Religion (GMIR), St. Petersburg.

Fig. 2. Beads in the form of scarabs from burial 114 (after (Khrshanovsky, Khanutina, Kruglikova, 2007: 47)). © GMIR.

Fig. 3. Bead in the form of scarab from burial 58. © GMIR.

Fig. 4. Beads in the form of scarabs from burials 76 (*1*) and 98 (*2*). © GMIR.

Descriptions of faience scarabs

The finds can be divided into three groups.

Group I. Scarabs without images on the reverse side (3 spec.):

1. Bead in the form of scarab from burial 98 (find of 1989, inv. No. A-1253/49-II). Its size is 1.3 × 1.0 cm. The color is blue. The type is 45b (after (Alekseeva, 1978: 41; pl. 10, *5*)).

2, 3. Two identical scarab-shaped beads from burial 114 (find of 1990, inv. No. A-1255/31-II and A-1255/32-II) (Fig. 2). Their sizes are 2.5 × 2.2 and 2.6 × 2.2 cm. The color is turquoise. The type is 50c (after (Ibid.: 42; pl. 10)).

Group II. Scarabs with abstract images on the reverse side (3 spec.):

4. Bead in the form of scarab from burial 58 (find of 1987, inv. No. A-1244/8-II) (Kublanov, Khrshanovsky, 1989: 26–27; Khrshanovsky, 2010: 593–595, fig. 8, *8*) (Fig. 3). Its size is 2.0 × 1.6 cm. The color is light blue. The type is 45b (after (Alekseeva, 1978: 41; pl. 10, *5*)).

5. Bead in the form of scarab from burial 76 (find of 1988, inv. No. A-1252/21-II) (Kublanov, Khrshanovsky, 1989: 24; 25, fig. 9) (Fig. 4, *1*). Its size is 1.4 × 1.1 cm. The color is violet-blue. An inset image of snake with a groove

Fig. 5. Beads in the form of scarabs from burials 79 (*1*) and 114 (*2*). © GMIR.

is on the reverse side. The type is 45b (after (Alekseeva, 1978: 41; pl. 10, *7*)).

6. Bead in the form of scarab from burial 98 (find of 1989, inv. No. A-1253/48-II). Its size is 1.9 × 1.5 cm. The color is light green. An inset image of a snake with a groove is on the reverse side (Fig. 4, *2*). The type is 48b (after (Ibid.: Pl. 10, *22*)).

Group III. Scarabs with anthropo-zoomorphic images on the reverse side (2 spec.):

7. Bead in the form of scarab from burial 79 (find of 1988, inv. No. A-1252/70-II) (Kublanov, Khrshanovsky, 1989: 27) (Fig. 5, *1*). The size is 1.5 × 1.2 cm. The color is light turquoise. An inset image of a human figure is on the reverse side. The type is 50c (after (Alekseeva, 1978: 42; pl. 10, *9a*)).

8. Bead in the form of scarab from burial 114 (find of 1990, inv. No. A-1255/33-II) (Fig. 5, *2*). Its size is 1.3 × 1.0 cm. The color is turquoise. An image of a seated jackal (Anubis ?, cf.: (Motouk, 1977: 382–383)) is on the reverse side. This image has no parallels in the Northern Black Sea region. The type is 50c (after (Alekseeva, 1978: 42; pl. 10, *9a*)).

Discussion

We will avoid the problem of the ethnic and cultural affiliation of the persons buried with the items made of Egyptian faience. A.V. Simonenko pointed to the presence of these items at the "Sarmatian, Meotian, Late Scythian, as well as Greek Antiquity necropolises", yet emphasized that "on the territory of the Ukraine, beads and pendants made of Egyptian faience prevail in the main burials of the 'Eastern wave'… these amulets are a part of the cultural complex of migrants, brought with them from their original places of habitation" (2011: 116). Relying on the available research, S.V. Voronyatov observed: "…Egyptian faience beads are one of the constituent features of the Middle Sarmatian culture" (2011: 96). The role of such things in the spiritual life of this population is more important for us. There are hardly any doubts that in a new cultural environment, Egyptian items received a semantic status that was extremely different from their original meaning and was associated with the local magical, religious, and mythological realities (cf. (Vysotskaya, 1994: 124; Batizat, 2007)). These items should be viewed in the context of indigenous funeral traditions. The present-day interpretations of their meaning are highly ambiguous. For example, in the most general manner, many scholars have mentioned that the Egyptian faience items acted as amulets-apotropes or averters (Korostovtsev, 1957: 80–81; Piotrovsky, 1958: 24; Vysotskaya, 1994: 124; Falkovich, 1992; Pyankov, 1996: 99; Medvedev, 2008: 46; Mosheeva, 2010; Stoyanova, 2012: 91). However, this does not explain their absence in the adult burials at the Iluraton necropolis. I.N. Anfimov believed that these items played an ambiguous role in the religious and magical beliefs of this population: "Amulets in the form of scarabs, genitals, frogs, bunches of grapes, and doubled small cylinders were associated with the cults of fertility and childbearing. Figurines of lions, Bies, and pendants in the form of a fist with a fig sign served as apotropes" (1982). Such a functional division can only be conditional. According to A.V. Pyankov, the items discovered were related to healing magic (1996: 99) (cf. (Vysotskaya, 1994: 124)). However, those buried with these items did not seem to have needed medical treatment. A.K. Korovina proposed a hypothesis that the presence of Egyptian amulets in children's burials testified to adherence of their parents to the Egyptian cults (1972: 111) (cf. (Chekhovskaya, 2011)). There is a fairly large amount of data on the distribution of the cults of Egyptian deities, primarily Serapis and Isis, in the city-states of the Northern Black Sea region since the Hellenistic period (see (Solomonik, 1973; Saprykin, 2009: 160–178)). Yet it is hardly possible to assume such a situation for the Sarmatian population of the Roman period, including the people who left their graves on the Iluraton Plateau. T.M. Gelfman focused on the image of Horus the Child/Harpocrates, depicted with a finger at his mouth (1994: 87). It is known that in the Greco-

Roman world he turned into a god of silence, which seems quite natural for a funeral cult. However, only two such amulets have been found at the necropolis of Iluraton so far, while eight scarab beads were discovered there*. In addition, it is unknown to what extent the Greco-Roman perception of this image was spread among the so-called Barbarian tribes.

At the same time, the soteriological aspect of the semantics of the Egyptian scarab (Keller, 1913: 409–413; Bonnet, 1952: 720–722; Giveon, 1984) as an image of reviving and creative energy of the morning sun, may have found a certain place in the beliefs of the Black Sea Greeks and nomads (Bogdanova, 1980: 86) (however, cf. (Vinogradov, 1968: 52)). In Ancient Egypt, the first scarab images** appeared in the Middle Kingdom (2040–1650 BC) and continued to be used until the Greco-Roman period. The scarab was considered a sacred animal of the Sun, also embodying its special hypostasis of Khepri—a god of creation. At the same time, scarabs played an important role in the funeral and Osirian beliefs of the Egyptians (Stadler, 2001).

Of course, it is currently impossible to give a definitive answer to the question of the semantics of Egyptian symbols in the context of the funeral rite revealed by the examined Iluraton graves. Apparently, the answers should still be sought not so much in Egypt, but in the role the child played in the worldview of archaic societies in general (Tulpe, 2002; 2012: 59–65). As is known, before reaching a certain age and going through initiation, children were not considered full members of a community (that is, fully human) and had a kind of borderline status between life and death, order and chaos. In the event of death of a child, this inevitably required different actions during the performance of funeral rituals, and special grave goods, which at the same time served as a sacrifice to the gods of the chthonic world. It is quite possible that the Egyptian items possessed exactly this semantic status among the nomads of the Eastern Crimea.

Scholars have long noted that beads made of Egyptian faience were found in the complexes of the Roman period only among the goods of children's (mostly girls') and female burials (Touraïeff, 1911: 31–32)*, which quite clearly reveals the gender aspect for including these items into the realm of "female subculture" (Voronyatov, 2011: 97). Preconditions for this can be seen at the earlier stages of using Egyptian images, in particular the scarab, in the funeral rite of the nomadic aristocracy in the Northern Black Sea region. In fact, the items made of Egyptian faience have been often found in women's, less often in children's**, Scythian kurgan burials in the steppe part of the Northern Black Sea region (Nosaki, Rogachik burial ground, Gyunovka, etc.) (Kurganniye mogilniki…, 1977; Boltrik, Fialko, 2007; Ostroverkhov, 2014: 43–45; 52, fig. 6, *1*)***. In the forest-steppe area, the only known scarab of Egyptian faience (Late Period) was discovered in 2019 in an undisturbed female burial at the Belsk fortified settlement (the Skorobor burial ground, 6th century BC)****.

Notably, the association of the scarab image with the female burials among the Iranian-speaking nomads shows examples that are quite remote from the Northern Black Sea region. For instance, a scarab-seal with the cryptographic inscription "Amon" (*Imn*) was found in a Saka female burial 3, kurgan 2 (05) at the Kyryk-Oba II cemetery, in Western Kazakhstan (Eder, 2012: Pl. I, 125, *1*, *2*)) (Fig. 6). This burial is dated to the 5th century BC, and the scarab-seal to the 7th–6th centuries BC (Ibid.: 191).

Conclusions

The semantics of representations on the reverse sides of the scarab beads under discussion is generally associated

*Generally, the available statistical data suggest that precisely the scarab figurines were the most common type of beads in the burial complexes under discussion (Vysotskaya, 1994: 126; Simonenko, 2011: 115).

**These were originally used as seals (Newberry, 1906: 61–85; Petrie, 1917: 2–8). This function persisted for a long time and spread far beyond the borders of Egypt, including the Northern Black Sea region. B.A. Turaev noted that before the 14th century, rings with shields of engraved stone seals were called "zhukovina" (from *zhuk* – 'bug, beetle') in Russian language (especially in the Crimea) (Touraïeff, 1911: 35). In the charters written in the Old Russian language, this term was used until the 16th century to designate the rings that had a carved stone insert (Krysko, 1990: 270; Nelyubov, 2002: 4). According to the etymological dictionary of M. Vasmer, the meaning of "zhukovina" as a ring with a stone also survived in the Ukrainian language ("ring with a stone in a frame") (1986: 64). From the end of the Middle Kingdom of Egypt, scarab figurines were used as amulets (Quirke, 2003), and since the New Kingdom of Egypt, their production became widespread.

*In addition, B.A. Turaev observed that even in his time the beads of Egyptian faience, accidentally discovered in the Crimea, definitely became women's adornments.

**For example, three scarabs made of Egyptian faience were recorded in a children's burial near the village of Kut in the Dnepropetrovsk Region (kurgan 7, burial 3, 4th–3rd centuries BC) (Berezovets, 1960: 51).

***Such finds are extremely rare at the Scythian fortified settlements of the Northern Black Sea region. As an example, we can mention the faience scarab found at the Annovka fortified settlement (Kherson Region) of the Late Scythian period (Gavrilyuk, 2013: 552; 555, fig. 9, *10*, *12*).

****We would like to thank the site's researchers I.B. Shramko and S.A. Zadnikov (Kharkiv) for the information on this important find.

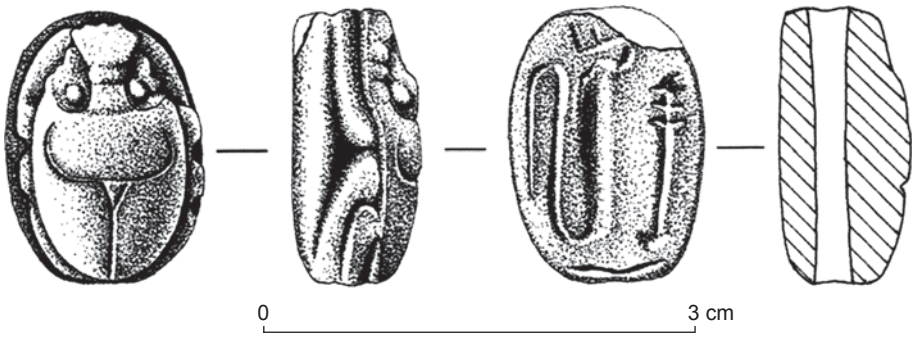

Fig. 6. Scarab-seal from burial 3, kurgan 2, at Kyryk-Oba II (after (Eder, 2012: Pl. I, 125, *2*)).

with the feminine principle and idea of fertility, which well correlates with the idea of chthonicity of women among the Iranian-speaking nomads of Eurasia (see (Bessonova, 1991: 95)), and with the soteriological concept of the scarab symbolism. The interrelation of these two concepts in the form of the scarab beetle probably led to its perception in the Northern Black Sea region as a psychopomp or mediator between the worlds of the living and the dead. It is possible that exactly the image of the scarab influenced the "strange" iconography of spiders with three pairs of paws on the plaque from the Aleksandropol kurgan* and on the sewn-on plaques from tomb No. 1 of the Melitopol kurgan (Terenozhkin, Mozolevsky, 1988: 91, fig. 98, *7*).

Thus, our analysis makes it possible to suggest that in the perception of the scarab by the Iranian-speaking nomads, their own autochthonous ideas might have merged with the "Egyptian" beliefs. The local beliefs clearly manifest themselves in the gender-age aspect, with the obvious tendency: among the Scythians, sculptural images of scarabs are known predominantly from female burials, while among the Sarmatian tribes, scarabs became a stable attribute of children's burials. This may be explained by a special position of women and children in ancient societies. During their burials, the sacrifice of "atypical" items (that is, those that possessed the expressive semiotic status of otherness), such as artifacts made of Egyptian faience, to the chthonic gods could be perceived as a pledge of birth of new life (procreation). In this respect, scarab beads from female and children's Sarmatian burials of the Roman period, including those found in the graves on the Iluraton Plateau, apparently continued the development of the above general idea that had manifested itself already among the Scythian-Saka tribes of Eurasia in the mid first millennium BC.

*The plaque is kept in the collection of the Sumtsov Kharkiv Historical Museum. We are grateful to L.I. Babenko (Kharkiv) for the photograph of this artifact.

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Traces of the Dahaean and Sarmatian Cultural Legacy in Ancient Turan and Old Rus

This study examines the migrations of the Dahae and Sarmatians—the two related early nomadic peoples of Middle Asia and Eastern Europe—directed to the south and west of their homeland. Archaeological, written, and folkloric sources make it possible to trace the migrations of the Dahae and Sarmatians over several centuries preceding the spread of Islam in Central Asia and of Christianity in Old Rus. The study focuses on mortuary monuments, temples, and sanctuaries, cross-shaped in plan view, of migrants and their descendants. A detailed analysis of the major southward migration of Dahae from the Lower Syr-Darya in the late 3rd to early 2nd BC is presented. This migration had a considerable effect on ethnic and cultural processes in Middle Asia. The migration aimed at conquering the lands of Alexander the Great's descendants, who were rapidly losing control over them. Features of Dahaean culture are noticed in town planning, architecture, mortuary rites, armor, etc. over the entire territory they had captured. Southward migration of the descendants of the Dahae—people of the Kaunchi and Otrar cultures—from the Syr-Darya, led by the Huns, was part of the Great Migration. The Kaunchi people headed toward the oases of Samarkand and Kesh, the Otrar people toward the oasis of Bukhara, and those associated with the Dzhetyasar culture toward the Qarshi oasis. It is demonstrated that while the cross-shaped plan view of religious structures turned into the eight-petaled rosette, the funeral rite did not change, remains of burials and charcoal are observed everywhere. Relics of the Scytho-Sarmatian legacy are seen in the culture of Old Rus. For instance, remains of the sanctuaries of Perun are walls and ditches arranged in a cruciform or eight-petaled fashion, filled with charcoal and bones of sacrificed animals, with a statue of the supreme Slavic deity, in the center. Early sanctuaries of Perun in Kiev and Khodosovichi were cruciate in plan view, while later ones on the banks of the Zbruch and the Volkhov rivers had octopetalous plans. Apparently they were influenced by the architectural traditions of Dahae and Sarmatians, who took part in the ethnogenetic processes in both Old Rus and Turan.

Keywords: *Mortuary rites, traditions, migrations, cults, archaeological cultures, ecology.*

Introduction

According to the tradition of the Avesta and Shahnameh, the lands of the sedentary Aryans were in the basin of the southern Amu Darya – the upper reaches of the Vakhsh – Oxus (Iran and Khorasan (from "Khors", "Khorshid" – the Sun)), and the lands of the wandering Turs were in the basin of the Syr Darya – Tanais and the upper reaches of the Jaxartes (Turan). On the basis of archaeological evidence, it has long been established that the Syr Darya was the southern border of the steppes, and the interfluve of the Amu Darya and the Syr Darya (Sogdiana) often turned out to be the region of rivalry and interaction between the cultures of the agricultural and nomadic peoples of Central Asia. Something similar happened in Eastern Europe and southern Siberia, where the southern

foothills and northern forest-steppe of the middle latitudes were separated by the so-called steppe belt.

Bounded on the northwest by the Aral Sea, the delta of the Syr Darya—a vast alluvial plain surrounded by semi-desert steppe and sands of the Kyzylkum Desert—had traditional connections with Khorezm, the Volga region, and the steppes of Kazakhstan. Sedentary agricultural urbanized culture of the population inhabiting the Lower Syr Darya region emerged in the mid first millennium BC under the influence of the urbanization of Khorezm and on the basis of the cultures of the nomads who were engaged in seasonal agriculture along ancient the delta channels of the Syr Darya.

The migration of ancient societies entailed carrying the entire complex of their ethnic features, which could take root or eventually disappear under the influence of ethno-genetic processes in a new ecological and ethno-cultural environment, depending on specific conditions. We know mainly about migrations in ancient periods from fragmentary information in written sources. The comprehensive analysis of burial structures and sanctuaries, as well as traces of cultic rituals, makes it possible to supplement this information and reconstruct the customs and rituals of particular peoples. In ancient times, rituals were closely associated with mythology and language. An exchange of mythological subjects, as well as religious beliefs and vocabulary, took place during the periods when migrants settled down and ethnic boundaries in certain ecological zones became stabilized. In material culture, exchange of production techniques, styles of fine art, types of weaponry, coins, etc., occurred. The emergence of a special nomadic type of cattle-breeding resulted in annual large-scale and long-term seasonal migrations as a lifestyle of population in vast expanses of the Eurasian steppes, while the formation of local cultures of the sedentary agricultural population was sometimes interrupted by new waves of nomads.

Migration of the Dahae to the south of Middle Asia

Large migration of the Dahae from the lower reaches of the Syr Darya in the late 3rd to early 2nd century BC made a great impact on the ethnic and cultural genesis of the population living in Middle Asia. Numerous but very brief reports about this event have survived in various written sources. The nomadic peoples of the steppes were heterogeneous, but had similar archaeological complexes. The Greco-Roman sources call them the Sauromates, Sirmats, and Sarmatians, although occasionally the Dahae are named among the nomads. The Chinese sources mention the Kangju land. The Persian sources inform us about the Dahae. This ethnonym in the form of *daya* also appears in the Greco-Roman sources. The Dahae and Sarmatians, whose movements can be traced through archaeological finds, had a similar material culture and mythology; at least the majority of them spoke similar dialects of the Eastern Iranian language group.

The Khorezm Archaeological and Ethnographic Expedition has established that after the defeat of Cyrus by the army of nomadic tribes and peoples led by the Massagetae by the mid first millennium BC, the Chirik-Rabat and Dzhetyasar archaeological cultures emerged in the area of the ancient delta channels of the Syr Darya. After two centuries of successful development, the Chirik-Rabat culture found itself in a crisis. The movement of tectonic plates in the Turan Depression had caused serious changes in the landscape—the hypsometric slope of the entire Eastern Aral Sea region constantly increased from south to north, which resulted in reduction of the volume of water inflow from the middle river channel into the southern channels in the ancient delta of the Syr Darya. In the 3rd century BC, the river in its lower course broke into a new northern channel and flowed from the northeast into the Aral Sea. This led to ultimate drainage in the territory of the Chirik-Rabat culture, which originated in the 5th–4th centuries BC. B.I. Weinberg reasonably considered this culture to belong to the Dahae mentioned in the written sources (1999). Specific aspects of their culture have been analyzed in a number of studies by B.I. Weinberg and L.M. Levina (Weinberg, Levina, 1993; Weinberg, 1999). The Dahae left their homeland in the lower reaches of the Syr Darya gradually, as the crisis unfolded.

The Dahae are mentioned in the Frawardin-Yasht of the Avesta, together with the Arya, Tura, Sairima, and Saina (Weinberg, 1999: 207). The appearance of the Dahae and Sairima in the same list (it does not matter whether the latter are compared with the Sauromates or Sarmatians) confirms that these peoples at that time represented independent political entities, although their material culture was very close, and the weaponry from the burials was identical. From the 4th century BC, the Dahae were known as warriors, first of the Achaemenid troops and then of the army of Alexander the Great. Genetically, the Dahae were related to the Sauromates and Sarmatians in the south of the Urals. The Ural River is the medieval Yaik and Ptolemy's Daik. This name is related to the ethnic name of the Dahae or Daae. In the 4th–2nd centuries BC, the Dahae are mentioned among the population of the territories located south of the Amu Darya—Khorezm, Uzboy, and Atrek, as well as the Zarafshan basin. Their archaeological complex is genetically related to the Prokhorovka culture of the southern Urals (Balakhvantsev, 2016).

According to the Greco-Roman sources, the Parni, who were a part of the Dahae union, led by Arsaces and Tiridates, captured Parthia. Under Mithridates the Great, the rulers of Parthia expanded their borders to

Mesopotamia in the southwest, and exerted pressure on the Kushans in the east; in the north, they owned the lands up to Turiva – Tarab and Kazbion – Kaspi on the southwestern frontiers of Sogd. The history of Parthia is an individual and vast topic.

After the Dahae left their homeland at the turn of the 3rd–2nd centuries BC, the life along old channels of the Kuvan Darya, Inkar Darya, and Jana Darya came to a standstill. Land cultivation began along the northern, new lower part of the river, but there were no settlements there until the 2nd century BC.

The earliest among the sites of the Chirik-Rabat culture is the Chirik-Rabat settlement in the place of the first capital of these people. It is now represented by ruins with burial structures of the leaders who lived in the 5th–4th centuries BC. The settlement is surrounded by an oval defensive wall. The Babish Molda settlement was the second in time. This was a fortress-type structure in the form of a monumental, square-shaped high fortress, surrounded by a defensive wall around the perimeter with an impregnable high tower at the entrance, which was connected to the fortress by a swing bridge. Weinberg dated the castle to the 4th century BC and believed that it was built as the seat of a satrap after incorporating the lands of the Dahae into the Empire as allies of the Achaemenids. The fortress remained unfinished, because already in the late 4th century BC, Khorezm, and with it the Dahae, gained independence. The land of the Dahae, through which large and small channels of the Syr Darya delta flowed, had been inhabited and cultivated, but in the process of the endogenous ecological disaster mentioned above, it became depopulated.

The Dahae roamed and went on campaigns in Middle Asia in the earlier time, since the 5th–4th centuries BC. This is revealed by the evidence from numerous burial grounds of the undercut and catacomb types, located in the middle reaches of the Syr Darya, Zarafshan, and in the Kyzylkum. In the Aral Sea region, the Dahae were preceded by the Saka people, related to the Sauromates (Smirnov, Petrenko, 1963: 5). Almost all scholars believe in the common origin of the Dahae and the Sarmatians, and the unity of their material culture. With all resemblance to the Scytho-Sarmatian world of the early nomads, the Dahae, who left the lower reaches of the Syr Darya in the 2nd century BC, had two hundred years of experience in sedentary agricultural, cattle-breeding and, moreover, urbanized culture, as evidenced by two hundred-year history of the Chirik-Rabat culture. The last and final movement of the Dahae to the south and east at the turn of the 3rd–2nd centuries BC became the impetus for the migration of other nomadic peoples, which swept away the last Greek rulers (the heirs of Alexander the Great) in the 2nd century BC and laid the foundation for new dynasties of autochthonous origin. It is no coincidence that the Sarmatian movement in the spaces to the west of the Aral Sea and the Urals began in the 3rd century BC.

In the south, one part of the Dahae invaded Parthia, while another part, passing Sogd and Bactria and crossing the Hindu Kush, occupied the lands up to the Helmand Valley and the middle reaches of the Indus, where the so-called Indo-Scythian or Indo-Parthian kingdoms existed in the first centuries BC. These kingdoms minted their own silver coins, from which the names of the rulers such as Vonones, Maues (Mahvash?), and Azes are known.

Roman written sources report that Bactria was taken away from the Greeks by the Asii, Pasiani, Tokhari, and Sakarauli. It may be assumed that these were the names of the main tribal unions of the Dahae. Zhang Qian paid a diplomatic visit to the Da Yuezhi, who settled in the upper reaches of the Amu Darya after being driven out by the Huns and Wusuns from Eastern Turkestan; he called the land they recently occupied "Daha". It may be the case that the Tocharians of the Greco-Roman historical tradition correspond to the Yuezhi from the Chinese sources.

Thus, by the first century BC, a large cultural community, which occupied the territory from the lower reaches of the Volga and Ural Rivers to the lower and middle reaches of the Syr Darya, had emerged in the steppe zone of Middle Asia. In the west, it bordered with the lands of Greek colonies. This is reflected in Greek sources informing us about the arrival of the Sarmatians, who were known as the Dahae or Daae in the south of Middle Asia. Chinese sources call them "Kangju". The population of these areas is distinguished by a common archaeological complex. Since the beginning of the Common Era, red-clay mugs with the side handle in the form of a lamb with twisted horns have been a marking feature of this cultural community (Podushkin, 2015).

These large-scale migrations and ethno-cultural processes resulted in profound changes in the material and spiritual culture of the population living in Middle Asia. These changes are reflected primarily in the monetary economy of this vast region. After new rulers of each separate possession declared their sovereignty, they began to mint coins in their own names. Not all rulers had an opportunity to issue full-fledged silver coins, but they tried to adhere to the weight and nominal standards of the Greek drachma and chalkos whenever possible. In most possessions, with the exception of the Parthian State, coins quickly lost their weight and quality, and silvered drachmas appeared. Coins vary in typology; all copper coins are imitations of Greek coins of various types. The new thing was that the clan tamgas of the rulers appeared on the coins, while the image of a deified ancestor, often on horseback, was represented on the reverse. These are already the undoubted symbolic features of the sovereignty of the nomads.

Initially, the Dahae (represented by their warlike clans, which were inclined to nomadism) occupied the

vast fragmented territories of the heirs of the Empire; but over time, when the last wave of migrants had left the lands in the middle reaches of the Syr Darya, which their ancestors had developed, the Dahae began to populate these lands. This was also an exodus from the homeland by those communities of the Dahae who had long been sedentary and were engaged in sophisticated cattle-breeding and agricultural economy. They moved upstream the Syr Darya along the right bank, which was partially irrigated by small rivers running down from the southern slopes of the Karatau Ridge. In the process of slow migration, these Dahae communities began to appropriate the lands suitable for agriculture. Later, some of the Dahae went to Semirechye, as indicated by the pottery complexes of the first half of the first millennium BC discovered there. As a result, two new ethno-cultural communities represented by the Otrar-Karataus and Kaunchi archaeological cultures well-studied for a long time, emerged in the basin of the middle reaches of the Syr Darya in the 2nd century BC. The groups of the Dahae who settled in Semirechye spread their original early urban culture to the right bank of the Syr Darya. In the 2nd–1st centuries BC, the founding of large and small towns such as Sygnakh, Sauran, Yassi (Turkestan), Otrar, Chimkent, Tashkent, and Taraz, as well as fortified settlements located between them, took place. The evidence of long-term excavations carried out in Tashkent, Chimkent, and Taraz has confirmed their age of over two thousand years.

These movements were fundamentally different from the previous movements of the nomadic Dahae, which corresponded to the traditional model of nomadic migration. Now the Dahae became united and, thanks to their mobility and military superiority and despite their small numbers, they captured wealthy but defenseless agricultural areas in order to receive tribute. In this case, the Dahae acted as occupiers; in the role of new lords, their aristocracy infiltrated the urban centers of the conquered territories.

Wherever the Dahae appeared, they left the signs of their culture, manifested in urban planning and architecture, funeral rites and weaponry, and art and religious traditions. At the same time, the material culture of the Dahae retained the features inherent not only in the Prokhorovka culture, but also in the Sarmatian culture of Eastern Europe. This has been observed by the researchers of burial mounds in the valley of the Syr Darya and Zarafshan, and on the right bank of the Amu Darya (Yagodin, 1982; Podushkin, 2015). Sarmatian mugs with the lamb-shaped handle are also typical of the Kaunchi culture of the Tashkent oasis of the 1st–4th centuries AD (Fig. 1).

In my opinion, the emergence of the Chirik-Rabat and Prokhorovka cultures happened not only synchronously, but also syngenetically: the carriers of both archaeological

Fig. 1. Mug with the lamb-shaped handle. 2nd–3rd centuries AD. Yangiyul (URL: http://uza.uz/oz/society/yangiy-ldan-yangi-tarikhiy-topilma-17-09-2020).

cultures constituted the union of the Dahae. In the 3rd century BC, owing to the drying up of their oasis in the delta of the Syr Darya, all Dahae were set in motion, and some of them entered the territory of the Sauromates. After merging with the newcomers, the Sauromates could have begun to be called "Sarmatians".

The influence of the Dahae on the urban planning and culture of Sogd is also manifested in Nakhshab, in the lower reaches of the Kashkadarya. A new grand fortified town of the fortress type Qal'ayi Zahhoki Moron—the Castle of Zahhak the Snake (Dahak)—was built 10 km south of the capital fortified settlement of Yerkurgan in the 2nd century BC. It was a colossal square fortress with 100-meter long sides and height exceeding 15 m; it was surrounded by three rows of walls: the first row measured 210 × 210 m; the second 400 × 400 m, and the third 1500 × 1500 m (its walls have not survived). Walls up to 8 m high and up to 10 m wide at the base have been preserved. Previously, there were such structures neither in Sogd nor in Bactria. Qal'ayi Zahhoki Moron reproduces all the fortification features of Babish Molda—an unfinished residence of the 4th century BC, belonging to the Satrap of the Dahae in the Aral Sea region, in the lower reaches of the Syr Darya—but has exaggeratedly enlarged sizes and three times as many walls. The fortress and second row of walls in Qal'ayi Zahhoki Moron on its southern façade have massive protrusions similar to the Babish Molda gatehouse. It can be assumed that precisely this fortress town of the Dahae was the center of power for the new lords of the land. The very name Zahhak or Dahak indicates its connection with the ethnic name of the Dahae. Judging by the grand sizes of Qal'ayi Zahhoki Moron, the power of the owners of the new Dahae residence in Nakhshab extended far beyond the boundaries of Nakhshab proper and Sogd. The formerly

Hellenized capital of Nakhshab (the fortified settlement of Yerkurgan) might have been assigned the role of the trading and artisanal center of the oasis. It is important to mention that the settlement of Kat was located in the fortified settlement before the latter was consumed by the modern town of Qarshi; old-timers remembered this still in the second half of the 20th century. Kat is a traditional name of towns and fortifications of the Eastern Aral region, including the name of the capital town and Early Medieval Khorezm; most likely, the word is associated with the Dahae language.

The construction of such large ancient towns of the Fergana Valley as Akhsikath and others happened at that same time.

In addition to the fortress center Qal'ayi Zahhoki Moron, a monumental Zoroastrian Tower of Silence was built outside the walls of the Yerkurgan settlement in ancient Nakhshab (the Qarshi oasis). The town was surrounded by a second outer wall with semicircular flanking towers. The Tower, which turned out to be inside the town wall, was mured up.

The town of Samarkand under the Dahae was going through hard times; at that time, less than half of its area was inhabited. Small fortified towns with citadels were built in the Samarkand, Bukhara, and Kesh oases (Poykent, Varakhsha, Dabusia, Kitab, etc.), in the Fergana Valley, and in the south of Kazakhstan.

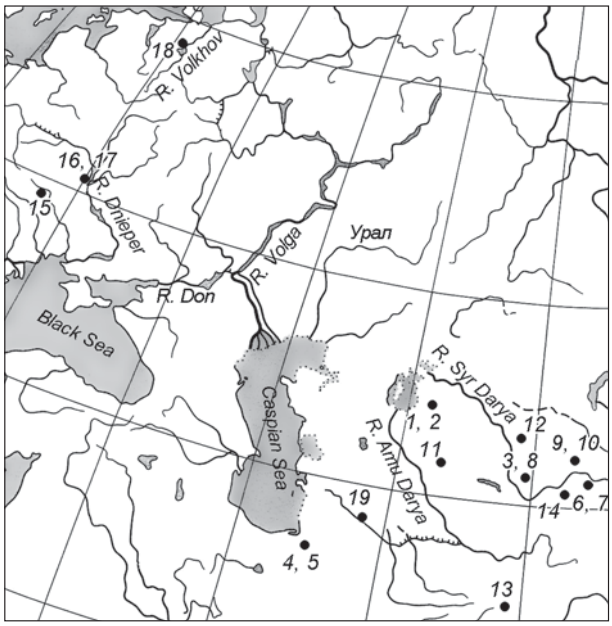
In the 2nd–1st centuries BC, on the lands newly captured by the Dahae, temple structures of previously unknown types were built: in the form of a large cross in plan view, with rooms inside, surrounded by a wall rounded or square in plan view.

A classic example of such a religious complex is the oldest temple complex—Shashtepa, of the 2nd century BC in Tashkent. The structures Arktepe and Bilovurtepa in the Fergana Valley of the same period, as well as the Early Parthian Shahr-i Qumis VII and Shahr-i Qumis XIII in northeastern Iran, have a similar layout. All of these bear traces of cultic and commemorative rituals that go back to the rituals of the Eastern Aral Sea region and burial rites of the Sarmatians. The Early Scythian mausoleums at the cemetery of Northern Tagisken and the Chirik-Rabat culture in the lower reaches of the Syr Darya reveal various combinations of a cross, circle, and square in their planning. However, outside their homeland, the Dahae continued to reproduce only one layout model of their commemorative structures in a form of a cross surrounded by a round or square wall (Fig. 2).

In the early first millennium AD, a religious building of the cruciform layout with four towers was built one parasang upstream of the Salar River, on the site of the settlement of Minguryuk (the territory of Tashkent). The towers are not rectangular, as is the case with the buildings in Shashtepa, but semicircular; because of that, the structure had the form of a four-petaled rosette in plan view (Filanovich, 2010: 131ff). During the transition period from Antiquity to the Early Middle Ages, this model for religious buildings was widespread in Middle Asia. Referring to G.V. Grigoriev and A.I. Terenozhkina, who discovered the Kaunchi culture, M.I. Filanovich wrote that the pottery of the Kaunchi stage 2 (1st–2nd centuries AD) with mugs with handles of horned lamb was similar to Sarmatian pottery. Kaunchi 3 or the Dzhun culture dates back to the time of the Hunnic movement (3rd–5th centuries AD), while the pottery of Kaunchi 1 shows parallels with the pottery of the Chirik-Rabat culture (Filanovich, 1983: 112).

A burial of the leader dressed in laminar steel armor was discovered by S.P. Tolstov in the center of the Chirik-Rabat settlement. Such armor is associated with the beginnings of the semi-sedentary early urban culture and statehood of the Dahae in the lower reaches of the Syr Darya. The discovery has made it possible to establish the origins of the famous cavalry of the cataphracts from Central Asia. Iconographic evidence clearly links this aristocratic type of warrior with the Dahae, Sarmatians, as well as with the armies of Kangju and Parthia. Images of warriors-cataphracts are represented on a belt buckle from the Orlat burial mound dated to the turn of the Common Era, which in fact are a documentary illustration of Plutarch's narration about the cataphracts encased in iron armor and serving the Parthian leader Surena, who defeated the Roman army of Crassus. However, the horses shown on Orlat's plates are not protected by armor, since in the vast expanses of Middle Asia there was no need for that. Mobility and speed were much more important

Fig. 2. Map of pagan cultic and commemorative sites of Ancient Turan and Old Rus.
1 – mausoleums of the Northern Tagisken burial ground, 10th–8th centuries BC (after (Itina, Yablonsky, 2001)); *2* – mausoleums of the Chirik-Rabat culture of the 5th–3rd centuries BC (after (Weinberg, Levina, 1993)); *3* – Shashtepa, 2nd century BC–4th century AD (after (Filanovich, 2010)); *4*, *5* – Shahr-i Qumis, 2nd century BC–2nd century AD (after (Filanovich, 2010)); *6* – Bilovurtepe, 1st–3rd centuries AD (after (Zadneprovsky, 1985)); *7* – Ark Tepe, 1st–3rd centuries AD (after (Gorbunova, 1994)); *8* – Minguryuk, 1st–4th centuries AD (after (Filanovich, 2010)); *9* – Kzyl-Kainar-Tobe, 1st–4th centuries AD (after (Mershchiev, 1970)); *10* – Chol-Tobe, 1st–4th centuries AD (after (Mershchiev, 1970)); *11* – Setalak I, 3rd–6th centuries AD (after (Suleimanov, Mukhamedzhanov, Urakov, 1983); *12* – Kultobe, 1st–4th centuries AD (after (Smagulov, Erzhigitova, 2013)); *13* – Khair Khaneh, 5th–6th centuries AD (after (Hachkin, Carl, 1936)); *14* – Tepe-5, 3rd–6th centuries AD (after (Gorbunova, 1985)); *15* – sanctuary of Perun on Mount Bogit near the Zbruch River, the beginning of the Common Era–9th century AD (after (Rybakov, 1987; Ivanov, Toporov, 1982)); *16* – sanctuary of Perun in Kiev, 8th–10th centuries AD (after (Sedov, 1982)); *17* – sanctuary of Khodosovichi, 10th–11th centuries AD (after (Sedov, 1982)); *18* – sanctuary of Perun in Novgorod, 9th–10th centuries AD (after (Sedov, 1982)); *19* – eight-tower structure in Garry-Kyariz I, 7th–6th centuries BC (after (Pilipko, 1984)).

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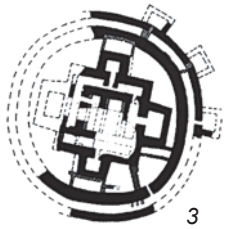
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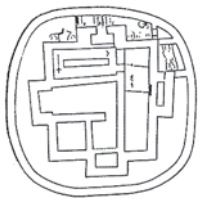
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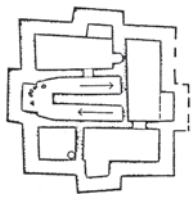
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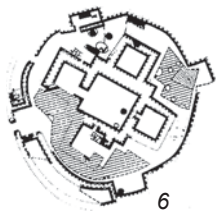
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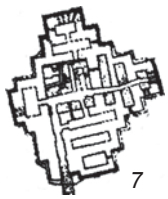
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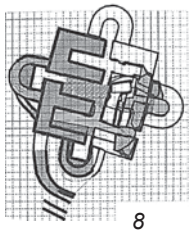
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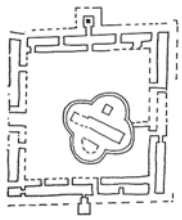
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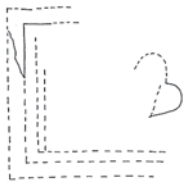
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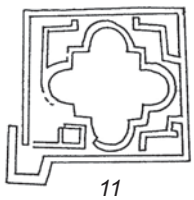
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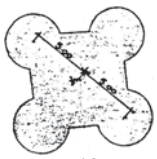
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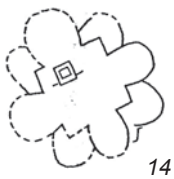
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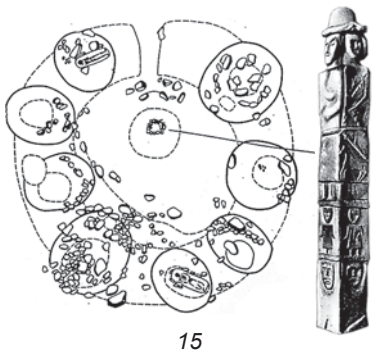
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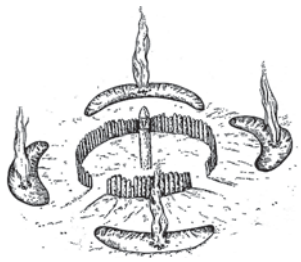
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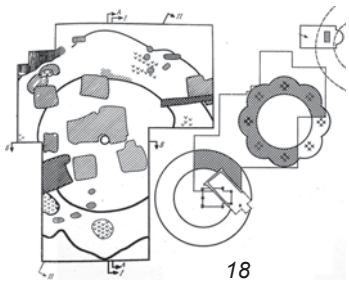
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in the small skirmishes of steppe dwellers with each other. Armor and complex of weaponry, similar to those depicted on the Orlat buckle, also appear on the coins of the Indo-Scythian rulers, Roman bas-reliefs, and on a few iconographic finds from Parthia. Later, military armor of this type would be depicted on the coins of the rulers of the Kushan, and in Early Medieval paintings in Sogd and Eastern Turkestan.

In pottery production, the appearance of large spherical flasks flattened on the sides in the oases of Middle Asia, as well as bell-shaped goblets in Sogd and Bactria, are associated with the influence of the Dahae-Sarmatians; some specific features of the Dahae pottery are known from the evidence of the Chirik-Rabat culture. Decorating pots and jugs with streaks of brown engobe is a distinctive feature of the Dahae pottery.

Several examples of painting and sculpture from the temples of Middle Asia of the first centuries BC to the beginning of the Common Era, as well as compositions on toreutics from the famous burials of Tillya-Tepe of the 1st century BC in Northern Afghanistan, testify to the spreading cult of female deities of the tribes of the Daho-Sarmatian circle. The traditionally high position of women and mothers was undoubtedly the legacy of the earlier Sauromates, among whom the Greek sources mentioned gynecocracy. The Sauromates contributed to the emergence of the culture of both the Sarmatians and the Dahae.

The history of female deities in Central Asia is worth considering in some detail. Patriarchy had developed since the Chalcolithic in ancient agricultural societies in connection with the development of economy, accumulation of wealth, and militarization of lifestyle. In the steppe zone, this process happened more slowly—the role of women was too high in nomadic societies, since for most of the year men grazed cattle in vast steppes or participated in long military campaigns to foreign lands. The role of the woman and her cult persisted for a very long time in sophisticated cattle-breeding and agricultural societies in Central Asia, the Northern Caspian and Aral Sea regions, and the basin of the Syr Darya, Semirechye, and the foothills of Eastern Turkestan.

Fig. 3. Stamp representing the investiture of a ruler. 3rd century AD. Yerkurgan (Suleimanov, 2000).

It is known that the patriarchal pantheon corresponds to Zoroastrianism; it included only two female characters—the goddess of water and fertility Aredvi Sura Anahita and goddess of the earth Spenta Armaiti. The main character in the pantheon was the male deity Ahura Mazda. In this respect, the pantheon of Zoroastrianism did not differ from the Greek and Roman pantheons presided over by Zeus and Jupiter, respectively. After the appropriation of the entire heritage of the Achaemenids and Alexander the Great by the early nomads in the first centuries BC, female deities returned to the cultic pedestals. Sculptural representations of female deities appeared in the urban temples of Khorezm and Bactria, in Parthia, and in the south of Sogd. Written sources report about the temple of Cybele in Samarkand. Images of Asian goddesses are rendered in the traditions of the Hellenistic art, showing a fusion of Asian goddesses with Greek imagery. However, the fact that these deities were of local origin is confirmed by the phrase of Clement of Alexandria: in Bactras, there was a statue of Aphrodite Tanais, that is, the goddess of the Syr Darya (Trever, 1940: 21).

An important difference between Aphrodite and Zoroastrian Anahita was her companions—representatives of the water element: fish, dragons, snakes, and frogs. In the Zoroastrian bestiary, these were considered unclean beings from the world of evil; but in most myths of the peoples of Antiquity, these creatures were companions of aquatic female deities. Earlier, we have examined in detail the image of a female deity embodied in the sculpture of the goddess, located in the temple of Yerkurgan (the ancient capital of Southern Sogd), along with a metal figurine of a snake and an image of a frog carved of agate. An imprint of a seal of the country's ruler was found in the same location, in potters' quarter. The ruler is depicted sitting on a dragon with a whip in his hand, and the figure of a goddess holding out a goblet to him is represented opposite him (Fig. 3). It was the classic investiture composition typical of the proclamative art of the Ancient East and Scythia. It is possible that the image of a female deity was introduced to the oases in the basin of the Amu Darya by the Daho-Sarmatian peoples, who crushed the power of Alexander the Great's heirs (Suleimanov, 2000: 274).

We should also discuss the image of the dragon Azhdar. According to the conclusion of A.D.H. Bivar, Azhdar or Azhi Dahāka of Avesta means the Dragon of the Dahae (Dandamaev, 1991). The mythological Azhi, Slavic Yassi, and Yashcher (Lizard), as well as Indian Ahi are associated with the water element. For the Dahae, this was the image of the sacred sturgeon—the largest

predator of the Aral-Caspian basin. It can be assumed that Astrakhan/Ashtarkhan in the north of the Caspian Sea, and Astrabad in the south had been the places of worshipping this fish since prehistoric times. A gold plaque from one of the female burials that accompanied the ruler's burial in Tillya-Tepe in Northern Afghanistan depicts the goddess of water holding a large sturgeon in each hand (Fig. 4). Among the Dahae, the sturgeon was considered a companion of the Great Goddess of the water element, who gave life. In the territories of the Dahae remote from the sea, the sturgeon turned into the mythical dragon *azhdar*. In Shakhrisabz, until the 20th century, there was a cult of the grave of Saint Malik Azhdar or Ashtar. According to N.S. Nyberg, Anahita could originally have been a river nymph among the Saka people of the Syr Darya (1938: 261).

The dragon (mythical serpent and inhabitant of the three elements) is popular in the mythology of all peoples of the world. These images are of different origins. In Middle Asia, it was originally a fish. The earliest images of *azhdar* known from the Tillya-Tepe toreutics retain all the anatomical features of fish.

Fig. 4. Plaque representing the goddess of water. 1st century BC. Tillya-Tepe (Sarianidi, 1985).

Migration of the Dahae descendants under the auspices of the Huns, Kidarites, and Hephthalites

The second major migration from the basin of the Syr Darya to the south happened in the 4th century BC. The migrants were distant descendants of the Dahae (the carriers of the Kaunchi and Otrar-Karatau cultures), who were displaced from their homeland as a result of the movement of the Chionites, superimposed by the invasions of the Kidarites from Eastern Turkestan, and later the Hephthalites from the Altai. The ethnonym of "Daha" completely disappeared from the sources of this time.

Analyzing the reasons for the Great Migration, L.N. Gumilev came to a well-grounded conclusion that the impetus was a century-long drought, which swept through the middle latitudes of the Eurasian continent in the 3rd century AD. At this time, all ancient states underwent a crisis. First, the Parthian State collapsed in the early 3rd century. In the 4th century AD, the Roman Empire, weakened by internal contradictions, became divided into two parts, with the subsequent degradation of its western part. The Kushan and Han states disappeared from India and China. However, it was especially hard for the steppe nomads: the absence of herbaceous vegetation led to a massive loss of livestock and widespread famine among the Huns, who dominated the entire steppe belt from Mongolia to the lower reaches of the Danube at that time. The entire population of the steppe zone was forced to migrate south to the areas of traditional agriculture. Chinese, Indian, Sogdian, Iranian, and Roman written sources report the invasions of the Huns.

The drought forced the majority of the substrate of other steppe (including sedentary) cattle-breeding and agricultural peoples to migrate along with the Huns.

Ammianus Marcellinus wrote that the Huns or Chionites fought in the army of the Sassanids as their allies against the Romans. The Chionites had white complexions, showed high culture, and observed the law no worse than the Romans. All this distinguished them from the rest of the Huns. These Chionites might have been the descendants of the ancient population living in the middle reaches of the Syr Darya, which became involved in the general movement of migrants under the banner of the Huns. They might have been the carriers of the Kaunchi and Otrar-Karataus cultures—the descendants of the ancient Dahae. The burial rite of the deceased son of the Chionite leader, described by Marcellinus, was accompanied by lighting a fire, similarly to the Sarmatians and Dahae.

Archaeological evidence, primarily massive pottery complexes, reveals the influence of pottery traditions typical of the Kaunchi and Otrar-Karataus archaeological cultures of the middle Syr Darya on the pottery production of Sogd, Khorezm, Merv, and Bactria. After the 4th century AD, bell-shaped goblets disappeared from the typology of pottery in the oases in the basins of the Zarafshan and Kashkadarya; these became replaced by wide bowls with vertical rims, typical for the pottery of the 3rd–6th centuries AD. Spherical mugs with loop-shaped handles appeared in the Samarkand and Shakhrisabz

oases. Their earlier prototypes again can be found among the pottery of the lower and middle Syr Darya. However, if in the former case, the handles of the mugs were made in the form of a lamb; on the products of Sogd, the animal head was turned into a small molded button on the upper part of the loop-shaped handle. Home production of rough molded kitchenware—cauldrons, pots, braziers, etc.—became widespread. The material culture of Nakhshab (Ancient Nakhshab) also manifests a strong influence of the Dzhetyasar culture from the lower reaches of the Syr Darya. During this period, most of the carriers of that culture settled in the lower reaches of the Kashkadarya and in the areas adjoining the borders of Khorezm.

Cessation of life in the ancient urbanized settlement of Shashtepa, located in the southwestern part of the present-day Tashkent along the ancient channel of the Salar, was associated with that time. In Minguryuk, life was also interrupted.

The migration of the Chionites along with the major part of the agricultural and cattle-breeding population of the Middle and Lower Syr Darya to the south resulted in the building of distinctive small and strongly fortified castles by the newcomers in the newly occupied territories—mainly in the peripheral zones of the oases. Migrants preserved not only the traditional features of their material culture, but also their ideological life, with rituals and religious paraphernalia; they built their temples in accordance with the sacred prototypes left behind in their homeland. These temples corresponded to the model of the temple in Minguryuk. The Setalak I temple on the western outskirts of the Bukhara oasis, which I excavated in the 1970s, is very close to it in time and structure. First, a temple structure square in plan view was built there; then it was mured up, and monolithic semi-oval towers were attached to it on four sides, following the model of the temple in Minguryuk (Suleimanov, Mukhamedzhanov, Urakov, 1983). Similar monolithic temple structures (the complexes of Chol-Tobe and Kzyl-Kainar-Tobe) were built in Semirechye near Taraz. The former complex contains two small rooms without entrances; the second complex has a narrow corridor-like room in which a warrior with weaponry of the Hunnic type was buried (Mershchiev, 1970). The Tepe-5 temple near the Kerkidon reservoir in the Fergana Valley (see Fig. 2) is an example of similar structure. It was built in the form of a monolith with a small closed room in the center (Gorbunova, 1972). In the course of subsequent rebuilding, four more similar towers were constructed between the four semicircular towers, which resulted in the eight-petaled rosette in plan view (see Fig. 2).

In recent years, a similar cruciform cultic structure has been excavated by E. Smagulov in the center of the town of Turkestan—Ancient Yassi. The structure is dated to the 3rd–4th centuries by a Huvishka's coin, although the coin might have also gotten there later. The building was rebuilt and expanded several times. Back in 1936, photographs were published of the remains (discovered near Kabul) of a small monolithic tower structure, cross-shaped in plan view, which belongs to the complex of the Sun temple—Khair Khaneh of the 5th–6th centuries. However, the cross in this case is of a different design—it is represented by four towers at the corners of the square (Hachkin, Carl, 1936: Pl. I). Importantly, the modern toponym "Khair Khaneh" is translated as the "House of Sacrifices" (see Fig. 2).

It should be mentioned that the Early Medieval archaeological complexes of Sogd, Fergana, and Semirechye preserved until the emergence of Islam their own techniques and typological features (especially in pottery), which had developed in the 4th–5th centuries.

Sculptural and pictorial images of female deities in urban temples of Nakhshab at the fortified settlement of Yerkurgan, Penjikent, Shahristan, and Dilberjin indicate that in the 4th–7th centuries these deities remained the main mediators between heaven and earth prior to Islam.

Relics of the Scytho-Sarmatian heritage in the culture of Old Rus

The Sarmatians migrated to the west from the Northern Caspian Sea region and Aral Sea region. Roman sources report their wars with the Dacians of Decebalus in the 2nd century BC. Trajan's Column depicts the Dacian cavalry with the banner of a dragon-fish with an open mouth. S.P. Tolstov pointed out the similarity of the Dahae from the Aral Sea region and the Dacians of the Western Black Sea region (1948: 186). It is possible that after leaving their homeland in the lower reaches of the Syr Darya, some part of the Dahae together with the Sarmatians went far to the west and established their possessions on the borders with the Roman Empire.

The Sarmatians have been most often mentioned in the Greco-Roman sources. In the 2nd century BC, they were the true lords of the Northern Black Sea region, conquering the Scythian Kingdom on the Crimean Peninsula. According to B.A. Rybakov, the Proto-Slavs (Scythians – "plowmen" of Herodotus) had contacts with the Sarmatians at the turn of the Common Era in the Northern Black Sea region (1987: 219–220). It is known that ancient Slavs and Sarmatians together with Goths participated in the formation of the Chernyakhov culture of Eastern Europe. After the migration of the Huns to the west, the carriers of the Chernyakhov culture participated in the emergence of the Eastern Slavic group of tribes. The sanctuaries of the Chernyakhov culture also had a form of square grounds with idols; bonfires were made on them (Vinokur, 1972, 1983).

In the Late Sarmatian period (3rd–4th centuries AD), as a result of the advance of the Huns to the west,

skeletons with circular deformation of the skull appeared in Sarmatian burials. Notably, Sarmatian cemeteries extended to the north into the interfluves of the Volga, Khoper, and Don Rivers. In the forest-steppe regions and in the upper reaches of the Volga and the Don, the Sarmatians mixed with the Veneti, and became a part of the emerging groups of Eastern Slavs (Berestnev, Medvedev, 2015). These observations are of fundamental importance for understanding the genesis of paganism in Old Rus.

It is known that after the Christianization of Rus in the 10th century, ancient temples and sanctuaries of the Slavs were destroyed. Information from the written sources about the destruction of temples of Perun in Kiev and Novgorod, as well as the idol on the Zbruch River, is confirmed by archaeological research (see Fig. 2). It has been established that all idols were thrown into the rivers. In Kiev and Novgorod, idols of Perun were made of wood. A four-faced stone statue carved of local limestone stood in the sanctuary of Zbruch (Rusanova, Timoshchuk, 1986).

For our topic, it is important to discuss the structure of such sanctuaries with the sculpture of an idol in the center. These were elevations round in plan view, with eight round depressions encircled by embankments along the perimeter. On the Zbruch and in Peryn near Novgorod, the structures looked like a symmetrical eight-petaled rosette in plan view. Similar in plan to the Early Medieval cultic structures of the Fergana Valley and comparable in sizes, all of them date back to the Early Middle Ages. However, in the Fergana Valley, such sanctuaries were monolithic adobe structures, while in the sanctuaries of the Zbruch and Peryn, the hill with the idol was surrounded by eight pits, where bonfires were kindled and animal sacrifices were made. This was a traditional ritual of sacrifice rooted in common Indo-European archaic times. Ash pits identical in content have been found at all of the above-mentioned cruciform structures in Middle Asia. Similarly to the monuments of Middle Asia mentioned above, remains of people buried in pits around the idol have been found in the sanctuaries of Old Rus. The authors of the excavations at the Slavic shrine on the Zbruch considered them to be human sacrifices (Ibid.). Christian authors of Old Rus accused the pagans of rituals of human sacrifice (Ibid.). Human burials also appear in the cruciform structures in Middle Asia mentioned above. For example, the bones of a male of middle age were laid in anatomical order in large ash pit under a clay mound near the entrance to the building of the 5th–6th centuries at Setalak in the Bukhara oasis. A small rectangular chamber, where a warrior with weaponry of the 5th–6th centuries AD was buried, was found in the continuous adobe masonry of the cruciform structure of Kzyl-Kainar-Tobe near the town of Taraz in Kazakhstan (see Fig. 2). Burials of human skulls with traces of fire were found in the interior spaces of the cruciform structures of Shashtepa in Tashkent and Shahr-i Qumis in Northeastern Iran. These skulls might have belonged to priests or revered people whose lives could have been associated with these sanctuaries. The oldest prototypes of the structures under discussion are represented in the lower reaches of the Syr Darya by the Scythian mausoleums of Northern Tagisken of the 10th–8th centuries BC and adobe mausoleums of the Chirik-Rabat culture of the 5th–3rd centuries BC. On the ground plans of all these structures, we may see the same composition—the combination of circle, square, and cross—the symbols of heaven, earth, and the sun (see Fig. 2). These commemorative cultic structures reflect the evolution of burial practices—transition from cremation in Northern Tagisken to inhumation in Chirik-Rabat with ritual burning of the mausoleum. Ritual burials at the sanctuaries of Old Rus may also constitute the burials of priests of ancient Slavic cults, and their funeral rite testifies to a transition from archaic Indo-European cremation to inhumation yet accompanied by the ancient rite of making a bonfire. It is known that traces of fire have been found in all Sarmatian burials. The reports of Christians may be a sheer slander against the pagans, like many ridiculous accusations by the early Muslims against the population of Sogd, which adhered to their old religion.

As far as the eight-partite structures of the outer peripheries in the two above mentioned sanctuaries of Old Rus and the Early Medieval structure in the Fergana Valley are concerned, these could have been the embodiment of the natural development of the idea on the symmetry of the cross. Transition from the four-petaled to eight-petaled ground plan is manifested in the cultic building in the Fergana Valley. The corners of the central square structure protruding between the four semicircular towers in this cruciform structure were transformed into semicircular towers, which resulted in a monolithic cultic tower or high platform, eight-petaled in plan view (see Fig. 2). This is certainly a conjecture. The evolution of ancient Slavic sanctuaries, initially represented by round and square elevated platforms on which idols stood and bonfires burned, might have followed the same trends. There were shrines and sanctuaries in the form of the cross in Old Rus. The central structure of the temple of Perun excavated by V.V. Khvoiko in Kiev, which had the form of an oval superimposed on the cross in plan view, was built of stone blocks in the 8th century. Semicircular pits were dug in the four cardinal directions at the sanctuary of the 10th century in Khodosovichi, which was cruciform in plan view. Bonfires were made in the pits, and bones and other waste from collective meals were thrown there in honor of the deity (Sedov, 1982: 286–287). The fact that the eight-petaled structures

also had their own history is evidenced by the eight-tower structure Garry-Kiariz I of the 7th–6th centuries BC in Turkmenistan (see Fig. 2). Its function raises questions (Pilipko, 1984). It is known that the eight-pointed star or eight-petaled flower was a symbol of the Great Aquatic Goddess—the goddess of love and childbirth. Her planet Venus (Aphrodite, Cholpan, Zuhra) appears for eight months as the evening star and for another eight months as the morning star, which has been known since prehistoric times.

All of these sanctuaries were usually built on river banks. Fragments of legends about the complex of river deities have survived. The main deities among them were the archaic river Nymph and her two companions, including the river dragon or sacred fish. The most famous narrative on this topic in Rus is the Novgorod tale about Sadko. The legends about Sadko written down from various storytellers do not coincide in details, but have their plot, storyline, and protagonists in common. In the earliest pre-Christian version of this epic tale, the events unfolded around three main characters—Sadko, the Virgin Whitefish, and the King of the Sea. In later versions, a Christian saint guiding Sadko's behavior appeared in the plot. The female character is represented by two images—the mother Virgin Whitefish and her daughter Charnava, identified with the Chernava River which flows into the sacred Lake Ilmen. According to this most common version, Sadko was a lonely stranger, popular *gusli* player; he played music on his multi-stringed *gusli* entertaining the sea king. After he gained the support of the king, Sadko made a bet with the merchants of Novgorod that he could catch the Fish of the Golden Feather and become richer than them. The sea king did not disappoint Sadko, and after catching the fish, Sadko quickly became rich. The king of the sea demanded payment for this wealth. Sadko sank to the bottom of the sea and enchanted everyone with the music he played on the *gusli*. The king of the sea also started to dance, so that a hurricane raised on the sea and the waves sank all the ships. Only the appearance of St. Nicholas the Wonderworker, who insisted on tear the strings of the *gusli*, before Sadko, saved everyone. Peace and tranquility at started to pervade the sea again. The contented sea king invited Sadko to become his relative. At the bride show, following the advice of the Virgin Whitefish, Sadko chose Charnava, the daughter of the king, out of hundreds of girls of the underwater kingdom. The newlyweds miraculously returned to Novgorod. According to another version of the epic tale, the newlyweds sailed away to the Khvalynskoye Sea (Caspian Sea) on ships donated by the sea king; this is an allusion to the fact that by origin Sadko was associated with the Sarmatian lands.

This Novgorod epic tale has preserved the oldest and, in fact, matriarchal mythologeme about the marriage of a guest to an autochthonous virgin. The same legend speaks about the origin of the Scythians from Hercules, who married the serpentine maiden, the daughter of the Borysthenes River. According to the Shahnameh, Rustam (the hero of the Sako-Sogdian epics) married Takhmina, but he himself was the grandson of the dragon Zahhak (Dahak) on the side of his mother, a pagan who did not know the doctrines of Zarathushtra.

The legend of Mother Anbar (Anbar Ena) has survived to this day in Khorezm, where a dynasty of people from the Daho-Sarmatian environment has ruled since the 2nd century AD. Mother Anbar was the patroness of motherhood and origin of life. According to a legend, as a result of a conflict with his father, her son Sultan Khubi or Yubi—the Sultan of the waters ("ob", "ov" – 'water')—went to live under the waters of the Amu Darya, where even today he rescues the drowning and grazes schools of fish. Legend has it that Anbar Ena is still looking for her son. Until the 20th century, she was worshiped by the boatmen and fishermen of the Amu Darya; the bows of their ships were decorated with the figure of Mother Anbar carved of wood (Snesarev, 1969: 232ff). The video of the Azov Museum "Treasures of the Sarmatians", recently posted on the Internet, reports a pottery vessel with the representation of a man grazing a school of fish (https://www.youtube.com/watch?reload=9&v=dMXHSeO6kEI).

The advance of the late Sarmatians to the north could have accelerated after their defeat by the Huns in 375 in the steppes of the Northern Black Sea region. Part of the Sarmatians (the Ases) entered the Hunnic union, while the irreconcilable part left to the north.

As mentioned above, in the second century BC the Dahae occupied not only the entire Amu Darya basin, but also the lands in the middle reaches of the Indus and Afghanistan, after crossing the Hindu Kush. There, in Gandhara, the archaic hymns of Mithra (Avestian "Mihr" – 'deity of the treaty', Russian "Mir"), Aredvi Sura Anahita, and Hvarn have been preserved; later, they entered the canon of Zoroastrianism, even though they contradicted the doctrine of Zarathushtra reflected in his sermons-gathas (Lelekov, 1992: 247–255). This, the so-called, Drangiana tradition of the Avesta is associated with the tradition of the Helmand River valley—repeating the hydronym of the sacred Lake Ilmen. "Helmand" means 'depositing clay, silt'. The water in the river and lake into which it flowed was muddy, like in Lake Ilmen and in the Volkhov River flowing from it.

In his book *The Paganism of Old Rus*, Rybakov made an exhaustive analysis of the cultic and mythological semantics of idols on the Zbruch and in the sanctuary of Perun on Lake Ilmen and in Novgorod (1987). He emphasized that the idol on the Zbruch was set at a sanctuary which appeared in distant Scytho-Sarmatian times, and from there it was thrown into the river in the

10th century. Rybakov identified that stone idol from the sanctuary with the most ancient deity of the Slavs—Rod-Svyatovid, the same as Svarog or Stribog (Ibid.: 172–173). In Novgorod, the idol of Perun—the patron deity of the Prince and his retinue, the god of thunder and lightning of the Slavic pantheon—was set up by Dobrynya Nikitich in 980, and stood for only eight years until Prince Vladimir decided to convert to Christianity. All these eight years, the unquenchable fire burned near Perun similarly to the cultic temples of the Parthian rulers—descendants of the Dahae and Sarmatians. Avestan Farn or Sogdian Parn was also associated with celestial fire. During forced Christianization, the people (Slovenes) led by their pagan priest Bogomil-Solovei rebelled against Dobrynya Nikitich. The image of Solovei (the oldest water deity) is associated with the snake or lizard of ancient Russian mythology. The source reports that the slogan "It is better to die than to give our gods over to mockery" raised five thousand residents of Novgorod to protest; but Dobrynya defeated the pagans, and in 988 threw the idol of Perun into the Volkhov River.

Rybakov cited a legend about the emergence of the Slovenes, written down in the 17th century on Lake Ilmen: "Two tribal leaders left their old lands in 'Scythenopontos' and began to search for 'favorable places' 'in the world'; 'like sharp-winged eagles they flew over the desert'; after forty years of wandering, they reached the Great Lake named after Sloven's sister Ilmera. On the bank of the Volkhov River ('then called' "muddy"'), the town of Slovensk the Great ('and now Novgrad') was built. And after that time, the Scythian newcomers began to be called Slovenes…" (Ibid.: 179). We should mention that the muddy Karasu River—'Black Water', the Sogdian name Matrud—'muddy, dim river'—also flows near Samarkand and is also considered sacred.

According to Rybakov, earlier, before the idol of Perun was set there, a sanctuary of the ancient deity of the Volkhov River had been in that place (Slavic Veles + ov, ob – Iranian 'water'. Cf. the name of the most ancient Aryan town of Balkh on the Balkhob River)—a water lizard that the Christian chronicler called "Korkodel" (Ibid.: 180–190). Rybakov cited an Old Russian text that Ov ("someone") conducted magical rituals of worshiping the goddess of the river and god-beast living in it. Ov made a sacrifice for a rich catch (Ibid.: 180). This archaic text preceded the legend of Sadko. This classical triad reappears in the hymn of the Avesta about the goddess of the river Aredvi Sura Anahita with the dragon Gandharva living in her waters, and a protagonist who worships this river.

Rybakov pointed out that the ancient *gusli* discovered during the excavations of the 12th century Novgorod in the form of a wooden trough with strings, had a handle with representation of the head of a dragon or lizard—the king of the sea. This is the Slavic water deity Jassa—Yasha, Lizard. As Rybakov observed, in the southern Kiev triad of Yashcher (Lizard), Lada, and her daughter Leya, Lizard corresponded to old Slavic "Rod" (clan). According to V.V. Sedov, the Slovenes were genetically related to the Lechid tribe of Poland (1982). There is another version: the Slovenes came from the banks of the Danube. Fibulae were decorated with lizard heads among the Slavs of the Dnepr region of the 6th–7th centuries AD. Later, the dragon image often appeared in the decoration of the Christian architecture of Novgorod in the 10th–13th centuries. Rybakov came to the conclusion that the history of the sanctuary in Peryn could be divided into three stages: the first stage was associated with the pagan cult, lake, river, and fish (led by Yashcher), the second stage with the artificial introduction of the cult of Perun, and the third stage with forced Christianization (1987).

The Sarmatian sanctuaries of the first century AD were square or round areas in the open air, on which large bonfires were lit. The sanctuaries of the carriers of the Chernyakhov culture and ancient Slavic places of worship, where the stone idol stood, were the same (Vinokur, 1972, 1983).

According to Sedov, two more round platforms, which could have been dedicated to two female deities of the Slavic triad, stood (one on either side) by the sanctuary of Perun in the place where the idol of the Yashcher (the deity of the Volkhov River) had previously been (1982).

It is important for our research topic that a pair of sacrificial knives was discovered in the famous Chernaya Mogila burial mound, where one of the pre-Christian Kiev princes of the 10th century was buried according to the cremation rite (Rybakov, 1987: 216). The earliest pairs of bronze sacrificial knives have been found in the Scythian burial mounds in the Northern Black Sea region. Apparently, bronze knives quickly became blunt during sacrifices of large animals among the Scythians, and therefore it was the custom to prepare two knives for ritual celebrations. Even today, when cutting carcasses, butchers usually use not one knife, but several, and often sharpen them. Paired knives have been also found in the inventory of a royal person of the first century BC, buried in Tillya-Tepe (Fig. 5). Two identical knives were inserted into a golden scabbard (Sarianidi, 1985: Ill. 162; 1989: 98–101). The information about this find given by V.I. Sarianidi in his 1985 book was somewhat incorrect. At the invitation of Sarianidi, I participated in the expedition, and excavated and unearthed this royal burial, and I know that two identical narrow knives were inserted into the same scabbard. A similar scabbard with paired ritual knives was also present on the belt of one of the khalats of the Emir of Bukhara, which was exhibited in the museum collection of the Ark of Bukhara in the 1960s. The Emir's purple velvet robe was embroidered with silver thread; a

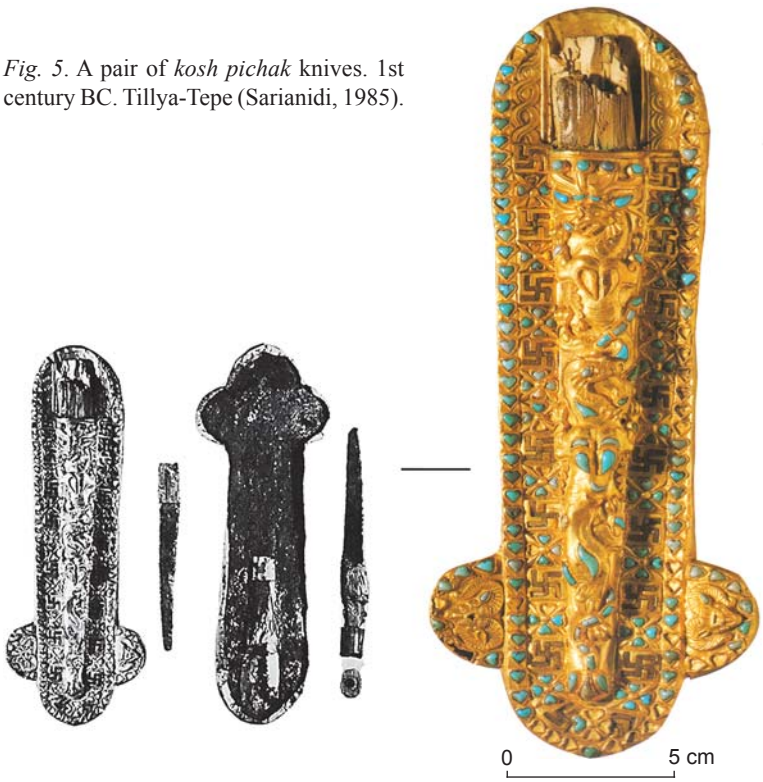

Fig. 5. A pair of *kosh pichak* knives. 1st century BC. Tillya-Tepe (Sarianidi, 1985).

silver scabbard, from which the turquoise handles of two identical knives protruded, was attached to his wide silver belt. The memory of a pair of sacrificial knives "kosh pichak" has survived until this day in Uzbek folklore: the characters of fairy tales sharpen "kosh pichak" before sacrificing an animal.

In this regard, the following plot of the Uzbek fairy tale can be summarized. An older sister and her brother go into the field to gather "mother-kaymak" (dandelions). When they return to the house, ashes await them: the Kalmyks have ravaged and burned the village. The children go to search for at least anyone who has survived. The sun is scorching mercilessly. The brother asks for a drink; the sister persuades him to be patient. There is no water anywhere, and suddenly, the brother sees a hoof-print filled with water on the ground, and drinks from it. It is goat-urine, and the boy turns into a kid. After the sister realizes what has happened, she leaves her brother there and runs to the sacred spring for miracle-working water. At this time, the Kalmyks have set up a camp nearby, and a son has been born to their leader. The leader has ordered the organization of a "beshik-toi" (a feast in honor of the swaddling of a newborn in a cradle) for the people. Those who were sent on a hunt to bring meat for the feast find the kid. Preparations for the feast at the Kalmyk camp are already in full swing. The brother bleats loudly and calls his sister:

Altyn beshik boulandi, apa kel, apa kel. – They have tied the golden cradle, come, sister, come, sister.

Mies kazanlar kainadi, apa kel, apa kel. – Copper cauldrons have boiled up, come, sister, come, sister.

Kosh pichaklar kairaldi, apa kel, apa kel. – The kosh pichak knives have been sharpened, come, sister, come, sister…

At that very moment, the sister breaks in with a mug in her hand; she rushes to the kid, and pours water from the sacred spring into his mouth. A miracle happens, and the kid turns back into her brother. The Kalmyks, struck by the miracle, let them go unharmed.

The Russian fairy tale about Sister Alyonushka and Brother Ivanushka has a similar plot. Such coinciding plots belonging to peoples who seem to be remote in space and time, are called "wandering" by folklorists. Archaeology, to the best of its capacity, makes it possible to trace the paths and times of migrations of these subjects, associated with specific types of material culture of particular ethnic groups in place and time.

Conclusions

Cyrus' historical campaign against the nomads was caused by the need to secure the northeastern borders of the Kingdom of Kingdoms he was building, in which he was Shahan Shah—the King of Kings—before his distant campaign to Egypt. Cyrus knew the Scythians who found themselves within the boundaries of his rapidly expanding Empire, yet he underestimated the powerful mobilization capacity of the nomadic tribes of the Great Steppe, which at that time were also creating extensive military and political entities. Cyrus became a victim of his own mistake. After he was defeated by the united coalition of the nomads from Middle Asia, two early state formations of the Dahae and Massagetae emerged. Their oases appeared in vast delta of the Syr Darya. The example was the southern neighbor—the Ancient Khorezm, which appeared in the Amu Darya delta a hundred years earlier, in the Median time. Khorezm could certainly not avoid fighting with Cyrus together with the nomads, although there is no information about this in the sources.

The Dahae settled in the southwestern part of the delta of the Syr Darya and formed their semi-sedentary early urban culture. Two hundred years after the disastrous draining of the delta channels in their oasis, they migrated mainly to the south and east, and created their own larger and smaller states there. It is no coincidence that precisely at this time, the carriers of the Prokhorovka culture, who continued to roam in the Southern Urals, migrated to the

west and invaded the lands of the Sauromates, as a result of which the ethnic name "Sarmatian" appeared. A part of the Dahae might have left for the steppes of Kazakhstan, where they mixed with the Massagetae and Saka people, who remained in the steppe in the second century BC, originating the strong state of Kangju, mentioned in the Chinese sources.

The Sarmatians constituted the western wing of this large ethnic and cultural community of the early nomads, which may have been a confederation, and migrated west starting in the 3rd century BC. They moved on the paths by which the Scythians had passed five hundred years before. Like the Dahae in Middle Asia, the Sarmatians dominated the steppes in the south of the present-day Russia until the appearance of Huns in the 3rd century.

In the 3rd–4th centuries AD, owing to the subsequent aridization of climate and advance of the Huns to Middle Asia, the carriers of the Kaunchi and Otrar-Karatau cultures (the late derivatives of the Dahae culture) migrated to the south. The influence of the pottery traditions of the Kaunchi artisans has also been observed in the Syr Darya basin. At this time, cultic and commemorative structures cross-shaped in plan view, with ritual premises inside, became replaced by squat monolithic towers or platforms cross-shaped in plan view; but, unlike the earlier structures, the ends of the crosses in them were not rectangular, but rounded in the form of semicircular towers. These were monolithic structures, on top of which fire could have been made and sacrifices performed. In plan view, these buildings have the form of four-petaled rosette. A thick layer of ash with the remains of ritual sacrifices and meals has survived around them. In the Early Middle Ages, four more of the same towers were built in the spaces between the four towers in a similar structure in the Fergana Valley. Thus, the ground plan of the structure acquired the form of an eight-petaled rosette similarly to the pre-Christian sanctuary on the Zbruch and sanctuary Peryn on the sacred Lake Ilmen. It is possible that idols whose cult was mentioned by the Arabs stood there as in the pagan sanctuaries of Rus, and fires burned.

These ancient traditions of spiritual culture from the middle latitudes of Eurasia in the Middle Ages were swept away by the monotheistic religions (Islam and Christianity) that came from the Eastern Mediterranean and were more in line with the needs of medieval societies.

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Shovels Used by Russians in 17th–18th Century Siberia

The study describes types of the shovel—one of the most widely used and multifunctional tools in 17th–18th century Russian culture of Siberia. The principal collection includes more than twenty intact and fragmented specimens unearthed during 13 field seasons of excavations at Tara, in the Omsk Region. Shovels found elsewhere in Western Siberia are also described, and the role of this tool in the households of Russian pioneers in Siberia is assessed. Judging by the drawings in Semen Remezov's chronicle and excavation records from Tara, Mangazeya, and Nadym forts, we conclude that shovels were specialized for various kinds of work, and that they varied with the season. There were diverse types used for constructing fortifications, dwellings and utility structures, for digging graves, tillage, clearing snow, handling bulk materials, and baking bread; children's toy shovels are also described. Information is provided on shapes of shovels and the types of wood Siberians used for making them.

Keywords: *Tools, shovels, history, Siberia, material, form, subsistence.*

Introduction

Archaeologists carefully study various types of finds, including weaponry and tools, pottery, items of portable art, etc. However, some of them, such as wooden shovels, very rarely come to attention of scholars. This can be explained by the absence of a series of such items: at the majority of archaeological sites, wooden items very rarely survive in a state suitable for research. The evidence obtained from studying the first Russian towns in Siberia may fill this gap. Excavations at the location of the historical center of Tara—one of the first Russian towns in Western Siberia—yielded materials making it possible to reconstruct not only the town's planigraphy and wooden architecture, but also almost all aspects of life among Tara's residents, including their use of wooden shovels in everyday life.

This study is aimed at presenting the shovels of the 17th–18th centuries, found during the excavations of the Tara Fortress, and establishing the role of this tool in the subsistence system of the Russians of Siberia.

History of research into wooden shovels in Russian scholarship

As a tool for loosening and removing soil, and moving bulk materials, shovels have been used in Northern Eurasia at least since the Neolithic. In the early 20th century, at the Shigir peat-bog, near the village of Neivo-Rudyanka (Sverdlovsk Region), 32 items made of coniferous wood were discovered. These were identified as shovels with support, which were used for soil loosening (Tolmachev, 1916: 36–37, 41–42, pl. I). In 1937–1939, at the Modlona site, in Kirillovsky (formerly Charozersky) District of the Vologda Region, in the layer of the Volosovo culture of the second half of the 3rd millennium BC, a shovel with slanting shoulders

was discovered (Bryusov, 1951: 39, fig. 11, *2*). The same kind of item was found in 1960 by G.M. Burov during the excavations at the Vis I site (the mouth of the Simva brook, the Sindor Lake system, Knyazhpogostsky District of the Komi Republic). Burov did not identify the artifact as a shovel, but considered it to be similar to the finds of Bryusov (Burov, 1966: 162). In 1954, S.I. Rudenko found seven shovels in the Tuekta burial mound 1 (Altai Republic) (1960: 112, fig. 61; 113).

The amount of information about shovels discovered at archaeological sites has increased with the appearance of studies discussing the evidence from excavations of Russian sites, primarily in Novgorod. In 1968, B.A. Kolchin described wooden items from the Nerevsky excavation area in Veliky Novgorod, Among these, there were shovels made of oak. According to Kolchin, 24 intact shovels and about 150 shafts and blades were found (1968: 15–17, fig. 5, *1–6*, *11–14*). He divided the shovels into groups according to their function: for placing bread into the oven, for doing earthworks, for working with loose materials, and for removing snow. According to Kolchin, Novgorod shovels had a platform for the foot only on the right side, which gives us a clue on the technique of earthworking: a person pressed on the shovel with his right foot, while the right hand was usually placed on the shaft of the shovel below the left hand; the soil was dumped forward to the right, sidewise to the right, or backwards to the right. In an earlier study, the scholar only mentioned wooden shovels and iron fittings found in Novgorod, Kyiv, and Suzdal (Kolchin, 1953: 88–89, fig. 51). A.V. Chernetsov, A.V. Kuza and N.A. Kiryanova, the authors of the section "Zemledeliye i promysly" ('Agriculture and Crafts') from the monograph *Drevnyaya Rus* ('Old Rus'), published in the series *Arkheologiya SSSR* ('Archaeology of the USSR'), used the findings of Kolchin and gave a description of the shovels, where they mentioned that their blades had a rectangular, trapezoidal, or triangular shape (Drevnyaya Rus…, 1985: 224, 237, pl. 85, *1–8*). In the 1990s, the publications by A.P. Borodovsky (1994) and S.S. Tikhonov (1994) showed the opportunities of studying wooden shovels and iron fittings on the basis of a wide range of material and written sources (Borodovsky, 1994: 67; Tikhonov, 1994: 63–66). Wooden shovels do not appear in the studies of Russian scholars as often as pottery or artifacts made of metal, bone, etc., but these works have laid the foundation for further research of this category of finds.

Siberian evidence and purpose of wooden shovels

Evidence from excavations of Russian archaeological complexes of the 17th–18th centuries in Siberia has made it possible to increase significantly the corpus of sources with items made of organic materials—leather, wood, and vegetable and woolen fibers. In terms of numbers, these collections are comparable to those from the most famous sites of European Russia, such as Novgorod, Ladoga, etc. The reason for the good preservation of such artifacts is special natural conditions: low temperatures in Mangazeya (Vizgalov, Parkhimovich, 2008, 2017; Kardash, 2009), or a specific type of the cultural layer; for example, in Tara it was accumulated during two centuries within the fortress walls, and frequent large fires contributed to its intensive formation up to 4 m thick (Tataurov, Chernaya, 2015; Aleksandrovsky et al., 2019).

Good preservation of wooden architecture at Siberian sites makes it possible to correlate the finds with specific housing and economic complexes, which enhances more accurate attribution of the items discovered. For example, kitchen spatulas and tools for calking log cabins with moss are similar in shape. In order to establish the functions of the tools, one needs to have information on the locations of the finds. Shovels and oars are not only quite similar in shape, but were often used for purposes other than those intended: people might row in boats with shovels, and shovel bulk materials with oars.

Drawings from the Remezov Chronicle, made at the turn of the 17th–18th centuries, help us to establish specialized purposes of shovels (Remezovskaya letopis…, 2006). In our opinion, the tools shown there have remained practically unchanged during the first century of the Russian possession of Siberia. It is important that the images of items (weaponry, tools, dishware, etc.) are rendered in detail.

In the Remezov Chronicle, shovels are mentioned in several articles, which also provide detailed drawings of them. For example, article 36 contains information about the victory of the Cossacks and capturing a large amount of booty: "…and so much booty was captured that they could not take it on the boats. And they hid that booty in the ground at the mouth of the Tura River" (Remezovskaya letopis…, 145), which is supplemented by the drawing depicting a sentry and three diggers with shovels, making a mound over the treasures (Fig. 1, *1*). One shovel is drawn in sufficient detail: it has a long, straight shaft almost as tall as human height, equal straight shoulders and a metal fitting, extending towards the working edge. The fitting is fixed to the shovel with staples.

Article 42 mentions the opposition of Khan Kuchum to the advance of Yermak's unit: "He made a tree entanglement near Chuvashy on the Irtysh, fortifying the town with trenches…" (Ibid.: 151), and provides a drawing showing two diggers and a lumberjack, holding shovels with long straight shafts. Notably, these tools are without fittings.

Article 81 provides information about the first losses of Yermak: "Yermak returned back and buried his people at the Sauskan promontory, at the royal cemetery on the edge of the promontory, so as to remember the place" (Ibid.: 178). The drawing shows the process of burying the killed Cossacks in the mass grave (Fig. 1, *3*). Three diggers are throwing earth into the grave, using large shovels. Two more shovels with long shafts, straight, equal shoulders, and fittings along the working surface are lying on the ground.

Article 98 reports: "Yermak… went up the Irtysh towards the Bukharans, and in the Agit bow he dug across the portage" (Ibid.: 193). The drawing shows the camp of the Cossacks, fenced off by a sufficiently wide and deep ditch into which the water of the Irtysh was brought (Fig. 1, *4*). There are no shovels, but the amount of work done suggests that almost the entire unit did the earthworks, and therefore a lot of shovels were available.

Article 112 mentions the burial of Yermak by the Tatars at the Begishevo cemetery (Ibid.: 202). The drawing shows two diggers making a mound over the grave; they are holding tools with long, straight shafts and slightly sloping shoulders (Fig. 1, *5*). The shovels have rounded blades without fittings.

Analysis of the drawings allows the conclusion to be drawn that both Russians and Tatars used shovels with long, straight shafts and well-marked shoulders. Tatar shovels did not have metal fittings, and had rounded edges. All Russian diggers had shovels with fittings and straight edges. These tools were used for digging and filling grave pits, and for constructing fortifications.

On the basis of the evidence found during the excavations of the Tara Fortress, as well as finds from Mangazeya and Fort Nadym, we attempted to distinguish the shovels of Siberia in accordance with such features as the purpose of the tool, its shape, and its material, relying on the typology developed by Kolchin (1968: 15–17). We should note that we do not claim to be innovative, since this typology does not require revision.

Several types of shovels have been identified in accordance with their intended purpose.

Shovels for earthworks (Fig. 2, *2*, *8*, *9*; 3, *8*, *13–14*). These have long (at least 1 m) shafts. The end of each shaft has the shape of spherical knob or is flat (sawn off), with a hole for rope. The blade is relatively small (35–45 cm long, no more than 30–35 cm wide), which made it easier to dig soil. The working edge of a shovel without fittings can be either straight or rounded. Shoulders in the shovels of this type are straight for convenient resting of the foot, or slightly slanting; when working with such tools, one could rely only on the strength of the arms. The Tara shovels were made of birch—its timber was considered one of the toughest in this forest region. The Mangazeya and Nadym tools were also made of birch.

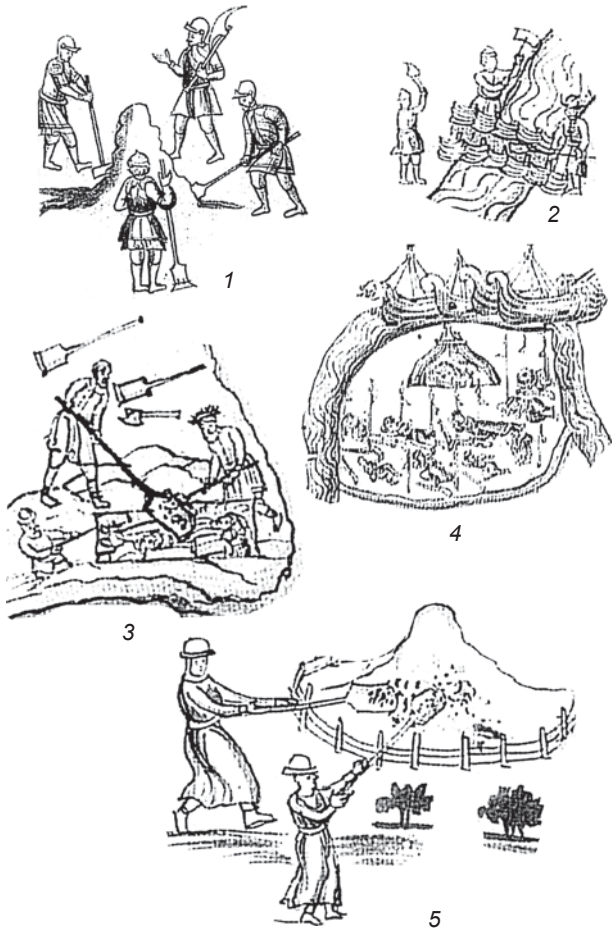

Fig. 1. Shovels in the drawings of the Remezov Chronicle (Remezovskaya letopis…, 2006).
1 – Cossacks bury treasures on the Tura River (Ibid.: 145); *2* – diggers of Khan Kuchum (Ibid.: 151); *3* – burial of Yermak's soldiers (Ibid.: 178); *4* – ditch with embankment created across the portage by Yermak (Ibid.: 193); *5* – burial of Yermak by the Tatars (Ibid.: 202).

An iron fitting was attached to the shovel blade. The drawings in the chronicle of S.U. Remezov show all Russian shovels with fittings. However, only a few such tools are present in archaeological collections; the fittings could have been recycled in forges or, if the wooden base became broken, they were reused on a new tool. For example, the specimen from Tara is well-worn. The iron fitting was made of thick rod (Fig. 3, *7*), in which a deep cut was made with a chisel, and then each side was forged using a sharp insert. This is a rather laborious method; more often, the fitting was made of two plates joined with welding by a smith.

Shovels for earthworks were used for planting, processing, and harvesting vegetables: for example, turnips. A large pot with turnips was found during the excavations in Tara. Turnips and cabbages were the most common vegetables among Russians in Siberia of that period (Tataurov, Tikhonov, Chernaya, 2016). Another use

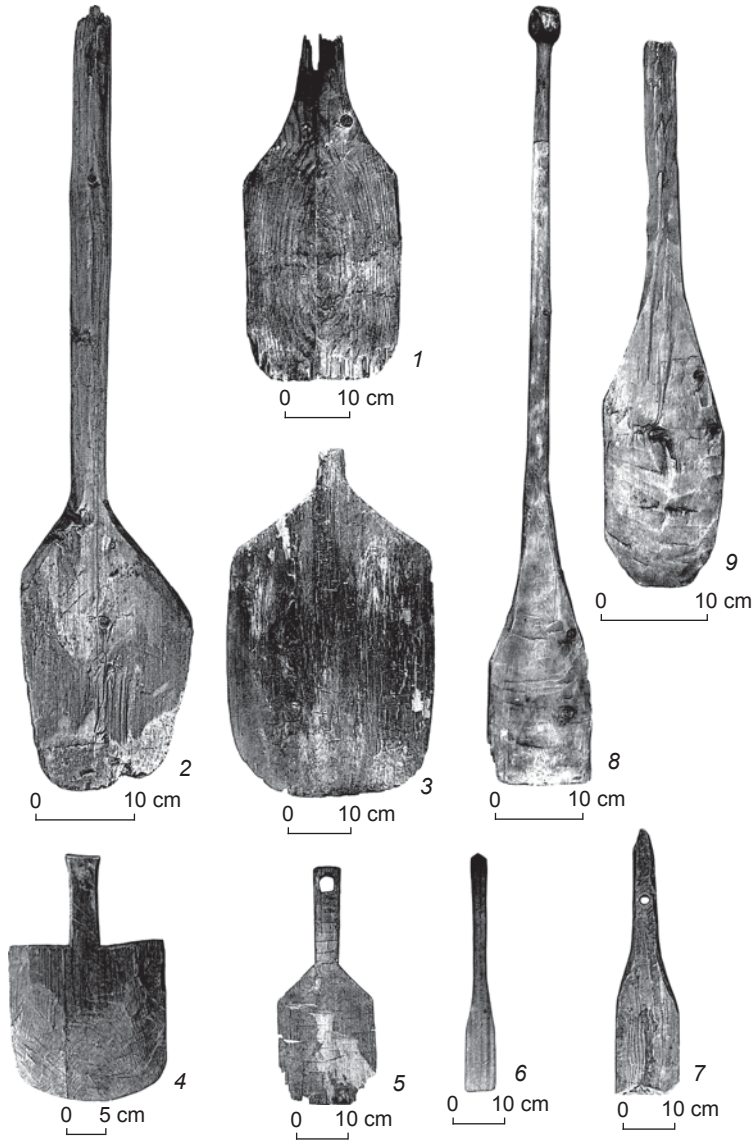

Fig. 2. Wooden shovels from excavations at Mangazeya (*1–7*) and Fort Nadym (*8*, *9*).
1, *3* – for snow removal; *2*, *8*, *9* – for earthworks; *4* – for baking bread; *5–7* – kitchen spatulas.

of shovels was associated with the need to store food—for digging cellars. Cellars were divided into compartments with ice for storing meat and fish in the warm season, and compartments for storing vegetables (Tataurov, Chernaya, Borilo, 2018). Tara, like any other fortress, had several sources of water supply. The town had both public (fortress and monastery) and private wells. Digging tools were needed for their making and routine cleaning. One of the wells was excavated in 2012.

Several clay pits for pottery and brick production have been found during the excavations of the town. The town dwellers extracted raw materials within fortress walls, using shovels for earthworks. Such shovels were also used to clean sheds where livestock were kept in winter.

An important part of Tara's life was the construction and maintenance of defensive structures. The powder magazines under the fortress and fortress towers were 3 sazhens (over 6 m) deep into the ground. The fortress walls consisted of *gorodni*—cribworks filled with soil and palisades; a ditch was dug in front of them along the entire perimeter of the town. Shovels for earthworks were indispensable.

Stirring shovels. Small shovels, which served rather as stirrers (Fig. 3, *11*, *12*), were used for mixing solutions. Their length did not exceed 1 m; in some cases, the shovel's blade constituted over a half of the item. The blade's width reached 20 cm. The working edge could be either straight or rounded. The shoulders were weakly expressed.

Fig. 3. Shovels (*1–6*, *8–14*) and iron fittings (*7*) from excavations at the Tara Fortress.
1 – kitchen spatula; *2* – toy shovel; *3–6*, *10* – shovel for snow removal; *8*, *13*, *14* – shovel for earthworks; *9* – shovel for baking bread; *11*, *12* – stirring shovels. *1–6*, *8–14* – wood; *7* – iron.

Snow shovels (see Fig. 2, *1*, *3*; 3, *3–6*, *10*) were the most numerous category among the shovels discovered during the excavations of Russian sites in Siberia. In Tara, all tools for removing snow were carved of aspen—the softest and most fragile timber, with the exception of one shovel (see Fig. 3, *3*) made of cedar pine. It is not surprising that aspen shovels often broke (usually the edges of the blade broke off); it is very rare to find intact items in collections. Unlike other tree species, aspen had the largest trunk diameter, so it was most often used to make wide shovels for snow removal. A person who had command of an axe needed a piece of log and half an hour to make it.

Snow shovels did not differ in length from digging shovels, and had the same long straight shaft. However, they had larger blades, over 40 cm in width and up to

60 cm in length. The working edge was usually straight, but it could also be rounded. Of interest is a cedar pine shovel (see Fig. 3, *3*); it is larger than others (ca 3 cm thick), and has shoulders with protrusions (like modern spades); its working edge is not straight, but slanting. The absence of wear traces suggests that the shaft broke at the very beginning of the tool's operation. The shoulders are usually strongly slanting, but there are specimens with straight shoulders. One of the shovels bears the inscription: "oCh" (see Fig. 3, *4*); this is probably a mark of belonging to a certain area of the town, or the stamp of the manufacturer or owner of the tool.

Shovels for baking bread (see Fig. 2, *4*; 3, *9*). The heads of excavations in Mangazeya identified a shovel with a short shaft as "bread" shovel (see Fig. 2, *4*) (Vizgalov, Parkhimovich, 2017: 97). The short shaft was probably made taking into account specific features of the Mangazeya ovens: these had short hearthstones, and there was no need to insert loaf-tins or sheets with bread deep into the oven. Stoves in Tara and in the surrounding settlements had long hearthstones, sometimes reaching 2 m (Adaptatsiya russkikh…, 2014: 264, fig. 63, *1*; 266, fig. 65), so shovels with long shafts were needed for baking bread (see Fig. 3, *9*). A bread shovel differed from a digging or snow shovel in shape and thickness: its shaft was thinner and had a spherical or T-shaped knob at the end, which made it easier to pull the tool with bread out of the oven. The blade was made in the form of an elongated oval with a sharp working edge. Its small thickness (no more than 2 cm) and width (ca 20 cm) corresponded to the purpose of the shovel to pull out bread, and not to lift it; such a shovel could be easily slipped under a sheet or tin with bread. If necessary, the same shovel could be used for raking charcoals and pulling out pots from the oven. Oven-forks appeared simultaneously with cast-iron pots only in the 19th century.

Kitchen spatulas (see Fig. 2, *5–7*; 3, *1*). The material evidence from Mangazeya includes dozens of these kitchen utensils (Vizgalov, Parkhimovich, 2017: 171). Among the finds from Tara, such spatulas were less numerous; this can be explained by specific features of northern cuisine, or by the fact that the Tara-dwellers used whorls to stir the prepared dish (in terms of quantity, whorls are comparable with the Mangazeya spatulas). The Tara spatula (see Fig. 3, *1*) might not only have been used for stirring: it served as a cutting-board, as evidenced by numerous knife traces. Spatulas do not exceed 50 cm in length; their shoulders are strongly slanting; the working edge is straight; the width of the blade is 10–12 cm. The spatulas used for plugging the cracks in cribworks with moss are very similar to these items; their purpose can be established more accurately only by using the data on the location of such artifacts.

Toy shovels (see Fig. 3, *2*). The toys discovered during the excavation of Tara included several children's shovels. As was shown in the study on this category of finds from Tara, they reproduced the tools used by adults (Chernaya, Tataurov, 2019: 87, fig. 3, *9*). For example, the children's shovel shown in Fig. 3, *2* was an almost exact replica of the above-described cedar pine shovel for moving snow.

Sizes and proportions of shovels (ratio of the shaft's length to the blade, and ratio of the blade's length to its width) show that shovels for placing bread into the oven were the longest. Shovels for earthworks and snow removal were almost 0.5 m shorter than those. The shortest were kitchen spatulas (see *Table*). Snow shovels had the widest blades, while bread and kitchen shovels had the narrowest blades (see *Table*). With the accumulation of new evidence, it will be possible to establish the purposes of shovels from their sizes and proportions with more confidence. It would be useful to describe some features of the ends of shafts and blades. A shaft ended with a knob or hole in a shovel designed for earthworks. A bread shovel had a T-shaped or spherical knob at the end of the shaft; the thickness of the oval blade did not exceed 2 cm. A kitchen spatula was characterized by numerous knife cuts on the blade and the presence of hole in the shaft, through which a rope was threaded for hanging the utensil. As far as the slope of the shoulders is concerned (the angle between the shaft and the shoulder), this indicator was confidently identified only for the shovels intended for earthworks or snow removal—135–160°. We did not measure the parameters of the children's shovels, since they were adjusted for the hand of a child.

Parameters of the shovels discovered in Tara

Shovel	Amount, pcs.	Shaft length, m	Blade length, m	Blade width, m	Proportion	
					shaft length to blade length	blade length to blade width
For earthworks	6	≥ 1	0.35–0.45	up to 0.35	2.2–2.85	1.0–1.3
For stirring	2	ca 0.5–0.7	up to 0.5	≤ 0.2	1	ca 2.5
For removing snow	7	1	0.6	0.45	1.5	1.5
For baking bread	3	up to 1.6	0.4–0.5	0.2–0.3	3.2–4.0	ca 2
Kitchen spatulas	3	≤ 0.5	ca 0.2	up to 0.2	1	0.2–0.25

Conclusions

It is difficult to find an aspect in the life of an inhabitant of Siberia that would not entail the use of shovel. People cultivated land using shovels, dug cellars for storing harvest and ditches surrounding fortress walls, set up defensive obstacles, and created the *gorodni* cribworks. This tool was also used to dig grave pits. In winter, the life of a town in Siberia was inconceivable without snow removal. Kitchen spatulas were indispensable in cooking.

The study of shovels that were found during the excavations in the Tara Fortress has shown that shovels were used at different times of the year, indoors and outdoors, and for specific works. The tools differed in the length of the shaft, the design of their ends, the width and possibly thickness of the blades, and the presence or absence of knife marks on the blades. A shovel for earthworks had a total length of at least 1.5 m, a straight or rounded cross-section of the blade, and slightly slanting or straight symmetrical shoulders. This indicates that a person worked with the shovel standing straight up or slightly bent, using his right or left foot while pressing the tool into the ground. To work only with the arms was possible on light soils or with bulk materials. Most likely, precisely such shovels had iron fittings. The question of what determined the presence of one or two shoulders in shovels is still open. The number of shoulders might have been an ethnic trait discovered by I. Balassa and Gy. Ortutay in the evidence from Hungary (Tikhonov, 1994: 65). It cannot be ruled out that the difference in the number of shoulders reflects specific methods of working with a shovel. Digging shovels could have been used for moving bulk materials, removing manure, rowing a boat, etc. Such tools can be considered versatile, but their main purpose was to work with soil. Snow shovels differ from those described above by their wider blades. They might have also been used for working with other materials, but in that case more effort would have been required from the worker.

At first sight, stirring shovels appeared to be tools for working in the kitchen, but in fact this was not the case. During the excavations, several dozen whorls made from a thin tree trunk, were found. Stirring shovels were different from these. Their purpose was mixing/stirring solutions, such as mortar for brickwork or clay. For the latter, there were short (no more than 50–70 cm long) shovels with narrow blades, almost without shoulders.

Bread shovels were distinguished by thin oval (in some cases rectangular) blades and long shafts. Old bread shovels were most likely also used outdoors.

Kitchen spatulas probably served as cutting-boards: they show knife marks on them and a hole for a rope at the end of each shaft-handle. Using such shovels, it was possible to pour grain or flour into containers for subsequent processing. Since kitchen spatulas did not exceed 50 cm in length, they were not used when working with soil, manure, etc. These kitchen spatulas should be distinguished from tools for calking log cabins, whose blades were 3–15 cm wide. The latter were used together with a mallet, so they often have typical marks of mallet strikes on the shafts. Such finds occur outside the dwellings, and are not considered in this study.

Shovels show traits of both specialization and versatility. A wooden shovel was one of the simplest tools to make; only a suitable log and axe—an even more necessary tool in the life of a Siberian dweller—were needed to do it. Shovels were made of various types of wood and were given different shapes; iron fittings were used for ensuring their sharpness and durability.

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Hunting Equipment of Russians Living near Tara on the Irtysh in the 17th and 18th Centuries

This article describes Russian hunting tools unearthed from several sites near the town of Tara on the Irtysh: Ananyino I, Izyuk I, Tara, and Fort Bergamak. The functions of tools are assessed on the basis of archaeological parallels from the Baraba forest-steppe, ethnographic examples relating to the culture of the Irtysh natives, materials from Fort Albazin and Fort Sayansk, and much earlier burials dating to the Xianbei-Rouran time in the Altai Mountains. The variety of 17th–18th century hunting tools is best represented at Mangazeya, Fort Alazeya, and Fort Stadukhin. Apart from typological comparisons, technological analysis was carried out for several wooden and metal artifacts. Results are helpful for revealing continuities between the 17th–18th century Russian hunting tradition at Tara and that practiced in Old Rus and in the 15th–17th century Russian state, as well as for comparing it with the Siberian native traditions.

Keywords: *Russian population, Irtysh River, Tara in 17th–18th centuries, hunting equipment, bow, arrows, typology, chronology.*

Introduction

Archaeological evidence from Old Russian sites and written sources contains various information about hunting devices and methods (Tretyakov, 1951: 55, 73–75; Malm, 1956: 108–116; Medvedev, 1966: 11–12; Niederle, 1956: 322; Chernetsov, Kuza, Kiryanova, 1985: 232–233). Depending on the methods, all items and means used for hunting animals and birds are usually divided into tools for active hunting (bows, arrows, and guns) and passive hunting (snares, leghold and shooting traps, etc.) (Gerasimov, 1990: 54–58).

This research is based on archaeological evidence discovered at rural complexes of the Russians of the 17th–18th centuries in the Omsk Region (the sites of Ananyino I, Bergamak I, Izyuk I, and the town of Tara).

The village of Ananyina (the Ananyino I site in Tarsky District, Omsk Region) is one of the first Russian settlements founded near Tara. It was built on the southern shore of Lake Ananyino—an oxbow of the Irtysh. To the southwest of the settlement, there is a cemetery. This one-house village has been known from the written sources since 1624. In 2005 and 2010–2020, L.V. Tataurova researched 2320 and 684 m^2 of the area of the settlement and cemetery, respectively, uncovering 81 burials and nine housing complexes of eight three-chamber log houses and one single-chamber house (Tataurov et al., 2019: 200–204; Tataurova, 2020; Tataurova, Krikh, 2015).

The remains of the cultural layer at Fort Bergamak (the Bergamak I site in Muromtsevsky District, Omsk Region) have been found on a rock terrace above the Tara River, on the northern edge of the present-day village

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of Bergamak. The fort was built in 1668 on the border with the Baraba Tatar volosts on the left bank of the Tara River. In 1996–1998, L.V. Tataurova and S.F. Tataurov excavated 300 m^2 in the part of the site which was the most susceptible to destruction by the river. During the excavations, four buildings, as well as the remains of a cellar and wooden structures possibly associated with a fortification system, were discovered (Tataurov et al., 2019: 206–207).

The village of Izyuk (the Izyuk I site in Bolsherechensky District, Omsk Region) is located on the right bank of the Irtysh River, opposite the present-day village of Evgashchino; it was founded not earlier than the 1660–1670s. In 1999–2004, Tataurova researched the settlement and burial complexes of the site and unearthed 1805 m^2 of the area. Five out of nine excavated features were residential, including a log house, five-walled house with wooden addition, and three three-chamber log houses (Ibid.: 204–206). At the cemetery, 261 burials were examined (Tataurova, 2010).

The Tara Fortress, founded in 1594, is the first Russian fortress in the Omsk Irtysh region, located 300 km north of Omsk, on the left bank of the Irtysh River. At present, it is a district center, the town of Tara in Omsk Region. Since 2007, excavations by S.F. Tataurov and S.S. Tikhonov* have unearthed an area of over 2000 m^2. The remains of the Prince's Tower, which was a part of the fortification system, the household of a noble resident of Tara (presumably the Voevoda), shoe-making workshop, cemetery of the 18th century, foundations of St. Nicholas Cathedral, and a part of the church graveyard have been explored. Construction horizons of the late 16th–mid-20th centuries, residential and utility complexes, and wooden pavements have been discovered in the cultural layer, which was about 4 m thick (Tataurov et al., 2019: 253–392; Tataurova et al., 2014: 142–242).

The hunting tool complex at archaeological sites, as well as in ethnographic collections, is made up of a small set of items; therefore, it is very important to present such artifacts to a wider scholarly audience.

This study intends to describe the *saadak* (Russian terminology according to (Markevich, 2005: 10, fig. 22)) or bow and quiver—the set of archer's weaponry as a type of inventory for active hunting among the Russian population living in the Tara Irtysh region in the 17th–18th centuries.

The collections from Mangazeya and Forts Alazeya and Stadukhin are used as reference materials. The evidence from these sites is contemporaneous with the collections from the Tara Irtysh region and gives some idea about the material culture of the Russians in the 17th–18th centuries.

*The authors of this article are grateful to S.F. Tataurov and S.S. Tikhonov—the authors of the excavations in Tara—for the opportunity to use their research materials.

Research materials and methods

Equipment for active types of hunting practiced by the Russian population of the Tara Irtysh region in the 17th–18th centuries includes *saadaks*, and, since the 18th century, also firearms (which are not considered in this article). Composite bows and various types of arrows from the Russian *saadak* set were used in the region.

A fragment of a wooden core (the middle part of a bow shaft) was found at the Ananyino I settlement under the flooring of a three-chamber log house, which, according to its set of things, pertains to the 18th century (Fig. 1, *1*). The core is 50 cm long; the width of the limbs at the edges is 3.7 cm and 4.0 cm, and thickness is 0.7 cm. The handle is 17 cm in length, and 1.8 cm in width and thickness.

Three types of arrows have been discovered at the settlement complexes of the Tara Irtysh region: *tomars* of solid wood, bone arrowheads, and iron arrowheads (Fig. 1, 2).

Tomars of solid wood include 3 items. One of them, from Fort Bergamak, is represented by a 60 cm long fragment. The diameter of the shaft is 1 cm. The head (point) is 6 cm long; the width of the facets is 1.9 × 1.9 cm. In Tara, the upper parts of two *tomars* of solid wood with cone-shaped heads have been found (Fig. 1, *3*, *4*) (Tataurov et al., 2019: 333). Bone socketed heads of *tomars* have also been discovered in the cultural layer of Tara (see Fig. 1, *5*).

The collection of bone arrowheads is representative and varied. Around thirty such points of various types and three blanks have been discovered at the settlements of the Tara Irtysh region; points have been also found in Tara (see Fig. 1, *6–17*; 2, *1–23*).

There are far fewer iron arrowheads on the explored Russian sites of the Tara Irtysh region (Fig. 2, *24–41*). For example, only one item has been found in Tara (Fig. 2, *25*).

During the study, the methods of comparative-typological analysis for systematizing and dating the arrowheads, technical-technological and anatomical analysis of the wooden bow core, and microstructural analysis for identifying manufacturing techniques of some iron arrowheads were used.

Description of the evidence and research results

Bows

The fragment of the bow core found in Ananyino I is not the only find related to hunting tools in the material evidence from the sites of the 17th–18th centuries in Siberia. The referential collections from Mangazeya contain parts of bow cores, *nastrugi* (specialized scrapers

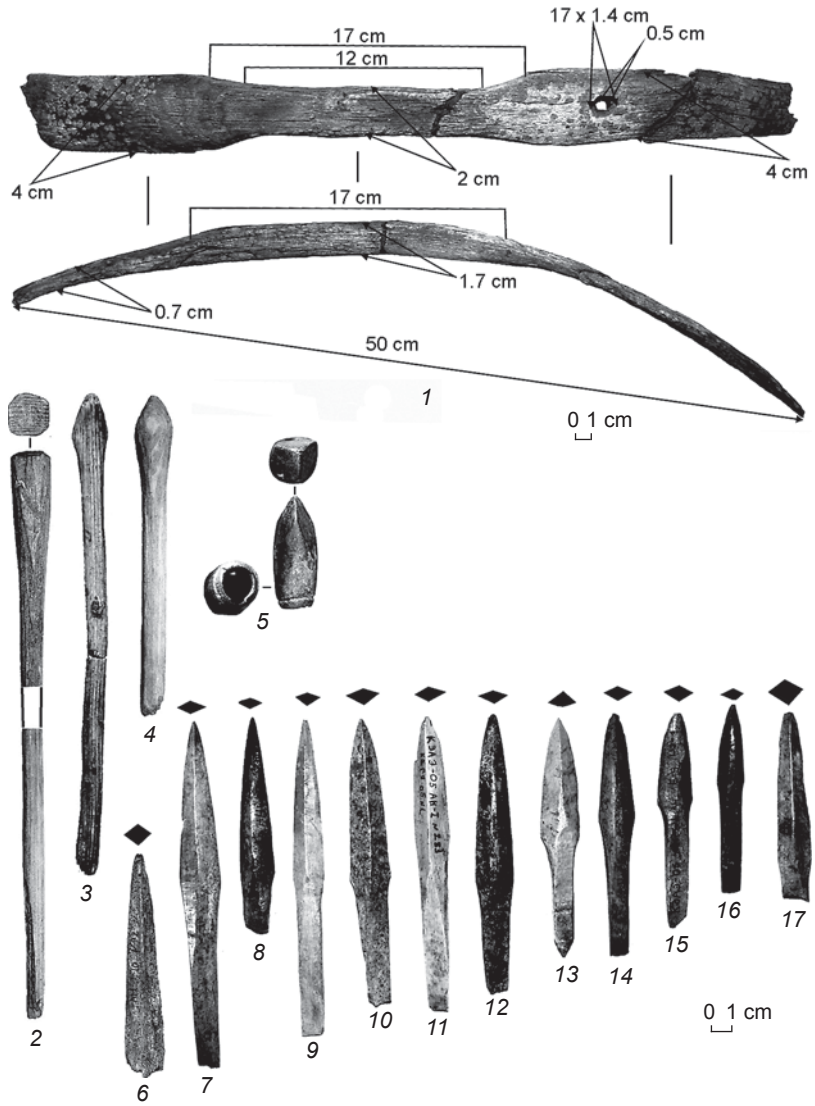

Fig. 1. Hunting equipment of Russians living in the Tara Irtysh region in the 17th–18th centuries.
1 – bow core; *2–4* – *tomars*; *5* – socketed point of a *tomar*; *6* – socketed arrowhead; *7–17* – tanged arrowheads. *1*, *6–8*, *11*, *12*, *14–17* – Ananyino I; *2*, *9* – Bergamak I; *3–5* – Tara; *10*, *13* – Izyuk I. *1–4* – wood, *5–17* – bone.

for producing arrow shafts), arrows, and protective onlays on bows (Belov, Ovsyanikov, Starkov, 1981: 74, pl. 64; Vizgalov, Parkhimovich, 2008: 62–63, Fig. 85, *4*; 2017: 94, 163, 177, etc.). The material evidence from Fort Stadukhin contains cores of composite bows, end inserts and *nastrugi* scrapers; that from Fort Alazeya includes protective shields made of horn (Alekseev, 1996: 41–42).

A bow core similar in shape to the find from Ananyino I appears in the collection of finds from the Tatar cemetery of the 16th–18th centuries at the Abramovo-10 site in Baraba (Molodin, Sobolev, Solovyev, 1990: 13, 46–47). The design of these bows is typical of the indigenous peoples of Siberia both in the time preceding the arrival of the Russians and in the subsequent period up to the early 20th century (Simchenko, 1976: 132–133; Solovyev, 1987: 25–27; Molodin, Sobolev, Solovyev, 1990: 47–48; Remeslenniye protsessy…, 2011).

In the Late Middle Ages, bows were made of various types of wood.

According to the analysis of the anatomical wood structure, the bow core from the settlement of Ananyino I was made of cedar pine (*Pinus sibirica* Du Tour*).

Technical and technological analysis of the bow core from Ananyino I has made it possible to recreate the process of its manufacturing. Judging by the anatomical structure of the wood, the core was made of a young cedar trunk 6–7 cm in diameter. The timber was harvested in the late autumn or late winter when a minimal amount of natural moisture remained in the tree trunk. The basis of the future weapon was made soon after harvesting the wood, while it was soft and pliable, and was easier for processing. The bow was carved using the blade of a sharpened knife. First, the limbs were formed, then the handle. Wood from the inner planes of the limbs was removed with small, frequent movements, cutting off thin shavings. The chipping of each limb was carried out evenly, symmetrically, with a decrease in thickness from the beginning of the handle to the ends of the reflective planes. At the end of each limb, at a distance of 3–4 cm, small oblique grooves were cut for attaching the bowstring. The handle for the hand of the archer was shaped after completing the limbs. The wood was cut symmetrically on all sides, so it would be as comfortable as possible to be held by the archer's closed hand. After the handle was made, the artisan gradually brought the bow limbs to optimal parameters by periodically checking their flexibility and elasticity. Then the blank without the bowstring was dried to some equilibrium humidity in the open air, avoiding direct sunlight, which negatively affected the flexibility of the product.

*Identification of wood species was made by I.Y. Slyusarenko, for which the authors express to him their gratitude.

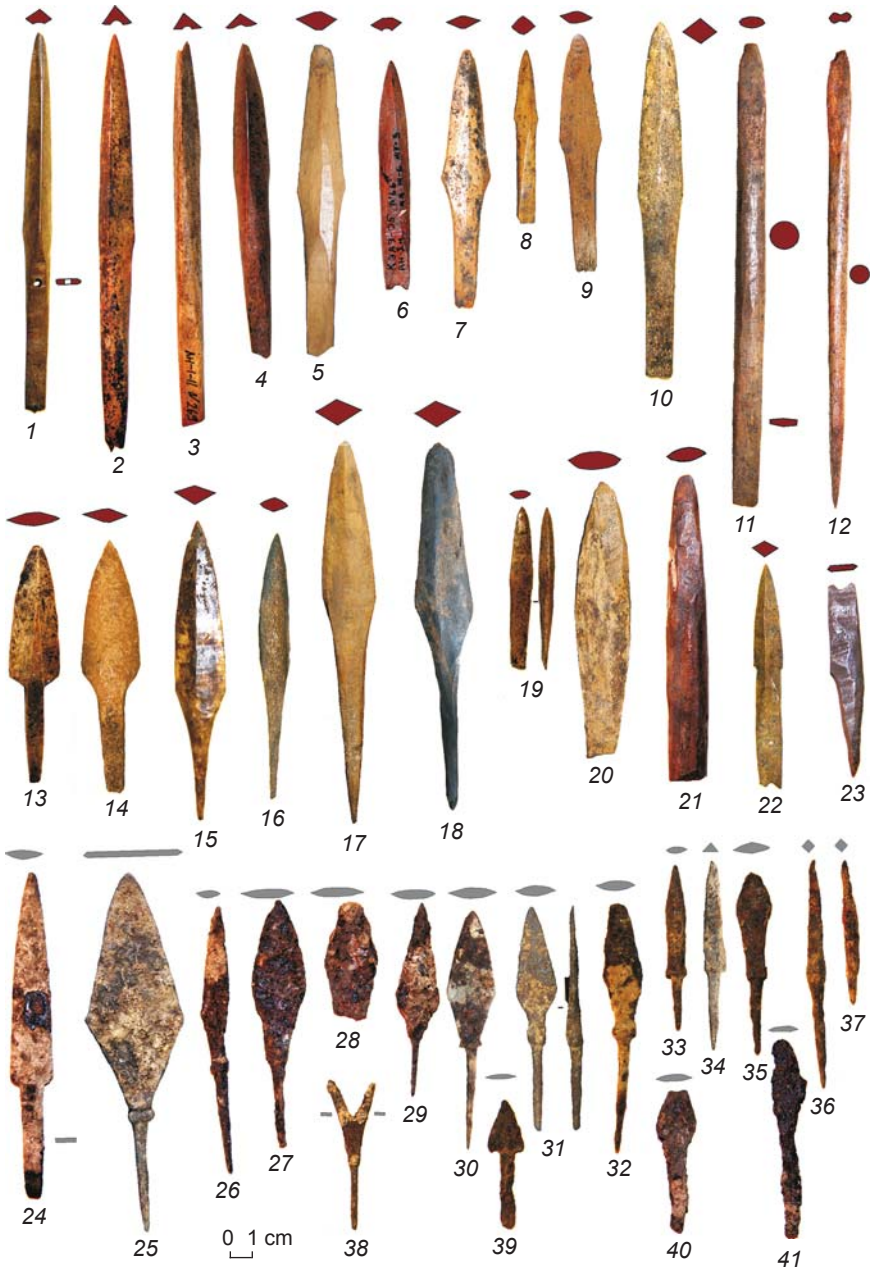

Fig. 2. Tanged arrowheads of Russians living in the Tara Irtysh region in the 17th–18th centuries.
1–4, *6*, *7*, *10–16*, *19–24*, *26*, *27*, *30*, *31*, *34*, *36*, *37*, *39*, *40* – Ananyino I; *5*, *8*, *9*, *17*, *18*, *25* – Tara;
28, *29*, *32*, *33*, *35*, *38*, *41* – Izyuk I.
1–23 – bone, *24–41* – iron.

In our opinion, the bow that was found in the dwelling was an original weapon, and not a copy. Since the bow core was found under the flooring, it can be assumed that the weapon (perhaps already unfit for use) was placed there specially as a talisman to protect the home.

In the Tara Irtysh region and in other regions of Siberia, in the 17th–18th centuries, the *saadak* sets were used not only by hunters, but also by service people. A similar bow may be represented in a pictorial reconstruction of the appearance of a service Cossack from Fort Albazin (Bagrin, Fomin, 2019: 234, fig. 2.7.5). A fragment of the bow core of such a weapon is a part of the collection from that site (Mylnikov, 2019: 288, fig. 2.11.3, *2*).

In terms of anatomical structure, shape, and design, the find from Ananyino shows similarities with the bow core with remains of reflective limbs from kurgan 31 of the Xianbei-Rouran period at the Yaloman II cemetery in the Altai Mountains (Tishkin, Mylnikov, 2016: 57–58, fig. 72). Additional information on its manufacturing technique was provided by the reconstruction based

on the finds from kurgan 31 by G.L. Nekhvedavichus (Ibid.: Fig. 73).

The bows from Mangazeya and Forts Alazeya and Stadukhin differ from the bow from Ananyino. The Mangazeya bows have wide (from 5.6 to 6–6.5–7.8 cm) reflective limbs, indicating a greater lethal force of the weapon, and handles with different design (Belov, Ovsyanikov, Starkov, 1981: 74, pl. 65; Vizgalov, Parkhimovich, 2008: 62; 2017: 94, fig. 42, *3*). The bows from Forts Alazeya and Stadukhin (Alekseev, 1996: 41–42, pl. 58, *4*) belong to the Yakut type of Eastern Siberian composite bow (Simchenko, 1976: 114, 116, fig. 7). The Yakut bow, like Western Siberian bows, was made of two types of wood, but the end plates of bone (from reindeer antler in the Forts) were glued into slits in the middle of the ends of the limbs (Ibid.: 133, fig. 7; Alekseev, 1996: Pl. 58, *4*). In Western Siberian bows, "the curved end was glued with its wedge-shaped part between the plates which form the back and inner part of the bow" (Simchenko, 1976: 133).

In addition to these items, the material evidence from Mangazeya contains a leather bow case with embossed ornamentation (Belov, Ovsyanikov, Starkov, 1981: 74–75); six quivers with arrows were found in Tobolsk (Matveev, Anoshko, 2019: 70, fig. 3, *3*).

Scholarly literature contains information that sets of bow and quiver in 1655/56 were sold for 1.5 rubles per piece at the Tobolsk marketplace (Vilkov, 1967: 95).

Arrows

Tomars. Whole *tomars*, similar in shape to those from the Irtysh region, with bowstring earlets at the end, are known from the evidence of Mangazeya (Vizgalov, Parkhimovich, 2008: 202, fig. 86, *5*, *7*) and Verkhoturye (the length of the item is 42 cm) (Korchagin, 1998: 69, 73). Solid wood *tomars* of other shapes, bone *tomar* heads, arrow shafts, bone and iron arrowheads of various types, and arrow balance weights have also been found in Mangazeya.

The collections from Forts Stadukhin and Alazeya include *tomars* of three types: those made of solid wood, those made of bone with flat working parts, and those with lobed working parts. In addition, there are bone *tomar* heads, other (mainly tanged) arrowheads made of bone (eight types) and iron (three types), and arrow shafts (Alekseev, 1996: 42–43, pl. 61). *Tomar* tips have been found in Tomsk (Chernaya, 2015: 248, fig. 149), Tobolsk (Adamov, Balyunov, Danilov, 2008: 66, fig. 33, *8*, *9*; Balyunov, 2014: Vol. 1: 84–85; vol. 2: 5, pl. 3), and Berezovo (Vizgalov, Kardash, 2012: 155).

On the basis of the evidence from the sites of Old Rus, five types of bone *tomar* tips have been identified. Their emergence is associated with the 10th–12th centuries (Medvedev, 1966: 87–88, pl. 22, 25, 30). According to the typology by A.F. Medvedev, the socketed bone arrowhead from Tara belongs to type 5, or blunt, massive arrowheads (Ibid.: 87, pl. 30, *106*), dating to the 10th–14th centuries.

Tomars were used for hunting fur animals.

Bone arrowheads. Scholars have proposed several classifications of bone arrowheads from the Russian sites of the Middle Ages and Modern period: for Old Rus (Ibid.: 88–89); for Forts Alazeya, Stadukhin, and Sayansk (Alekseev, 1996: 42–43, pl. 62–65; Skobelev, 2002), and for Tobolsk (Balyunov, 2014: Vol. 1: 84–85; vol. 2: 5, pl. 3).

The typology of bone arrowheads from the complexes of the indigenous population of the 16th–18th centuries (Molodin, Sobolev, Solovyev, 1990: 56–62) served as a basis for analyzing evidence of the Turkic population of the Tara Irtysh region, carried out by A.V. Shlyushinsky (2007: 129–133). Comparison has revealed similarities between the collection of arrows from the Russian complexes and from the sites of the indigenous population of Siberia. We used the same model. Two types of arrowheads were distinguished according to the shape of their bodies.

Class I – socketed arrowheads. There is one diamond-shaped tetrahedral, and pyramidal item from Ananyino I, measuring 10.0 × 1.8 cm. This arrowhead can also be attributed to type III (Fig. 1, *6*).

Class II – tanged arrowheads. It includes all other arrowheads analyzed in this article (Fig. 1, *7–17*; 2, *1–23*). Most of them can be described as group 3 (diamond-shaped), types I and VI.

Type I – elongated rhombic arrowheads (12 items). The sides of the blades vary from straight to slightly convex.

Variant 1 – the penetrating part prevails over the bearing part. There are three items—one item from each basic site (Fig. 1, *9*, *10*, *12*). Their sizes are 14.0 × 8.0 × × 1.5 cm; 12.7 × 7.0 × 1.8 cm, and 12.4 × 7.2 × 1.6 cm. It is possible that two more broken arrowheads from Ananyino I belong to this variant. The blade is 8.2 and 8.0 cm long, and 1.5 cm wide (see Fig. 1, *8*, *17*).

Items of similar shape are known from the evidence of Fort Sayansk and Tobolsk (Skobelev, 2002: Fig. 1, *14*; Adamov, Balyunov, Danilov, 2008: Fig. 33, *5*), and from the indigenous population of the Tara Irtysh region and Baraba (Shlyushinsky, 2007: Fig. 69, *28*, *31*; Molodin, Sobolev, Solovyev, 1990: 56–63).

Variant 2 – the penetrating part is less than or equal to the bearing part. Six items are from the settlement of Ananyino I, and one item from Izyuk I (see Fig. 1, *7*, *11*, *13–16*). The length of the arrowheads from Ananyino I varies from 15.4 to 8.3 cm; the length of the penetrating part ranges from 7.2 to 3.5 cm; the blade width ranges from 1.8 to 1.2 cm. The size of the arrowhead from Izyuk I is 10.0 × 5.5 × 1.8 cm.

Similar items appear among the evidence of the Turkic population in the Tara Irtysh region (Bolshoi Log, Okunevo VII) and the sites of Baraba (Shlyushinsky, 2007: Fig. 69, *32–34*; Molodin, Sobolev, Solovyev, 1990: 56–63).

Type VI – oblong-rhomboid arrowheads with concave sides and shoulders. Arrowheads of this type include two variants in the evidence from the Tara Irtysh region.

Variant 1 is the classical form, which served as the basis for identifying the type (Molodin, Sobolev, Solovyev, 1990: 58–59, fig. 45, *4*, *5*). The arrowhead from Ananyino I (Fig. 2, *7*) measures 11.5 × 5.6 × 2.2 cm.

Variant 2 – massive long bases and bodies almost equal in width with the bases. There are two items from Tara (Fig. 2, *8*, *9*), measuring 8.0 × 3.5 × 1.0 cm and 10.0 × 4.7 × 1.6 cm. Sub-variant 1 is the arrowhead from Ananyino I, measuring 15.1 × 7.5 × 1.9 cm, which has a massive, long tang and even (not concave) blade smoothly passing into the base (Fig. 2, *10*).

Group 4 – flattened hexagonal arrowheads.

Type II – elongated rhombic arrowheads; both planes are flattened. One item is from Tara and one is from Ananyino I (Fig. 2, *5*, *6*). They differ in size and measure 13.8 × 6.6 × 2.1 cm from Tara and 9.3 × 1.3 cm from Ananyino I. The latter arrowhead has no clear boundary between the body and base; the edges of the body disappear when passing into the base.

Type III differs from the described arrowheads (Molodin, Sobolev, 1990: 58–59) by only one flattened side with a medullary cavity (Fig. 2, *1–4*). The length of the body is equal to the length of the base. In one case, the blade is indicated only by facets, which disappear when passing into the base (Fig. 2, *3*). The sizes vary from 14.0 × 6.0 × 1.6 cm to 19.0 × 9.5 × 1.8 cm.

There is a hole on the tang, below the border with the blade (Fig. 2, *1*), on one item of this type, which measures 16.1 × 9.5 × 1.3 cm. This makes it possible to identify this point as a projectile for a shooting trap.

Group 7 – rod-shaped arrowheads (Fig. 2, *11*, *12*).

Type II – awl-shaped arrowheads. They were identified using the evidence from Forts Alazeya and Stadukhin (Alekseev, 1996: 42–43, pl. 62, 63). In the collection from the Russian sites of the Tara Irtysh region, this type appears in two variants. There are no arrows like these in the collections of the indigenous population of the region.

Variant 1 (type I according to A.N. Alekseev (Ibid.: 42)) has a pointed working part. It consists of a long (21.5 cm) rod-like point, rounded (1.5 cm) in cross-section (Fig. 2, *11*).

Variant 2. *S*ub-variant 1 (identified in the Irtysh region) is an arrowhead with a pronounced, scapular body, hexagonal in cross-section, in the center rounded in cross-section, with an awl-shaped base (Fig. 2, *12*). The size is 21.0 × 5.0 × 1.2 cm.

About seventy arrowheads of this type have been found in Forts Alazeya and Stadukhin. In Mangazeya, similar arrowheads have pronounced facets (Vizgalov, Parkhimovich, 2008: Pl. 87, *1*, *2*). A similar arrowhead appears in the Tomsk evidence (Chernaya, 2015: 149, fig. 159, *8*).

Among the bone arrowheads found at the Russian sites of the Tara Irtysh region, in addition to awl-shaped arrowheads, four new types can be distinguished that do not appear at the sites of the indigenous population.

Type 1 – keeled arrowheads with a flat tang. These items correspond to Old Russian bone arrowheads of type 11 according to the classification of A.F. Medvedev (1966: 88, pl. 30, *107*), and include two items from Ananyino I and two items from Tara. The "classical" arrowhead from Ananyino I, measuring 12.8 × 7.0 × 2.2 cm, has a diamond-shaped body, in cross-section longer than the base (see Fig. 2, *15*).

Three other arrowheads are variations of this type.

Variant 1 – keeled arrowheads with flat tang without shoulders. In one item, the blade smoothly passes into the base; the body and base are equal in length (Fig. 2, *16*). Its size is 11.3 × 6.0 × 1.4 cm. This item was found in Ananyino I.

Variant 2 – keeled arrowheads with flat tang; the body is shorter than the base; the blade is diamond-shaped in cross-section (see Fig. 2, *17*, *18*). The sizes of the items are 17.0 × 7.5 × 2.3 cm and 16.6 × 7.4 × 2.5 cm. Two of them were found in Tara. According to Medvedev, arrowheads of this type were widespread in Russia in the 13th century (1966: 88).

In the Siberian evidence of the Modern period, such arrowheads are compared with iron arrowheads of type 15 – elongated triangular without support, according to the classification by A.I. Solovyev (1987: 38), which, in turn, correlate with the typology of iron arrowheads of Medvedev – type 46, diamond-shaped arrowheads of the Novgorod type (1966: 67, pl. 30, *42*).

In addition to sites of the indigenous population, metal arrowheads of this type are known from Mangazeya (Solovyev, 1987: 38; Belov, Ovsyanikov, Starkov, 1981: Pl. 67, *14*). They correspond to type 7 – rhomboid-wedge-shaped arrowheads, in the typology proposed by O.V. Dvurechensky (2007: 285). Their iron prototypes existed until the second half of the 17th century in the European part of Russia and until the period of ethnographic modernity in Siberia (Solovyev, 1987: 38).

Type 2 – triangular, flat arrowheads of bone. There are two items from Ananyino I, measuring 11.1 × 6.3 × × 2.7 cm and 9.8 × 6.0 × 2.0 cm (Fig. 2, *13*, *14*). The body is diamond-shaped in cross-section and is longer than the base; the facets are convex; the shoulders are well defined.

In the typology of metal arrowheads elaborated by Dvurechensky, this shape corresponds to type 16 – triangular, flat, dissecting, and wide-lobed arrowheads

(2007: 288, fig. 15). According to Dvurechensky, iron points of this type have been found in Koporye, Pskov, Moscow, and Siberian towns, such as Old Kungur (Ibid.: 288). Iron arrowheads of similar shape are known from the evidence discovered in Mangazeya (Belov, Ovsyanikov, Starkov, 1981: Pl. 67, *14*; Vizgalov, Parkhimovich, 2008: Fig. 89, *7*).

Type 3 – sub-rhomboid, flattened arrowheads with elongated oval-shaped short base, named by analogy with the evidence from Fort Sayansk (Skobelev, 2002: 180–181, fig. 1, *11*). There are two items from Ananyino I, measuring 7.2 × 4.0 × 1.0 cm and 11.0 × 2.3 × 1.8 cm (Fig. 2, *19*, *20*). One of them is an unfinished product or broken blank (Fig. 2, *20*). Similar arrowheads appear among the finds from Mangazeya (Vizgalov, Parkhimovich, 2008: 63, 203, fig. 87, *3*; 2013: 27, fig. 13, *3*), as well as Forts Alazeya and Stadukhin (Alekseev, 1996: 42, pl. 58, *3*; 59, *5*).

Type 4 – wide, sharp-leaved, tetrahedral arrowheads represented by a bone point from Ananyino I (Fig. 2, *22*), measuring 9.5 × 4.3 × 1.3 cm. No close parallels to this item are known. In terms of the shape of the body with barbs and wide base, the points of type 20 are the most similar to it among iron arrowheads, according to the classification of Dvurechensky (2007: 291, fig. 17, *36*). A similar iron item was found in Mangazeya (Belov, Ovsyanikov, Starkov, 1981: Pl. 67, *11*). Yet, with iron arrowheads, the blade is triangular and shorter, like in the iron point discovered in Ananyino I (Fig. 2, *39*). A bone arrowhead has been found at a Khanty cultic complex near Fort Kazym, which was similar to the iron arrowheads and to the Ananyino arrowhead (Kazymskiy arkheologo-etnograficheskiy kompleks, 2018: 97, fig. 119). Two bone items from Ananyino I (Fig. 2, *21*, *23*) can be considered blanks.

Bone arrows were used for a long time over a wide area. They were in demand for hunting and warfare (Molodin, Sobolev, Solovyev, 1990: 62–63).

Iron arrowheads (Fig. 2, *24–41*). The collection is based on the typology by A.I. Solovyev (1987: 35–49). The same classification was used by the researchers of Mangazeya (Vizgalov, Parkhimovich, 2008: 63–65). The types of arrows from the Russian sites of the Tara Irtysh region were compared to those from the sites of Old Rus and the Russian State of the 15th–17th centuries, which made it possible not only to examine the finds on a regional scale and compare them with the items of the indigenous population, but also to trace the connection with the shared Russian culture.

The material evidence from the Russian sites of the Tara Irtysh region contains not all of the types and variants of arrowheads indicated in the typology by Solovyev, so we will mention only those items which appear among our finds.

All *metal projectiles* from the region in period under consideration are a part of group III—flat tanged arrowheads (Solovyev, 1987: 37).

Type 16 – combat arrowheads with a support. There are three items: two from Izyuk I and one from Ananyino I (Fig. 2, *33–35*).

Variant 1 are arrowheads with a diamond-shaped body. One of those items measuring 6.3 × 4.5 × 0.9 cm is from the Izyuk I site, and another one measuring 8.2 × 5.4 × 0.7 cm is from Ananyino I (Fig. 2, *33*, *34*). According to the typology of Dvurechensky, they belong to type 1 – awl-shaped and faceted, variant 1b – square or rhombic in cross-section with a simple support (2007: 282, fig. 5, *20*). Among the Old Russian items, they are parallel to the arrowheads of type 90, according to the classification by Medvedev, which are dated to the period from the beginning of the Common Era until the 14th century (1966: 83). According to Dvurechensky, such armor-piercing points with a perforating effect were in use until the second half of the 17th century (2007: 282).

Variant 3 – arrowhead with a wide, rhomboid body. There is one item measuring 7.5 × 4.5 × 1.5 cm from the Izyuk I site (see Fig. 2, *35*). Such arrowheads were in use until the second half of the 17th century (Dvurechensky, 2007: 286). Among Old Russian material evidence, there are similarities with the items of type 51 (Medvedev, 1966: 65).

Solovyev believed that arrowheads of this type reached different regions of Siberia before the arrival of the Russians and were in use in the southern regions including Tuva before the ethnographic period (1987: 38).

Type 17 – combat arrowheads without a support. There are two items from Ananyino I (Fig. 2, *36*, *37*), measuring 9.5 × 5.0 × 0.7 cm and 6.0 × 3.5 × 0.6 cm. In the Tara Irtysh region, such arrowheads have been found at the Bergamak II cemetery (Shlyushinsky, 2007: Fig. 67). According to Solovyev, items of this type were typical of the forest population of the region; the scholar dated them to the last centuries of the first millennium AD to the 17th century (1987: 38–39).

Type 18 – combat arrowheads with spikes. *Variant 1* – small. There is one item from Ananyino I (Fig. 2, *39*), measuring 5.3 × 2.0 × 1.5 cm. Such points are known from Mangazeya (variant 2) (Belov, Ovsyanikov, Starkov, 1981: Pl. 67, *11*) and Baraba (group 1, type III) (Molodin, Sobolev, Solovyev, 1990: 50). In the typology of arrowheads of Muscovy and the Russian State of the 15th–17th centuries, they correspond to type 20 – two-spike arrowheads (Dvurechensky, 2007: 291–292, fig. 17). Among the Old Russian evidence, this type is similar to type 29 – two-spike arrowheads without a support, which existed from the beginning of the Common Era until the 14th–15th centuries (Medvedev, 1966: 62), and are later known only from Mangazeya.

Most of the arrowheads from the Russian collection of the Irtysh region (8 items) belong to ***type 20*** – large rhombic arrowheads with a support (see Fig. 2, *25–32*).

Variant 1 – wide arrowheads. One item from Tara (Fig. 2, *25*) measures 16.0 × 10.5 × 4.4 cm. In the evidence from Baraba, the arrowheads of this variant represent type XIII – diamond-shaped, of the "Gnezdovo type", with convex sides and concave shoulders (Molodin, Sobolev, Solovyev, 1990: 50). The Tara arrowhead is larger than the Baraba finds.

Variant 2 – narrow arrowheads. There are four items from Ananyino I (from 9.7 to 11.0 cm long; the length of the body ranges from 4.5 to 6.5 cm and width from 1.4 to 2.3 cm) (Fig. 2, *26*, *27*, *30*, *31*), and three items from Izyuk I (10.0 × 5.0 × 1.5 and 8.0 × 5.0 × 1.7 cm, with the body 4.7 cm long) (Fig. 2, *28*, *29*, *32*).

According to Medvedev, arrowheads of this type (type 41 in his classification) were widespread in Russia from the 8th until the 14th century (1966: 65). In Western Siberia, they are known from the materials of Mangazeya (Vizgalov, Parkhimovich, 2008: 64, 205, fig. 89, *5*) and among the indigenous people, for example, those living in Baraba (Solovyev, 1987: 39; Molodin, Sobolev, Solovyev, 1990: 50). In the Tara Irtysh region, such arrowheads appear among the Late Medieval material evidence from the Okunevo archaeological area, and were dated to the 17th century (Shlyushinsky, 2007: Fig. 67; Matyushchenko, Polevodov, 1994: 198). Solovyev dated them to the 17th–18th centuries (1987: 39).

Taking into account the parallels and dimensional features of the bodies, the arrowheads of type 20, variant 2 (narrow) from the settlements of Ananyino I and Izyuk I can be dated to the 17th century.

Type 47 – stepped arrowheads, flattened-rhombic in cross-section. There are two items, one from Ananyino I and one from Izyuk I (Fig. 2, *40*, *41*), measuring 6.5 × 3.0 × × 1.7 cm and 8.2 × 4.0 × 1.5 cm. Items of similar shape have been found in Mangazeya: type 2 with a triangular blade and subtype 2 with a steep ledge at the base of the blade, measuring 5.8 × 2.5 × 1.8 cm (Vizgalov, Parkhimovich, 2008: 64, 205, fig. 89, *7*). In Medvedev's typology, this type is called "sharp-leaved". In the collections from the sites of Eastern Europe, arrowheads of this type were dated to the 11th–14th centuries (Medvedev, 1966: 73, pl. 12, *41*). In the Tara Irtysh region, they appear among the evidence from Okunevo VII (Shlyushinsky, 2007: Pl. 67, *27*). Solovyev established the time when they were in use as being the 17th–18th centuries (1987: 44).

Another iron point from the Izyuk I site belongs to ***type 42*** – forked splay-bladed arrowheads (Fig. 2, *38*). *Variant 1* has concave lateral and convex cutting edges (see (Solovyev, 1987: 43)). According to Dvurechensky, these are splay-bladed arrowheads of type 19, but there was no such variant in his classification. Such items are dated to the 10th–11th centuries. Dvurechensky also observed that at a later period they appeared only in Mangazeya (2007: 289, 291). The size of the find from Izyuk I is 6.0 × 3.5 × × 1.9 cm. Similar splayed arrowheads of the first and other variants were used by the Mangazeya dwellers (Belov, Ovsyanikov, Starkov, 1981, pl. 67, 1, *1*; 5, *7*; Vizgalov, Parkhimovich, 2008: 64, 204, fig. 88, *2*). Such items appear among the evidence from Fort Sayansk (Skobelev, 2002: Fig. 1, *3*) and the sites of the indigenous population of Baraba (Molodin, Sobolev, Solovyev, 1990: 53).

Splay-bladed arrowheads were used for hunting birds and animals, and for military operations in the 10th–14th centuries (Medvedev, 1966: 73; Dvurechensky, 2007: 289, 291). According to Solovyev, they were in use from the 6th until the 19th centuries; their bone imitations have also been discovered (1987: 43).

Microstructural analysis of the splay-bladed arrowhead (Fig. 2, *38*) and rhombic point of type 20, variant 2 (Fig. 2, *32*) from Izyuk I has revealed that the former arrowhead was made using the technique of welding two strips of iron and steel, while the latter arrowhead was forged entirely of raw steel (Zinyakov, 2005: 279, 289).

One iron arrowhead from Ananyino I site does not appear among the evidence of the indigenous population of Western Siberia (see Fig. 2, *24*). Its size is 13.5 × 8.6 × × 1.7 cm. In terms of shape of the body, the arrowhead is similar to type 38 (keeled, variant 4). Medvedev associated that variety with the Mongolian influence and dated it to the 13th–14th centuries (1966: 64, pl. 23, *18*). The tip of variant 3 of this type appears in the collection from Mangazeya, having a tang, like in the item from Ananyino I, but smaller, with triangular shoulders drooping downward (Vizgalov, Parkhimovich, 2013: 26, fig. 12, *4*).

Conclusions

Analysis has shown that the studied hunting equipment was traditional both for the Russian and indigenous population of the Tara Irtysh region of the 17th–18th centuries, the adjacent territories, and Siberia as a whole. Some types of items find parallels only among the evidence from the European part of Russia, which indicates the continuity of links and uninterrupted tradition of Russian Siberian culture.

Technical-technological and comparative typological analysis has revealed that the bow core from the Ananyino I settlement was almost identical in form and manufacturing methods to the core from kurgan 31 of the Xianbei-Rouran period (3rd century BC–5th century AD) at the Yaloman II cemetery, in the Altai Mountains. This means that the traditions of selecting raw materials and specific methods of manufacturing certain types of hunting tools were rooted in the distant past of Siberia. According to scholars, hunting tools similar in structure and purpose were common among the majority of the peoples of Siberia. Their design reflects the experience of the indigenous population and Russian settlers (Minenko, 1991: 146–147, 154; Korovushkin, 1997; Tyurki…,

1991: 42–51; Ryndina, 2003: 78–80; Vizgalov, 2005: 98; Selkupy, 2013: 77–87; and others). This observation is also confirmed by the written sources (Lepekhin, 1771: 30–34; Patkanov, 1999: Vol. 1: 56–59; vol. 2: 138–144; and others). In hunting practice, such items have been in use since the Late Middle Ages up to the present time among the Russian and indigenous population (Korovushkin, 1990, 1993, 1997; Ryndina, 2003; Kosintsev, 2006; Shukhov, 1928: 114–119; and others).

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Location of Tatar Settlements in the Middle and Lower Tara Region According to 18th Century Maps

This article discusses the location of Tatar settlements in the lower and middle reaches of the Tara on maps of the Tarsky Uyezd (1784 and 1798) and on topographic plan of the Kartashevskago and Bergamotskaya districts of the Tarsky Uyezd (1798). These maps had not been previously used for reconstructing the history of the region. To test their accuracy, other sources are used, including the Inventory Book of the Tarsky Uyezd, Gerhard Miller's itineraries, etc., as well as the results of archaeological and ethnographic studies. Based on the analysis of maps, patterns in the locations of Tatar settlements are reconstructed. They were situated between the mouth of Tara and its confluence with the Chertalinka River on the right bank, and between the Chertalinka and Kalinka rivers on the left bank. The reliability of the late 18th century maps as sources of information about the winter and summer settlements of the Tatars of the Middle and Lower Tara is assessed. These maps do not suggest that the settlements were still seasonal rather than permanent at that time. The winter camps were situated on the Tara high terrace, away from the valley, and summer camps were on the flood plain, close to the villages. The general pattern was that people settled along the river, often close to the places where the Tara tributaries flowed into it. Place names are suggestive of seasonal settlements. Comparison with modern maps suggests that the current settlements pattern on the Lower and Middle Tara emerged in the late 18th century.

Keywords: *Western Siberia, Middle and Lower Tara, 18th century maps, Tatar settlements, ethnography, archaeology.*

Introduction

This work is devoted to the analysis and comparison of cartographic materials of the 18th century that were not previously used in the research associated with the locations of the Tatars' settlements. Nowadays, there is a significant bias in the study of the early history of the Tatars and their ancestors who lived in the territory of the Omsk Region. Almost all the studied archaeological complexes that are associated with the Tatar population of the Middle Irtysh region are located on the Tara River. They belong to the 16th–18th centuries—the beginning of the formation of the modern cultural appearance of the Tatars. The rest of the territory of their settlement remains unexplored. Notably, the largest part of the sites that have been studied are flat-grave burial grounds. Thus, we have only a one-sided knowledge of the cultural history of this population. The settlements of the Tatars, and the huge layer of culture associated with them, remain practically unknown. The main reason for this situation is the difficulty of detecting and researching such objects. This is due, for the most part, to the lack of cartographic materials in circulation.

The sources for the study of the early history of the Tatars living on the banks of the Tara River were the maps of the territory of the Tarsky Uyezd from 1780, 1784, and 1798, which contain information about the

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location of Russian and Tatar villages. These documents, differing in the degree of reliability, are not as accurate nor as informatively rich as modern maps. Nevertheless, they make it possible to obtain new information about the places of Tatar settlements, hydronyms, the locations of watermills, the boundaries of districts, etc.

The present study concerns the extant abandoned settlements located on the banks of the Tara River, in the area including the mouth (Tarsky District), the middle course of the river (Muromtsevsky District of the Omsk Region), and the village of Almenevo on the border of the middle and upper reaches of the Tara (Kyshtovsky District, Novosibirsk Region). The choice for the study of this zone was determined by the fact that, according to the documents of the 17th–18th centuries, it was the territory of the Ayalynskaya Volost (district), compactly inhabited by a group of Tatars. As a result of many years of research by ethnographers and archaeologists, a large source base was formed on the history of the population of this region in the 17th–20th centuries (Korusenko M.A., Zdor, Gerasimov, 2015; Korusenko S.N., 2006; Titov, 2007; Tomilov, 1996; Etnografo-arkheologicheskiye kompleksy…, 2014, 2016; and others).

This study was based on previously unused published and unpublished cartographic materials of the 18th century: "Map of the Tarsky Uyezd… 1784" (hereafter—Map of 1784) (Karta Tarskogo uyezda…, 1784) from the "Geographic Atlas of the Tobolsk Vicegerency", "Map of the Tarsky Uyezd… 1798" (hereafter—Map of 1798) on a scale of 1 inch : 15 *versts**, and the "Topographic Plan of the Kartashevskago Village (on River Irtysh) District and Bergamotskaya Sloboda (on the Tara River, without the mouth area) District of the Tarsky Uyezd" (hereafter—Topographic Plan of 1798) on a scale of 1 inch : 3 *versts* from the "Atlas of the Tobolsk Governorate" (Atlas…, 1798; Konovalova, Popov, 2010). The Topographic Plan of 1798 contains information on the exact location of Tatar settlements along the Tara, from the Bergamotskaya yurts to the Almenevo yurts, as well as the number of lands (and their types) allocated to each settlement, the names of small rivers and lakes. It should be noted that some data on the Map and the Topographic Plan of 1798, compiled by land surveyor Vasily Filimonov, diverge. The main sources also include the map "Tabula Exhibens Cursum…" (hereafter—Map of 1780), created in 1780 by I.I. Islenyev (Tabula Exhibens Cursum…, 1780)**.

Additional sources were used for the analysis: the "Drafting Book Compiled by the Tobolsk Boyar's Son Semyon Remezov in 1701" (hereafter—Drafting Book) (Chertezhnaya kniga…, 1701), the "Chorographic Drafting Book of Siberia by S.U. Remezov" (hereafter—Chorographic Drafting Book) (Khorograficheskaya chertezhnaya kniga…, 2011), the "Inventory Book of the Tarsky Uyezd of 1701" (hereafter—Inventory Book of 1701), published in part in the monograph by S.N. Korusenko (2006), and records by G.F. Miller (Sibir XVIII veka…, 1996). Unfortunately, these sources do not indicate the exact location of the settlements.

When conducting a study, cartographic materials of the 18th century were compared to the modern maps. For this, the atlas of the Omsk Region 1 : 100,000 (Omskaya oblast, 2010) and satellite images posted on the open Internet resource Bestmaps (Bestmaps, (s.a.)) were used.

The information recorded in the indicated sources was corrected during the expeditions. One of the authors examined a large number of settlement sites and cemeteries of the Tara Tatars, took photographs of the objects, performed preliminary excavation of the cultural layer and surface collection, and created site plans. This made it possible to make new assumptions about the specific location of the settlements.

The names of the settlements in the above-mentioned cartographic materials of the 18th century differ; therefore, in the illustrations and in the text the names are given indicated in the sources.

The history of mapping the region in the 18th century, archaeological and ethnographic research of the Tatars settlements

For the first time, the settlements of the Tatars in the Middle and Lower Tara region in the 18th century were recorded on the maps of the Chorographic Book created in 1697–1711 (Khorograficheskaya chertezhnaya kniga…, 2011: 93), and of the Drafting Book compiled in 1699–1701 (Chertezhnaya kniga…, 1701). These are valuable resources on the topic at hand, but should not be idealized, as they are full of inaccuracies; in some places, they contradict each other and later cartographic materials. For example, the maps of the area of interest to us, on fol. 93 and on the insert on fol. 93, are more reminiscent of very rough schemes, and the data on them differ. Unfortunately, the settlements are marked on them without precision. These are tied only to rivers locations (Khorograficheskaya chertezhnaya kniga…, 2011: Fol. 93, ins. on fol. 93; Chertezhnaya kniga…, 1701).

Twenty-three years after the completion of works on the production of the "Chorographic Drafting Book of Siberia", G.F. Miller wrote travel notes that significantly clarified and supplemented the Chorographic Book's data. These indicate not only the geographical objects located near the settlement (lake, etc.), but also the distance between them in *versts* (Sibir XVIII veka…, 1996: 92–93).

*1 English inch equals 2.54 cm, 1 *verst* equals 1,066.9 m.

**There is also a version of this map in Russian, but it was not available to us, so we used the version in Latin.

In 1768, I.I. Islenyev made an instrumental-mathematical determination of the coordinates of Siberian towns, and in 1780, he made a map of the Irtysh River in the section from Omsk to Tobolsk, which includes the territory of interest in our study (Gnucheva, 1946: 250; Tabula Exhibens Cursum…, 1780).

In 1782, instead of the Siberian Governorate, the Tobolsk Vicegerency was formed, with the Tobolsk and Tomsk regions; therefore, in 1784, the "Geographical Atlas of the Tobolsk Vicegerency, Consisting of XVI Uyezds" was created. The administrative reform of 1796 led to the formation of a Tobolsk Governorate. This required new cartographic work. As a result, the "Topographic Atlas of the Tobolsk Governorate" was developed (Konovalova, Popov, 2010: 126).

Atlases of the late 18th century include the first detailed, professionally compiled maps, which reliably reflect the location of the Tara Tatars' settlements.

Targeted search for the locations of the Tara Tatars settlements were not carried out until the end of the 20th century. The most significant contribution to the study of the Tatars' settlements on Tara was made by S.N. Korusenko, N.A. Tomilov, and E.V. Titov. Their research was based on documents from archives, materials from ethnographic expeditions, published results of scientific research, official statistics, and local history works (Tomilov, 1981, 1996, 2011; Korusenko S.N., 2006; Korusenko S.N., Tomilov, 2011; Korusenko M.A., Korusenko S.N., 2019). However, the works of these researchers contain no data on locations of settlements; an exception is the article by M.A. Korusenko and S.N. Korusenko that reflects an attempt to identify the location of the village of Guzenevo in the past (2019).

The question of the location of the settlements of the Tara Tatars was researched by S.S. Tikhonov (2004, 2009). His research was based on the fragments of the Drafting Book and the Chorographic Drafting Book by S.U. Remezov, diary entries of G.F. Miller, and materials of archaeological excavations. Some of his conclusions are not sufficiently substantiated.

The locations of Tatars settlements in the Middle and Lower Tara in the 18th century

At the mouth of the Tara, the Inventory Book indicates "the village of Ust-Tarskaya (aka Tartamak)" (Korusenko S.N., 2006: 114). The Chorographic Drafting Book in this area also indicates the Ust Tarska / Usttarskaya (Khorograficheskaya chertezhnaya kniga…, 2011: Fol. ins. on fol. 93) (Fig. 1, *2*, *5*). According to G.F. Miller, there was "Tar-tamak-aul or the village of Ust-Tarskaya" here, with a mixed population: "Inhabited partly by Russians, partly by Yasak Tatars" (Sibir XVIII veka…, 1996: 92). The same was reported in 1772 by J.P. Falk (1824: 384–385). At present, the village of Ust-Tara is located in this place (Fig. 1, *7*). On the Map of 1784, the Russian village Ust Tarskoye is marked on the right bank, and next to it (above) Tatar settlements "Ust Tarskiye". It should be noted that it is here that the sign of the district with the inscription "Aelynska volost" stands (Fig. 1, *3*). On the Map of 1798, the villages of Ustarskoye and Ustarskiye are recorded to be in the same locations. It also bears the sign of the district with the inscription "Ayalynskaya" (Fig. 1, *6*). The western border of the Ayaly district was probably here. Its eastern border ran along the corresponding border of the Tarsky Uyezd. The territory of the next district located on the Tara, Tunuyska (judging by the corresponding sign), began at the Tatar settlement Chokovski (modern Chekiaul? – **Author**). On the Map of 1798, the border of the Tunuyska district is marked in the same location. Materials of the burial ground of the Tatar ancestors of the 17th–18th centuries discovered in the village of Ust-Tara (Tikhomirov, 2016: 115) point to the fact that Tatars had already been established in this area during the indicated period.

In the Drafting Book, upstream of the Tara, on its right bank, opposite the lake Beloye, a Tatar settlement is indicated (Chertezhnaya kniga…, 1701). According to the Chorographic Drafting Book, in this place, the Chaplyasovy (Khorograficheskaya chertezhnaya kniga…, 2011: Fol. 93) (Fig. 1, *5*) / Cheplyakovy (Ibid.: Ins. on fol. 93) (Fig. 1, *2*) was located. In the Inventory Book, there is a mention of the location of the "village of Chiplyarovy yurts" in this area (Korusenko S.N., 2006: 119). G.F. Miller recorded Tschupljar-aul on the right bank of the Irtysh, "2 versts distance from Loginov village". The researcher noted that this was a former summer village, "winter dwellings… under the same name are located on the Tara River, 10 versts from… the river's mouth. But a few years ago, they (Yasak Tatars. – **Author**) also built summer dwellings opposite the winter village (modern Cheplyarovo village. – **Author**), and left this older place" (Sibir XVIII veka…, 1996: 93). On the Map of 1784, on the right bank of the Tara, in this area, the Chiplyarovski are marked (Fig. 1, *3*). On the Map of 1798, opposite this place, on the left bank of the Tara, the Chiplyarovy is indicated (Fig. 1, *6*). At present, the village of Cheplyarovo is located on the low left bank of the river (Fig. 1, *7)*, but, according to local residents, earlier it was located opposite—on the high right bank. In the same place, archaeologists have discovered a flat-grave burial ground of the 17th–18th centuries, Cheplyarovo XXVII (Korusenko M.A., 2013), and the contemporaneous settlement of Cheplyarovo XXVIII (Arkheologicheskaya karta…, 2000: 86).

In the Chorographic Drafting Book, on the right bank of the Tara, below the mouth of the Intsis River, the Intsis yurts are indicated (Khorograficheskaya chertezhnaya kniga…, 2011: Fol. 93, ins. on fol. 93) (Fig. 1, *2*, *5)*. The

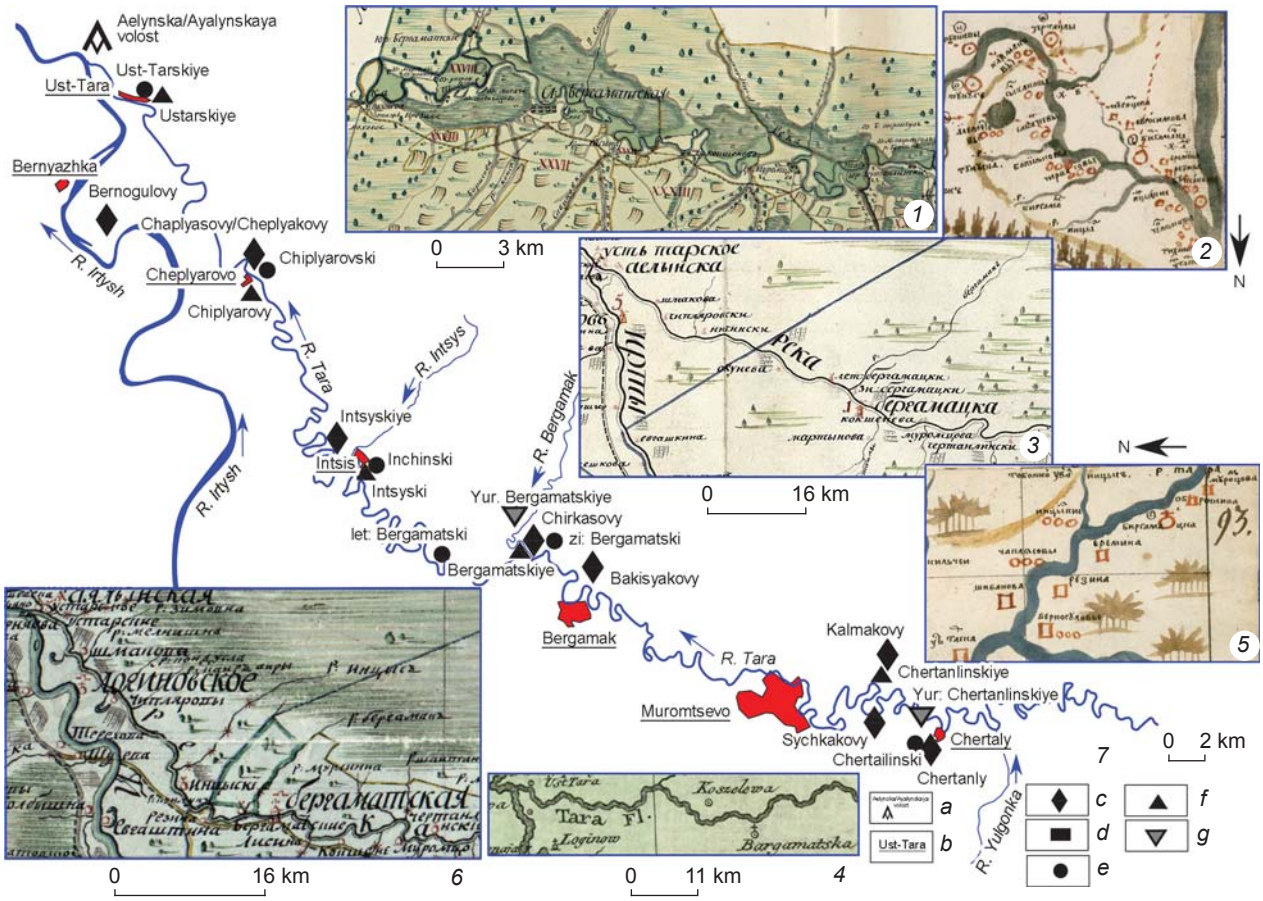

Fig. 1. Tatar settlements in the area from the mouth of the Tara River to Yulgonka River on maps of the 18th century. *1* – Topographic Plan of 1798; *2*, *5* – Chorographic Drafting Book; *3* – Map of 1784; *4* – Map of 1780; *6* – Map of 1798; *7* – a diagram of the location of settlements (the modern ones and those indicated in the cartographic materials of the 18th century) in the Middle and Lower Tara region: *a* – the names of the districts on the Maps of 1784 and 1798; *b* – modern names of settlements; *c* – in the Chorographic Drafting Book; *d* – on the Map of 1780; *e* – on the Map of 1784; *f* – on the Map of 1798; *g* – on the Topographic Plan of 1798.

Inventory Book notes "the village of Intsis yurts (aka Abaytomak Seitkulova)" (Korusenko S.N., 2006: 120). G.F. Miller mentions the village of Inzis (Intsis) on the Tara as a winter settlement of Tatars who lived in Isuk-aul (on the Lake Izyuk, in the Irtysh valley). He notes the seasonal nature of the settlement: "Only in the summer (Isuk-aul) is inhabited by Yasak people who in winter live in the village of Inzis on the Tara River" (Sibir XVIII veka…, 1996: 93). On the Map of 1784, on the right bank of the Tara, above the mouth of the Intsis River, the Inchinski are marked (Fig. 1, *3*); at present, the village of Intsiss is located here (Fig. 1, *7*). On the Map of 1798, on the right bank of the Tara, above the mouth of the above-mentioned river, the Intsyski are shown (Fig. 1, *6*).

Upstream of the Tara, on the right bank, at the mouth of the Bergamak River, the Chorographic Drafting Book indicates the Chirkasovy yurts (Khorograficheskaya chertezhnaya kniga…, 2011: Ins. on fol. 93) (Fig. 1, *2*). The Inventory Book mentions "the village of Birgamatsky yurts" (Korusenko S.N., 2006: 121). On the Map of 1784, on the right bank of the Tara, below Bergamak, Let: (Letniye) ('summer') Bergamatski is indicated (Fig. 1, *3*). Now, in this place, there is a locality called Staryie Yurty—the settlement of Bergamak XXIII (Arkheologicheskaya karta…, 2000: 46). Upstream of the Tara, from the mouth of the Bergamak River, Zi: (Zimniye) ('winter') Bergamatski are indicated (Fig. 1, *3*). Perhaps this is a settlement known today as the archaeological complex Bergamak III, containing materials from the Late Middle Ages (Ibid.: 34; Tikhomirov, Nikonova, 2016). On the Map of 1798, on the right bank of the Tara, below the mouth of the Bergamak, only one of them is indicated: Bergamatskiye (Fig. 1, *6*). On the Topographic Plan of 1798, Yur: (yurts) Bergamatskiye are indicated on the right bank of the Tara River, on the right bank of the Bergamak River, above its mouth, in the area where the now abandoned village of Kordon Bergamak was located (Fig. 1, *1*).

In the Chorographic Drafting Book, above the village of Chirkasovy, on the right bank of the Tara, the Bakisyakovy is indicated (Khorograficheskaya

chertezhnaya kniga…, 2011: Ins. on fol. 93) (Fig. 1, *2*). Such a village is currently unknown. Even higher on the right bank of the Tara, above the mouth of the Tunuska River (this is probably a mistake, since the present-day Tunuska River is located much farther to the east. – **Author**) the Sabancheevy is indicated (Fig. 1, *2*). Above the modern village of Muromtsevo, on the right bank of the Tara, opposite the mouth of the Sychkakova River, the settlement of Sychkakovy is indicated (Fig. 1, *2*).

On the left bank of the Tara, above the indicated settlement, the Chorographic Drafting Book mentions the Chertanly (Khorograficheskaya chertezhnaya kniga…, 2011: Ins. on fol. 93) (Fig. 1, *2*). Opposite it, on the right bank, the Kalmakovy is indicated (Ibid.) (Fig. 1, *2*). According to the Inventory Book, the "Kozhbakhta Sarybaeva (aka Chertanlinskaya)" was located in this area (Korusenko S.N., 2006: 122). On the Map of 1784, the Chertailinski settlement is shown on the left bank of the Tara (Fig. 1, *3*). On the Map of 1798, on the right bank of the Tara, above the Shaitanka river (at present, its middle and lower reaches are called the Berezovka River) ChertanlinskiYe is indicated (Fig. 1, *6*). Perhaps, this is an 18th century settlement Chertaly I, which, together with the contemporaneous burial ground Chertaly III-IV, was identified and studied by B.V. Melnikov (Arkheologicheskaya karta…, 2000: 19); later, excavations were carried out there by M.A. Korusenko and M.Y. Zdor (Korusenko M.A., Zdor, Gerasimov, 2015). On the Topographic Plan of 1798, opposite this place, on the left bank in the floodplain of the Tara, below the mouth of the Chertalinka, Yur: (yurts) Chertanlinskiye is indicated (Fig. 1, *1*). The modern village is located to the southeast of this place, on the terrace (Fig. 1, *7*). Above it, on the left bank of the Tara, below the mouth, the Map of 1784 marks the Saunchiny (Fig. 2, *3*). On the Map of 1798, on the right bank of the river, opposite this settlement, below the village of Samokhvalovo, the Suyunchiny is shown (Fig. 2, *5*). On the Topographic plan of 1798, this settlement is indicated on the left bank of Lake Chernoye (Fig. 2, *1*).

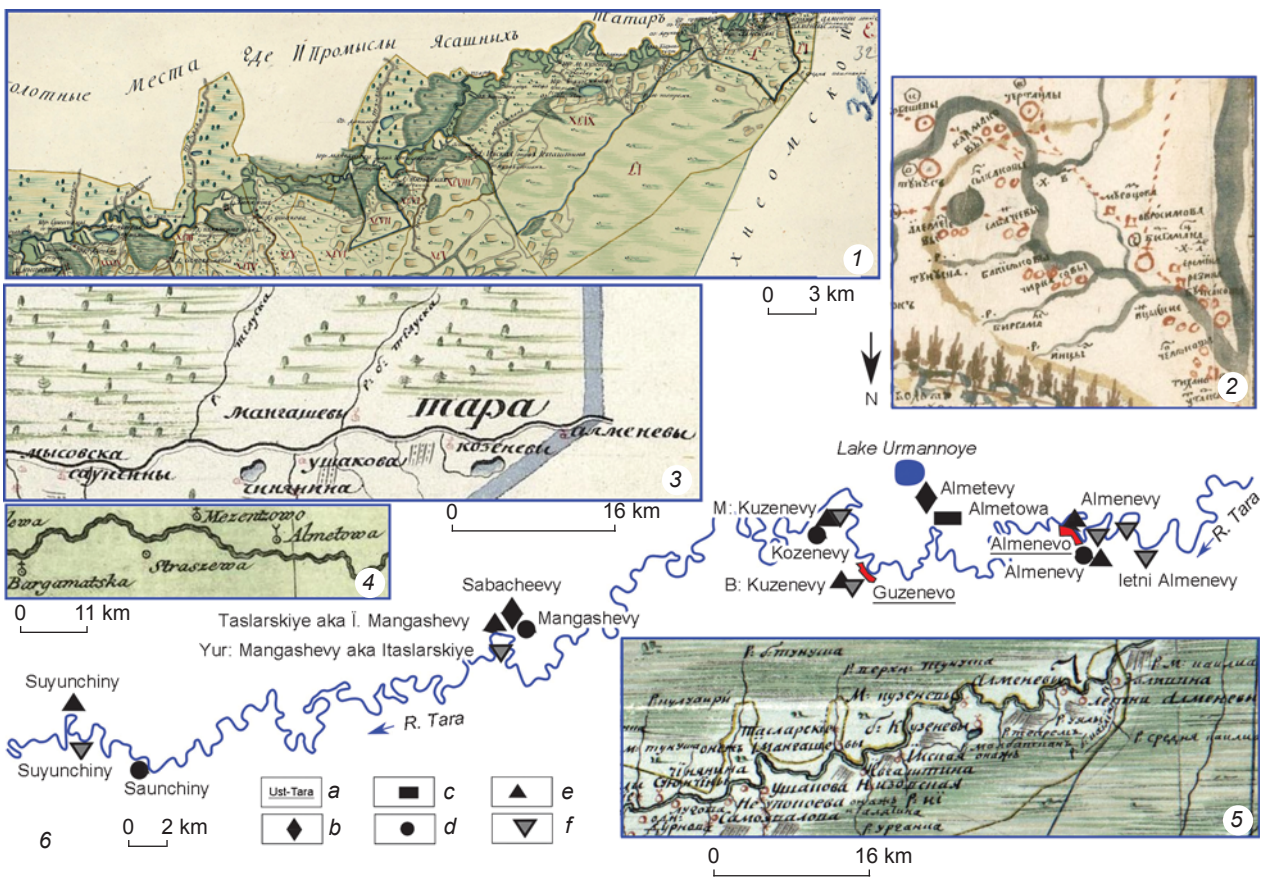

Fig. 2. Tatar settlements in the area from the mouth of the Yulgonka River to the mouth of the Kalinka River on the maps of the 18th century.

1 – Topographic plan of 1798; *2* – Chorographic Drafting Book; *3* – Map of 1784; *4* – Map of 1780; *5* – Map of 1798; *6* – a diagram of the location of settlements (the modern ones and those indicated in the cartographic materials of the 18th century) in the Middle and Lower Tara region: *a* – modern names of settlements; *b* – in the Chorographic Drafting book; *c* – on the Map of 1780; *d* – on the Map of 1784; *e* – on the Map of 1798; *f* – on the Topographic Plan of 1798.

The Inventory Book indicates the "Temshenyakova (aka Mantabarova Kukunova)", which was probably located higher upstream of the Tara (Korusenko S.N., 2006: 123). On the Map of 1784, at the mouth of the Bolshaya Teluska River (present-day Verkhnyaya Tunuska), on the right bank of the Tara River, upstream of the Tara River, the Mangashevy is marked (Fig. 2, *3*). On the Map of 1798, on the right bank of the Tara, upstream from the mouth of the Verkhnyaya Tunuska, the Taslarskiye is shown, also known as Ï. Mangashevy (Fig. 2, *5*). At present, the village of Lnozavod of the Muromtsevsky District, Omsk Region, is located here (Fig. 2, *6*). On the Topographic Plan of 1798, the Taslarskye is indicated on the left bank of the Tara, in the area of Lake Sagartly, but with the name of Yur: (yurts) Mangashevy, also known as Itaslarskiye (Fig. 2, *1*). A.F. Palashenkov marked the site of Nizovoye I in this place, pertaining to the Middle Ages. In his opinion, the Tatar town of Tunus was located here, in the Tatarsky Ostrov locality (Arkheologicheskaya karta…, 2000: 17; Korusenko M.A., 2002).

On the Map of 1784, the settlement of Kozenevy is indicated on the left bank of the Tara, upstream, near the drain of the lake that is now called Lebyazhye (Fig. 2, *3*). On the Map of 1798, in the same area, the M: (Malyie) ('small') Kuzenevy is indicated, and on the northeastern shore of the same lake B: (Bolshiye) ('big') Kuzenevy (Fig. 2, *5*). The Topographic Plan of 1798 gives the second name "Yur: B: Kuzevevy – aka Itaslarskiye" and indicates the exact location of these settlements (Fig. 2, *1*). The fact that in the 20th century local residents were finding ceramics, bones, and arrowheads on arable land near the lake, suggests that the Bolshiye Kuzenevy yurts were located here (Korusenko M.A., Korusenko S.N., 2019: 218). The modern village of Guzenevo, Muromtsevsky District, Omsk Region, is located away from the mentioned lake, on the Tara River. (Fig. 2, *6*).

The next settlement on the right bank of the Tara River, near a large lake, in the Chorographic Drafting Book is the settlement of Alemetevy (Fig. 2, *2*) (Khorograficheskaya chertezhnaya kniga…, 2011: Ins. on fol. 93). Currently, there is only one large lake between the Tunuska and Cheka rivers, Urmannoye, which is located near the village of Malaya Skirla (Kyshtovsky District of the Novosibirsk Region) (Fig. 2, *6*). It was probably on this lake that this settlement was indicated. In the Inventory Book, in this area, the "Sabancheyeva (aka the village of Almeneva)" is indicated (Korusenko S.N., 2006: 123). On the Map of 1780, the settlement of Almetowa is shown on the right bank of the Tara (Fig. 2, *4*), and on the Map of 1784, on the left bank of the river called Almenevy (Fig. 2, *3*). On the Map of 1798, on the right bank in this area, at the confluence of the Uyaly River in Tara, the Almenevy is marked; upstream of the Tara River, there is Letni Almenevy (Fig. 2, *5*). On the Topographic Plan of 1798, from the mouth of the right Tara tributary Bol. Uyaly River to the mouth of the Kailiairi (Kalinka) River, the following settlements are indicated: Yur: (yurts) Almenevy, Yur: ('yurts') M: ('small') Almenevy Letniye, Yur: (yurts) Verkhni Almenevy Letniye. Today, in this area, there is the village of Almenevo (Kyshtovsky District of the Novosibirsk Region) (Fig. 2, *6*).

The next Tatar village upstream of the Tara River in the 18th century was located on the territory of the Tunusskaya district.

Findings

As a result of the analysis of cartographic materials, some patterns were revealed in the location of the Tatar settlements in the Middle and Lower Tara region in the 18th century:

1. The settlements were located on the right bank of the Tara, in the area from its mouth to the Chertalinka River. All known flat-grave burial grounds are also located on the right bank: Ust-Tara LXX, Cheplyarovo XXVII, Bergamak II, Chertalinsky burial ground, etc. (with the exception of Okunevo VII) and settlement complexes: Bergamak XXIII, Bergamak III, Chertaly I, which, according to researchers, belonged to the ancestors of the Tara Tatars (Etnografo-arkheologicheskiye kompleksy…, 2014; and others). In the section from Chertalinka to the mouth of the Kalinka, Tatar settlements are concentrated on the Tara's left bank.

2. On the maps of the late 18th century, summer and winter settlements of the Tatars in the Middle and Lower Tara region are indicated. However, based on these materials, we cannot be sure that at the time the maps were created, these settlements were still seasonal in nature, and were not permanently inhabited. Information gathered by G.F. Miller about the winter aul Inzis (Intsis) and the summer settlement Isuk-aul (Izyuk-aul), the summer and winter settlements Tschupljar-aul allow us to speak confidently of the existence of the seasonal settlements in the first half of the 18th century (Sibir XVIII veka…, 1996: 93).

3. According to cartographic sources, winter settlements were located on a high terrace away from the Tara valley, and summer settlements were located in the floodplain on the river bank, near other villages. Moreover, as follows from the Topographic Plan of 1798, arable land was located on terraces.

Cartographic materials can be used to reconstruct the history of relocation of settlements. For example, the location of the village of Intsiss is marked at some point above the mouth of the homonymous river (modern location), and at other times below the river mouth; the village of Chertaly is indicated sometimes on the right, then on the left bank of the Tara, where it is located today. In the Chorographic Drafting Book, the Alemetevy settlement is

recorded on the right bank of the Tara, near the lake, and at present, the modern village of Almenevo is located on the left bank, etc. The Tatar settlement of Yurt-Bergamak changed its location several times (from the Bergamak River to the left bank of the Tara River, in the area of the Okunevo village) (Landik (Tikhomirova), 1998).

Conclusions

Analysis of cartographic materials from the end of the 18th century and comparison of them with other sources has made it possible to reveal the unique informational potential of the Map of 1784, the Map of 1798, and the Topographic Plan of 1798. The data recorded in them fairly reliably reflect the historical situation in the Lower and Middle Tara by the end of the 18th century (administrative division, location of Tatar and Russian settlements, types of settlements: seasonal, single-yard, etc.).

When comparing the maps of the indicated period and modern maps, supplemented by archaeological research data, one can draw conclusions about the settlement system at the end of the 18th century: the Tatar settlements were located according to the riverine type. Some of their settlements gravitated towards the estuarine sections of the Tara tributaries; names on maps, such as Zimniye Bergamatski and Letniye Bergamatski yurts, Malye Almenevy Letniye, and Verkhni Almenevy Letni yurts, correspond to seasonal settlements.

A comparison of the maps of the period under consideration to modern ones allows us to conclude that the modern system of settlement of the Tatars of the Lower and Middle Tara region was mostly formed in the 18th century (changes in the location of settlements were insignificant and were carried out within the same district). Based on the data obtained, it is possible to find the locations of specific settlements more effectively and explore the early history of the Tatars on the banks of the Tara River.

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From the Serbian Fair to the Russian Museum: On the Ethnographic Relevance of the Gingerbread Collection from 1902

Serbian figured gingerbreads owned by the Russian Museum of Ethnography are described, the history of the collection is provided, and its cultural meaning is evaluated. Ethnographic parallels are analyzed, and archaic examples are cited. The custom of baking gingerbread results from the commercialization of the agricultural tradition of baking ritual bread. In terms of cultural anthropology, the question may be raised whether the replacement of destroyed originals by plaster replicas preserves the information potential and ethnographic value of the collection. Its interpretation is relevant to national identity in new Balkan nations such as Slovenia, Croatia, and Serbia. Another problem is if and how a craft shared by several peoples can be an ethnic marker. In terms of ethnographic museology in the globalizing world, the prospects of acquiring recent collections are discussed. The role of such collections in constructing new national identities may be considerable.

Keywords: *Exhibit, craft, identity, replica, fair, Balkans, tradition.*

Introduction

Museum items convey various messages to descendants about accumulated human achievements, and various facets and shades of life in the past. Each item represents a separate historical narrative. However, its contents are not always obvious. This is the most important aspect of the process of comprehending museum exhibits, which makes scholars search for methods of revealing their information potential and valuable content in the context of cultural heritage.

The depositories of the Russian Museum of Ethnography (REM) contain more than 700,000 items—inanimate witnesses to historical epochs and human destinies. They are the result of someone's thoughts, knowledge, skills, collective and personal worldview foundations. However, in the existing practice of exposition, the multidimensionality of the information potential of items and collections is often lost owing to their diversity and thematic-descriptive engagement. A detailed study of museum items through scientific methods makes it possible to identify their informational and cultural value. That is why figured gingerbread, which made up the first collection of the Serbian traditional culture in the Russian Museum of Emperor Alexander III in the early 20th century, deserves a special study.

This paper examines the collection of Serbian figured gingerbread in terms of its information content, museum and cultural value. In this regard, it is important to refer to the history of the collection's formation, its exposition in the museum, ethnographic information about the existence of such items in culture in the past and present, as well as to analyze modern trends in the interpretation

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of museum heritage in the context of geopolitical shifts and the desire of ethnic communities to use the old items as a tool for updating their identity. This issue belongs to the framework of ethno-museological and source study discourse, and relies upon a comprehensive analysis of the collection. This analysis is based on the cultural-anthropological, structural-semiotic, functional, comparative-typological, and other approaches. The source base of the study included collection items, museum records, early minutes of the museum council meetings, and other archival documents. In general, the chosen strategy makes it possible to reveal the multifaceted nature of ethnographic objects, to determine their place in the museum collection, and to extend a kind of logical thread from the past to the present through updating the evidence of the bygone era.

The problem of material and preservation of the exhibits

The interpretation of artifacts is among the most important factors of heritage actualization in museum practice. It is of fundamental importance in cases when the items have lost their expositional attraction, yet they still bear the function of recording ethnographic facts. The problem is that even under specialized storage conditions, the items are hardly protected from decay. Over time, they are destroyed and loose much of the information they could convey to descendants. Museums react to this process by making replicas, which do not record all the characteristics of the originals, and only conditionally convey the information about their external features. In this regard, the scientific coverage of the information potential of fragile items made of impermanent materials seems to be a particularly important task.

Owing to the ethnographic specialization of the museum, its collections at the early stages of their formation included items made of rapidly decaying materials, in particular, samples of ritual food—loaves, gingerbreads, sweets, etc. Irreversible organic processes led to the loss of the originals; so, the practice appeared of replacing them with plaster models. This was the case with the first collection on the traditional culture of the Serbs—30 figured gingerbreads brought to the museum when it still had the status of the Ethnographic Department (ED) of the Russian Museum of Emperor Alexander III.

In 1902, these vivid and colorful products of various shapes and ornamentation, an attribute of the Serbian fair "vashar", were purchased in Belgrade by the first head of the ED, the outstanding ethnographer D.A. Klements (1848–1914). As a result of biochemical processes, several gingerbreads had already been lost by 1935; in 1955, they were excluded from the accounting records (REM, collection No. 217-1, 3, 4, 10, 24, 29). Foreseeing the fate of the remaining items, museum specialists came to the conclusion that it was necessary to create plaster replicas identical in shape, size, and color (this decision concerned not only the Serbian collection, but also similar cultural artifacts of other peoples—Russians, Belarusians, Ukrainians, and others) (Smusin, 1974: 158). The replicas were made in a museum workshop and recorded under the numbers of the originals, which meant an authorized replacement of the originals. However, time turned out to be merciless to plaster as well: many models split and lost the paint layer, which made them unsuitable for exhibition. However, this did not lead to the final loss of information about the originals. Data on the contents of the collection have been preserved in the inventory compiled by P.P. Slavnin (1878–1957) in January 1903.

Slavnin arrived in St. Petersburg in 1902 after graduating from the Tobolsk Theological Seminary (Ioganzen, 1962). In the capital, the future Tomsk local history expert and ethnographer became an external student at the Imperial University and the Archaeological Institute. In the Ethnographic Department of the Russian Museum, he worked part time as a registrar and was one of those who happened to hold in his hands the elegant Serbian gingerbread pieces in their original form. In the collection inventory, he briefly recorded their external features (color, shape, and decoration), but did not give any information about their use in the Serbian traditional culture. In those years, the museum was intensely forming collections, and owing to haste and lack of registrars, many artifacts were described formally. In addition, there was no experience in describing such items; Serbian gingerbread was the first massive addition of such artifacts to the collection. However, now, more than a century later, it is exactly the inventory that allows us to reconstruct the appearance of the lost originals and continue to consider them an integral part of the collection (REM, inv. No. 217).

Having been included into museum collections, ordinary items acquire semantic value and are memorialized as cultural phenomena. Nowadays, museologists admit that the material side of a museum item is not its only and key component (see, e.g., (Suvorov, 2017: 76)). The item conveys important information about itself as a component of culture, thereby enriching the informational capacity of the collection. Within the framework of ethnographic collection, the most important function of each item is to add a feature to the general image of the culture of a particular ethnic group. Thus, the collection of things forms a kind of dossier on the ethnic community, and characterizes the specificity of its material code. Consequently, the fact of including the set of gingerbreads in the museum collection suggests that this attribute of the Serbian traditional

culture was important for its appropriate representation in the museum.

In this regard, the role and place of plaster replicas in the history of this collection is of considerable interest. The idea of a "non-standard" appearance of "affected" artifacts allows us to consider replicas as a material reincarnation of the originals and as a part of their biography (Leonov, Grusman, 2019: 67). At the same time, these casts can be considered a separate narrative, telling about a certain stage in the work of the museum itself. The casts, keeping a semantic connection with the originals, continue to function as a conditional source of information. Correlation of museum data on the collection items with the information presented in ethnographic literature, as well as with similar items from other collections and the current state of tradition, makes it possible to reconstruct many historical and semantic aspects of figured gingerbread in the Serbian culture; and their scientific coverage allows for the presentation to the public of an unexposed part of the REM collection (Mylnikov, 1987).

Thanks to the replicas, the collection extended its visual functionality for a while. However, from the point of view of source study, its ethno-marking function has become doubtful. When considering gingerbreads as three-dimensional sources of information, the relationship between the original and the replica in recognizing them as historical documents becomes fundamentally important (Andreeva, 2017: 13). Discrepancies are found primarily in the material and the circumstances of manufacturing these items. Replacement of dough with plaster means the change of the information carrier; not only did it entail the loss of the original "text", but also provoked the appearance of attributes that have no common features with the originals. Approximately repeating the sizes and outlines of the originals, the replicas did not coincide with them in weight. The difference in the material determined different texture, taste, color, smell, and other characteristics that ensured the morphology and semantics of items (Balash, 2015: 42; Baiburin, 1981). A plaster cast does not provide information on whether the gingerbread was mint-flavored or toasted; it does not cause the visual and gustatory sensations that a person has when looking at an edible object. From a cultural and anthropological point of view, the sensual perception of properties of the observed items is important. Thus, the replacement of material leads to the loss of a whole block of initial information that makes it possible to characterize these items as a cultural phenomenon.

The material of goods is of great importance for the museum's representation of ethnic culture (Rudenko, 2017: 21). The reference exhibits for the ethnographic museum are the items made in natural economy, from natural materials, and using traditional techniques. Researchers note that the material sets the grammar (structure) of the thing: any manufacturing technology invented by people, like also the methods of decoration, is determined by the material's nature (Baranov, 2016: 36). For instance, the technology of making plaster casts does not provide for high-temperature thermal processes; so, their texture differs from baked dough in the absence of internal air. Also, a cast does not convey the lightness and sophistication of sugar patterns. The semantic properties of items are lost as well: folk ideas about the magical properties of bread, honey, and dough are inapplicable to plaster replicas.

Different compositions of input materials and manufacturing technology give rise to other differences. The shaping of the plaster mass does not use kinetic codes associated with the muscular memory of a skill that has been passed down from generation to generation in traditional culture. Neither does the motivation for creating plaster models stem from certain functions in the life of the ethnic community. It is determined by the need for a visual and symbolic demonstration of the object for informational purposes. All these factors ultimately affect the strokes, rhythm, plasticity of items and placement of creative accents in their pictorial details. No matter how obvious it may be, it should be noted that in the Serbian traditional culture of the second half of the 19th to early 20th century, there circulated no products made of painted plaster that would outwardly resemble figured gingerbread.

The thesis that the shells of things hide the ideas inside makes it possible to consider originals and replicas the personification of meanings that are completely different in nature (Nikonova, 2006: 11). Plaster models do not carry the inner thought that was fundamentally important for depositing things into an ethnographic museum. They have become part of a completely different cultural history. However, despite all the losses and distortions, these timely made models provide an idea of the Belgrade gingerbread tradition of the late 19th to early 20th centuries.

History and content of the collection

Preservation of various samples of archaic forms of the traditional culture under the conditions of the modernizing world was one of the priority tasks of the young museum. Its leader D.A. Klements paid particular attention to the conceptual side of the acquisition of exhibits. In particular, he believed that the museum collection should reflect the ethnography of not only the peoples of the Russian Empire, but also "all Slavic tribes, regardless of political boundaries" (Dubov, 1998: 116). Particular emphasis was placed on the ethnography of the Balkan Peninsula, thus highlighting the strong

ties and cultural kinship between the Balkan peoples and the Slavs of the Russian Empire (Makarenko, 1917: 19). This approach was in line with the current political moment: in that situation of the Slavophilic sentiments, Russia acted as the patroness of the Slavs of the Habsburg and Ottoman empires, as well as the young Balkan countries.

Especially close historical ties developed between Russia and Serbia. Having attained independence in the last third of the 19th century, Serbia sought to establish itself in the international arena in various ways, including representation of the traditional culture. In particular, at the First International Exhibition of Historical and Contemporary Costumes, which opened in November 1902 in the Tauride Palace, the Serbian queens Natalija and Draga Obrenović personally presented the collections of Serbian traditional clothes (Kael, 1902: 5). The head of the Ethnographic museum in Belgrade S. Trojanović (1862–1935) took an active part in the preparation for the exhibition from the Serbian part (Menković, 2002: 169). The professional contacts between S. Trojanović and D.A. Klements seem to have been established at that time. According to archival sources, in February 1902, at the meeting of the ED council, Klements reported that the Serbian envoy and head of the Belgrade Museum Trojanović proposed to assemble ethnographic collections for the Russian Museum (REM Archive. F. 1, Inv. 1, D. 13, fol. 25). However, the proposal was not accepted, owing to the objections of a member of the museum council E.A. Lyatsky, who said that collecting Serbian ethnography for the museum was a "leisurely" task, and therefore it could be postponed.

Contrary to this position, the Serbian ethnographic collection was soon on display in the St. Petersburg museum. In the summer of 1902, Klements visited the Ethnographic Museum in Belgrade (Ibid.: Fol. 59). From there, he brought a collection of figured gingerbread, which marked the beginning of the museum's collection of items from the Serbian traditional culture, currently totaling about 800 units (Mikhaylova A.A., 2013: 196). Today, the Serbian collection of REM is quite rich and varied in content. It includes several dozen outfit sets and separate items of traditional clothing, jewelry (including silver items), specimens of weaving, embroidery, ceramics, ritual items, household utensils, and labor tools. Many of the exhibited items are unique, have no parallels in other museums, and are of constant interest among foreign specialists (Niškanović, 2005: 82). Thus, the gingerbread collection, despite the loss of the original content, is still among the most valuable attributes, since it was the first acquisition, from which the collection of the heritage of world-wide significance began.

Descriptions made by Slavnin indicate that the gingerbreads were coated with multi-colored icing, decorated with paper pictures and sugar patterns, and sprinkled with almonds. In their artistic design, characterized by slender lines, bright colors, and sophisticated decoration technology, they differed from Russian gingerbread products. However, the images of the figurines were thematically similar to those found among other peoples of Eurasia, which is supported by the gingerbread collections of other museums (Shkarovskaya, 1988: 255; Gantskaya, 1972: 257). For example, the gingerbread from Belgrade included stylized figurines of women, men, children, horses, lions, rosettes, and hearts. Similar anthropo- and zoomorphic, as well as rosette-like, motifs of gingerbread products and backing pans are noted in the East Slavic, Baltic, and Far Eastern REM collections of the 20th century (e.g., coll. No. 524 (Belarusians), No. 625 (Ukrainians), No. 1264 (Russians)). Heart-shaped gingerbreads are recorded in the Czech (coll. No. 8542), Polish (coll. No. 8541), Lithuanian (coll. No. 8291), and Hungarian (coll. No. 8543) collections*. In other words, the shapes of the gingerbread presented in the Serbian collection were quite typical for this kind of product, which existed in the culture of other peoples, while the decor and manufacturing technologies had regional differences.

The specificity of the images and decoration of the gingerbread is sustained in the traditions of the licider (or licitar) craft, which was widespread in those years in the eastern part of Austria-Hungary. The word "licider" in Serbian language comes from the Austrian "lebzelter" – 'gingerbread baker'. It comes from the Latin "libum" – 'sacrificial bread'. The phenomenon of ritual bread in one form or another existed in the traditional culture of all agricultural peoples of Eurasia. This suggests that the gingerbread tradition among the Balkan Slavs had a ritual-ceremonial nature (Andrejić, 1977). For example, among the Serbs, figured ritual bread (flatbreads in the form of livestock, household features, and solar symbols) were baked at Christmas and presented to carolers (Kostić, 1971: 76). However, the question of whether the licider craft was a substitute for older local traditions remains open.

The licider craft was based on processing beekeeping products, from which wax candles, votive figurines (sacred figurines in the form of parts of the body, humans, or livestock), mead, gingerbread with honey,

*In the 20th century, REM acquired more than 2.5 thousand gingerbreads, with three quarters of them being a part of the famous N.D. Vinogradov collection. The overwhelming majority of the items represent the Russian gingerbread tradition, one fifth that of other peoples: Ukrainians, Belarusians, Serbs, Poles, Czechs, Lithuanians, Latvians, Jews, Uzbeks, Azerbaijanis, and Chinese. Very few original items have survived; some of them were replaced by plaster replicas, the others are irretrievably lost.

and other sweets were made (Belančić, 2016: 53). Gingerbreads with honey were known to the Balkan Slavs even before the advent of this craft. Their semantic functions were associated with the magical properties attributed to honey, including love magic, symbolism of immortality, fertility, divine principle, etc. (Valentsova, 1995). However, as a handicraft product with a specific recipe and a recognizable brand, gingerbread became widespread thanks to Austrian and German liciders. One of the distribution centers of gingerbread business was Styria (Biškupić-Bašić, 2002: 120). With the development of trade relations in southeastern Europe in the 18th century, gingerbreads were introduced into the fair culture of Pannonia. The archives have preserved clear evidence of how the licider craft penetrated Vojvodina—the Austrian territory adjacent to Serbia, with a mixed population, including Serbian. In particular, one of the documents reports that on April 17, 1769, the licider Michael Schmidt appeared in the city of Subotica; he got from the city "permission to settle and a six-year exemption from taxes and other payments, as well as guarantees that other visitors would be prohibited from selling the same products in the local market and in its vicinity" (Ulmer, 1995: 156). Austrian Serbs quickly mastered the technology of production and decoration of honey gingerbread, and from the second half of the 18th century began to sell them in small tents at urban and rural fairs, as well as in monasteries on cherished holidays (Gavrilović S., 1984: 80).

In the 19th century, liciders of Serbian origin also appeared in Serbia itself. Their professional terminology consisted of distorted German vocabulary, which emphasized the alien character of the craft. Serbian craftsmen acquired gingerbread molds and tools in large cities in Austria, which explains the repetition of types of figurines reproduced throughout the region. Thus, we can conclude that for the Serbian folk culture, the licider products were a sign of its modernization and Europeanization rather than a symbol of archaism. At the same time, they soon became its organic component.

In the second half of the 19th century, gingerbread baking flourished in many parts of Europe. Exactly at that time, the phenomenon of collecting gingerbread boards, metal molds, and the products themselves emerged. In ethnographic collecting, these items were valuable not only as attributes of a peasant holiday, but also as a kind of folk art (Galueva, 2003: 35). In purchasing a collection of gingerbreads for the museum, Klements considered these a fairly representative attribute of Serbian ethnicity, and the museum council considered the collection to correspond to the profile and purpose of the museum.

In Serbia, gingerbreads were a favorite folk fun and an attribute of the holiday. These were sold mainly in the streets from a distribution tray or in a mobile shop. Until the onset of the 20th century, only men were liciders; the craft skills were kept in strict secrecy and were inherited from father to son or passed on to apprentices (Biškupić-Bašić, 2001: 195). In the late 19th century, in Belgrade, there lived eight master-liciders (Marjanović, 2009: 73). Perhaps one of them baked the items of the collection brought to St. Petersburg.

In the folk culture of the 19th-20th centuries, figured gingerbread most often acted as a gift. The gingerbreads were presented to relatives, lovers, friends, and children, for whom the sweet present served as both a delicacy and a toy. People took gingerbread with them when they were going on a visit, brought them from a trip, or presented them as an expression of high regard. The holidays of the Glory of the Cross (Serbian Slava), weddings, Christmastide, and others could have been a reason for making such a gift (Ŝutić, 2008: 189). Gingerbreads served as a ritual meal if they were handed out at a commemoration for the repose of the soul of the deceased (Trajković, 2012: 23). The possibility of long-term storage of gingerbread also made it a convenient supply.

There is no information about the use of products of the licider craft in ritual practices*. The figured gingerbread was not baked in the household. It was a commercial production, and the masters who manufactured the figured gingerbreads obeyed the workshop rules governing the procedure of making products and selling them. To buy gingerbread, discretionary income was required, something always lacking in peasant life. Such a product, therefore, was acquired on a special occasion and presented as a gift and an expression of high regard. Thus, in the late 19th to early 20th century, figured fair gingerbread served as a communication tool. Although the craft itself had features of modernization, the use of its products as a gift was functionally associated with archaic practices aimed at strengthening friendly relations between the parties of communication (Moss, 2011: 165).

The ethnographic literature provides descriptions of recipes and technology for making such gingerbread. The dough consisted of honey and flour, eggs, water, potash, baking powder (ammonium bicarbonate), as well as spices—cloves, anise, ginger, or pepper (Marjanović, 2009: 74; Trajković, 2012: 26; Radulovački, 2005: 314; Kašpar, 1980: 79). It was quite stiff, which made it possible to form a figured biscuit by embossing "kalup" molds, carved from apple or pear trees or cast from clay (printed gingerbread). In the late 19th century, gingerbread

*It is known from ethnographic materials that it was customary for Russians to bake ritual cookies for certain calendar holidays: "kozuli" on Yegoryev's day or Semik, "ladders" on Ascension, and others (Propp, 2000: 33–36).

boards were replaced by aluminum "stecher" molds, with which the dough was figuratively cut according to one pattern (silhouette gingerbread) (Šarić, 2013: 119). The finished products were painted with special red, yellow, blue, and white confectionery paints, and decorated with sugar paste, skillfully squeezed out in a thin layer onto the surface in the form of rosettes or a "lace" border. Colored paper, forming various motifs, could also be a component of the decor.

In the late 19th to early 20th century, gingerbreads were decorated with colored pictures printed on paper, which enhanced the art image. The silhouettes of anthropomorphic forms of gingerbread were rather arbitrary—only the outlines of the head and shoulders were clearly shown; the limbs often merged with the body in a trapezoid or an oval. To give the gingerbreads a more expressive look, pictures with a male or female face were pasted on the upper part, and the lower part was painted with confectionery paints and decorated with a sugar border. The image of a man was usually conveyed in the Baroque style—with long hair and a hat, in an elegant coat with a fur collar, and striped trousers; that of a woman was shown in traditional outfit—an ornamented shirt, sleeveless jacket, apron, and headdress. Gingerbreads in the form of a male figure were presented to men, and those in the form of a female figure to women. The girls were presented with gingerbreads in the form of a baby in swaddling clothes. The paper pictures with painted children's faces in lace caps were pasted thereon. Boys often got gingerbread in the shape of a horse with paper images of the muzzle and saddle, standing on the grass, i.e. resting his feet on a rectangular base with floral patterns. Gingerbreads with religious and dynastic symbols (angels, crosses, faces of saints) were also widespread. They were usually presented to older people. Thus, an important attribute of gingerbreads as a tool of intracultural communication was their sex and age targeting and symbolism, based on the folklorization of the ideas about the gender-social structure of society and the archaic-traditional need to emphasize the social identity of community members in the public space.

There were no two identical gingerbreads, since each was decorated by hand. Sometimes a cake was decorated with a piece of mirror. After the end of the 19th century, such gingerbreads were used for decorative purposes. However, according to ethnographic records, the southern Slavs had a tradition of decorating ceremonial bread with a mirror for protection from the evil eye (Tolstaya, 1995). Among the licider products, mirrors occurred most often in the heart-shaped gingerbreads, which were presented as a sign of sympathy. When giving it to the girl, the young man meant that the one to whom his heart was given would see her reflection in the mirror. According to the other tradition, a guy held out his heart-shaped gift with a mirror while standing behind the girl, so that she could see there the reflection of her "betrothed". Researchers believe that the tradition of making heart-shaped gingerbread came to the Balkans in the 17th century from Northern Europe, together with religious ideas about the heart of Christ (Kus-Nikolajev, 1928: 135). Anyway, at present, gingerbreads of this particular form are the most widespread at Serbian fairs.

Analysis of the description inventory allows us to conclude that the content of the collection coincided with the "classic" assortment of gingerbreads sold at Serbian fairs in the late 19th to early 20th centuries (Fig. 1). Ten figured gingerbreads were shaped like horses standing on the grass (REM, coll. No. 217-1–10). Given the differences in the orientation and position of the horses' legs, it can be assumed that at least three different silhouette metal molds were used to make these cakes. "Horses" differed from each other in their decoration features: "gingerbread in the form of a horse, the upper part is covered with a red paint layer, decorated with white and yellow patterns, and a purple paper saddle decorated with zigzags and flowers is glued on the back"; "gingerbread-horse, covered with fine patterns and decorated with pieces of colored paper in the form of an asterisk and two tassels" (REM, inv. No. 217), etc. One of the gingerbreads, figured as a lion, was "coated with yellow paint with short red lines representing mane and tail; colored paper tassels descend from the neck" (REM, coll. No. 217-11).

The collection contains only one piece of gingerbread, stylized as a male figure (REM, coll. No. 217-12). Its plaster replica shows the outlines of long curly hair and a voluminous collar. The gingerbread was decorated with fine sugar patterns and pieces of colored paper. There were six female figures in the collection (REM, coll. No. 217-13, 14, 16–19); three different molds were used to make them. One of the figures, like the male one, had no distinct anatomical features except the head and shoulders, and ended in an oval at the bottom. The gender symbolism of this form of gingerbread was conditional and was indicated by a picture of a woman's face. Two other specimens had more vivid features of the female figure—waist, skirt, arms, and legs. Another gingerbread piece depicted a baby, as was indicated by a picture on it, showing a child's face in a cap.

The rest of the gingerbreads were manufactured in the form of circles and hearts of various sizes (Fig. 2). Slavnin described one of them as a "white rosette-shaped gingerbread, decorated with yellow paint with red dots at the edges" (REM, coll. No. 217-20); the other three samples he designated in the inventory as "flatbread" (REM, coll. No. 217-21, 23 a, b). On the surface of the plaster replicas that replaced them, there is a decoration in the form of embossed concentric circles. Features of the shape and decoration suggest that the prototype of such products was Christmas

Fig. 1. Plaster replicas of gingerbreads in the form of zoo- and anthropomorphic figurines (*1–3*) and with solar symbols (*4*, *5*) (REM, coll. No. 217-5, 12, 16, 20, 23). *Photo by O.V. Ganichev.*

Fig. 2. Plaster replicas of heart-shaped gingerbreads (REM, coll. No. 217-25, 26, 28). *Photo by O.V. Ganichev.*

crispbread with solar symbols. The "oblong gingerbread sprinkled with almonds on top" (REM, coll. No. 217-22) had a simple shape, but apparently tasted delicious. Seven heart-shaped gingerbreads were decorated with mirrors, colored glaze, sugar patterns, and colored paper appliqués (REM, coll. No. 217-24–28). One gingerbread bore a portrait of the Serbian king Alexandar Obrenović (1889–1903), who ruled at that time, the other a picture of the Virgin Mary with baby Jesus (REM, coll. No. 217-24, 25). Portrait of the king on the figured gingerbread served as a symbol of Serbian independence. As for the image of the Virgin Mary, noteworthy is her special veneration by the Catholic population of Slavonia, from where the licider craft came to Serbia; but at the same time, this image emphasizes the natural closeness of her cult to Orthodox Serbs.

Despite their conventionality and schematicity, the symbolism of the images presented in the collection attracts attention. When considering the issue of ethnic markedness of figured gingerbreads as ethnographic artifacts and their connection with Western culture, this quality seems to be important. Some features point to the correspondence of the symbolic and semantic content of gingerbread images to the archetypes of Serbian traditional culture; while commercial orientation and technology of production represent purely borrowed components.

Researchers of the phenomenon of dough figurines in folk culture strive to find archaic meanings in these products, relying on folklore heritage and pre-Christian beliefs (Galueva, 2003: 37). For example, it has been proposed that in Slavic mythology, the figure of a horse symbolized the sun, and this was semantically close to the image of lion—a solar archetype that conquers evil and darkness. The female figure could represent the deified mythical ancestor—Mother-raw-earth (see, e.g., (Shkarovskaya, 1988: 243)). Experts are unanimous in the opinion that in agricultural cultures, ritual flour figurines were most often associated with the magic of fertility (Propp, 2000: 34). By presenting the girls with gingerbread in the form of a baby, the prospect of their procreation was indicated. S. Marković connects the origin of the baby motif in the gingerbread tradition with the Christmas mysteries and the image of the newborn Christ (2011). Religious themes (images of angels, crosses, and saints) penetrated the gingerbread tradition around the 18th century (Scheybalová, 1974: 158). Thus, it can be concluded that the ritual nature of figured gingerbreads has lost its primacy with their transformation into a product of craft and a component of fair culture (Sergeeva, 2014: 49). Exactly the fair as a mass commodity-consumer phenomenon determined the decorative look of these products and made them the subject of special aesthetics in the folk culture. Despite the archaic roots of gingerbread images, by the end of the 19th century, they did not bear deep semantics any longer.

The Yugoslav licider gingerbreads reached their peak of popularity in the period between the two world wars. At that time, new cake forms appeared, such as cars, pistols, handbags, shoes, etc. Colorful gingerbread figures were made with strings and used as Christmas tree decorations, neck decorations, and home decor items. In the second half of the 20th century, licider craft gradually fell into decay owing to the emergence of other types of confectionery products and their mass production (Trajković, 2012: 28). At present, there are few liciders left in Serbia. They still run their workshops, mainly owing to the existing programs for the protection and revival of old crafts (Stari zanati…, (s.a.)), and sell their products in vashar fairs and in souvenir shops (Mikhaylova A.A., 2015: 333). Over the past 100 years, the production technology has remained practically unchanged; gingerbreads are still made by hand, but with the use of modern tools and brighter edible colors. It is symptomatic that the variety of forms has disappeared. The heart has become the dominant type of figured gingerbread. Today, the licider heart is not only a favorite fair souvenir and delicacy, but also an attribute of a wedding celebration: it is often presented as a gift symbolizing love and strong marriage. Nowadays, when producing these commemorative items, liciders add sand and other composites to the dough, which ensure durable storage. Thus, the emergence of inedible items that perform an exclusively decorative and symbolic function, but retain their traditional form, has become a characteristic feature of this craft today.

Significance of the collection in the context of modernity (instead of conclusion)

The trend towards transformation of the most striking elements of the material code of the pre-industrial era into souvenirs and symbols in the post-Yugoslav space is quite widespread. Reproduction of well-recognizable images of the past, including products of old crafts, allows ethnic culture to legitimize its connection with ancestors and history. Theoretically, this can be attributed to the phenomenon of ethnocultural neo-traditionalism, which has been studied intensely in recent decades, and which is a kind of reflection of ethnic culture on the strengthening globalization processes (Popkov, Tyugashev, 2012). The popularization of images of traditional culture, withdrawn from their original cultural context, associated with this phenomenon, is called folklorization, and the resulting objects are called folklorisms (Kurinskikh, 2016: 252). The desire of certain ethnic groups to brand the attributes of

their cultural heritage as symbols of national identity, despite the translocal nature of many such symbols, has become a side effect of folklorization in the 21st century (Mikhaylova N.G., 2011: 266). For example, in 2010, with the support of UNESCO, the licider craft has received the status of intangible cultural heritage of Croatia. Slovenia also claims the right to consider this craft its national treasure. In 2018, the Croatian Ministry of Culture officially recognized this status for the figured gingerbread craft (Nesnovna dediščina, (s.a.)). Such competition for cultural heritage among the young Balkan countries is associated with the unfinished process of constructing their national identities. The attributes of the past, which awaken nostalgia and are close and understandable to the general public, become convenient tools for the ideological consolidation of society in the absence of new stable symbols (Gavrilović L., 2012: 48). The Western European origin of the licider craft is another factor in its actualization as a phenomenon of national significance. In the desire of the Balkan countries for economic integration into the European Union, the emphasis on cultural kinship with Western Europe helps to justify these ambitions.

In the light of the described tendencies, the importance of ethnographic museum collections as a source of reliable facts about the traditions of certain peoples is growing significantly. Material exhibits testify to the origins of cultural phenomena, their localization, and historical fate. Scientific analysis of the heritage allows distortion to be minimized in its modern interpretations. It is in this vein that the thesis that museum artifacts are a bridge from the past to the present acquires its specificity. In the context of globalization, ethnicity strives to confirm its historicity through objectified forms; therefore, its need for contact with the museum heritage is intensified. This also explains the tendency towards the revival of traditional crafts in a folklorized form. The collection of Serbian gingerbread of 1902, despite the losses, allows us to conclude that in the 19th to early 20th century, it was a single cultural phenomenon widespread both in Serbia and in the Austrian territories inhabited by Croats, Slovenes, Serbs, and other peoples. The layering of modernization trends on the local archaic in this region was explained by the rapid facade of westernization (Mikhaylova A.A., 2016: 81). In this context, labeling ethnicity with a craft tradition, which is common for several ethnic groups, has acquired a controversial character. However, the trans-ethnicity of the considered phenomenon does not exclude its value for individual peoples as a tradition and heritage.

More than 100 years have passed since the collection of Serbian gingerbread appeared in the museum. It can be said that it recorded a certain stage in the development of the gingerbread tradition, at which the craft, having unified the basic technological principles and the forms that were in demand in folk culture, turned the latter into a recognizable product. This, in turn, allowed the tradition not to dissolve under the influence of modernization and, with some changes, survive in the 20th and 21st centuries. In the last 50 years, the Serbian REM collections have practically not been replenished, which fact is associated with both political factors and the weakening of the Slavophil rhetoric in general, and also with the peripheral (in relation to the rest of the collection) place of Balkan ethnography in the conceptual basis of the museum. However, they do not lose their importance as sources for a comparative study of the common Slavic cultural fund and modern ethnic processes in the Balkans. In this regard, another polemic question in ethnomuseology becomes important, about the expediency of replenishing the museum fund with modern exhibits—objects-symbols and folklorisms participating in the process of constructing new identities. As the collecting practice of the last century shows, the adoption of this strategy would make it possible not only to replenish the Balkan collections, but also to record the transformations of ethnic consciousness during periods of crises and their overcoming.

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Tungus-Manchu Traditional Beliefs. Part 1: Fertility Cult and Images of Divine Ancestresses

This article explores the traditional beliefs of the Tungus-Manchu peoples and is based on the hermeneutic and comparative analysis of the fertility cult. Some of its aspects are related to images of divine ancestresses, the tree of life, the hearth cult, ancestral lineage, and animistic beliefs. For the first time, cults of fertility, as well as those of divine ancestresses, are regarded as an integral whole. This analysis demonstrates that images of ancestresses are preserved in mythology, rituals (specifically domestic ones), tribal culture, and cultural features related to birth, shamanism, ludic culture, and applied art. Also, they relate to the hearth cult, fire rites, the tree of souls or tree of life, creation, and shamanism as part of folk medicine and rites of passage. The conclusion is made that the Tungus-Manchu fertility cult is an inherent religious system, relevant to the mentality, archetypal cultural values, ethno-cultural specificity, and contacts with other peoples.

Keywords: *Tungus-Manchu, traditional beliefs, rituals, fertility cult, divine ancestresses, symbolism.*

Introduction

The study of ritual cult practice in traditional societies is a relevant theme in today's ethnographic science, starting with the classical works of J. Frazer, W. Turner, A. van Gennep, A.K. Bayburin. Numerous studies of academic scientists have been devoted to it (Pamyatniki kultury…, 1977). The fertility cult is considered in the literature from various angles. S.A. Tokarev wrote about it at the level of early forms of religion as a family-clan hearth cult, as well as within the agrarian cult (1964: 252–265, 378–392). B.A. Rybakov investigated the fertility cult at the level of the image of the divine ancestress among the Slavs (1981: 438–470). E.A. Torchinov considered it in primitive sacerdotal societies/tribes as the cult of the Great Mother Goddess (1998: 108–131). In each ethnic community, the cult of fertility connects to universal human ideas and values, as well as specific historical features. Ethnography as a science combines the study of both of these components. Therefore, it is important to investigate the general and the particular in the fertility cult. This topic was researched using specific materials from various peoples of the world. The cult of fertility among the Tungus-Manchu peoples has been poorly studied; only discrete elements of it have been considered. S.M. Shirokogorov studied the Evenk system of shamanic spirit-helpers (1919: 14–19); I.A. Lopatin briefly described the cult of the tutelary spirit, Dzhulin, in the culture of the Nanai (1922: 222–223); A.F. Anisimov considered the image of the spirit of fire, Togo-mushun, among the Evenks, as a separate element of the belief system (1958: 93–97). A.V. Smolyak investigated the system of the shaman's spirit-helpers among the Nanai, having included the deity of fertility therein (1991: 13). S.V. Bereznitsky compared a broad array of materials on the peoples of the Amur region, and studied various aspects of beliefs in order to identify ethno-cultural influences (2003). I considered

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the issues of the fertility cult among the Tungus-Manchu peoples from the standpoint of various characters. For the first time, a typology of fertility deities is proposed (Sem, 2013: 114–178). This study continues the analysis of these images included in the complete set of all the components of the cult, as different parts of its integral whole.

The aim of this work is to study the general features and the ethnocultural specificity of the fertility cult among different Tungus-Manchu peoples in their traditional belief system, using the semantic analysis of the images of the divine ancestresses. The connection of these images to ideas about the creation of the world, the ancestral tree of life (the tree of souls), the souls of people and the soul-embryo is considered, along with the cult of the family hearth and matrilineal succession. The complex of ideas about the cult of fertility and the divine ancestresses among the Tungus-Manchu peoples is researched for the first time as an interconnected integral whole. This research includes the analysis of folkloric data, beliefs, and rituals, shamanism, applied art, and ludic culture. This work uses comparative, comparative-historical, systemic, semantic, hermeneutic, and iconographic methods.

Research materials

The image of the divine ancestress, and the creator of the world and people. In the system of beliefs of the Tungus-Manchu peoples, the cult of fertility was associated with the images of the mythological divine ancestress, family-clan, childbirth, and shamanistic rites. Its origins are preserved in the myths about the creation of the world and human beings. For example, during large (burial) commemorations, the Nanai perform a shamanic song, in which the great goddess Mamelji creates the world, stirring the waters of the rivers flowing from the world ocean in the form of snakes, and creates the earth, the surface of which her husband, the fertility deity Guranta, helps to level (Lipskiye, 1936: Fol. 48). This goddess creates the first people from a drop of her blood (Lopatin, 1922: 237)

According to Manchu mythology, the great goddess-ancestress, mistress of the Universe, Abuga-khekhe, together with the goddess of the earth begotten by her, Manga-khekhe, creates the world with a musical instrument—a drum and a beater, which are associated with the element of water chaos of the sky (the mythological feminine principle) and with the world mountain (the mythological masculine principal). Abuga-khekhe uses the willow to stir the waters; a world mountain grows, while the sounds of a tambourine/drum are heard as a symbol of the act of creation of the world by the goddess (Wang Hong-gang, 1993: 48). In this myth, the shamanic level associated with the music of the spheres is recorded. According to M. Granet, in ancient Chinese mythology, a musical string instrument made from the world tree Fusan is also used during the creation of the world (see (Shishlo, 1991: 200)). According to the beliefs of the Trans-Baikal Evenks of the 18th century, the supreme heavenly deity Buga had a harp/gusli for the creation of the world, which was ruined by his brother, the demon Buninka, the creator and owner of the lower world (Spassky, 1822: 44). Presumably, the image of the string musical instrument of the Evenks was associated with a female womb. Such representations were also known among the Ainu people. Among the Amur Evenks, the act of creating the world in the New Year's ritual is indicated by the cry of a loon, which, according to the cosmogonic myth, participated in the extraction of grains of sand and silt from the bottom of the world ocean (Varlamova, 2002: 29–30; Vasilevich, 1936: 29–30). In the Evenk mythology, there are also some plots where the Earth appears as the result of singing (Folklor evenov…, 2005: 206).

The image of the goddess of fire and the hearth. According to materials of the late 19th to mid-20th centuries, there are Tungus-Manchu images of the divine ancestresses associated with the cult of fire and the ancestral tree of souls. The Nanai and Udege people carved their images from wood. The most ancient version, made of stone, was found in the garden of one of the Nanai of the Lower Amur. It is dated to the 6th–12th centuries (Okladnikov, 1981: 30). The idols were 8-shaped, without legs.

The concept of the fire goddess dates back to the Jurchen era. During the excavations of the Shaiga fortified settlement, 8-shaped metal figurines were found, open at the bottom, similar to intertwined snakes. Their placement was at the hearth of the dwelling, on the basis of which E.V. Shavkunov suggested their relationship to the cult of fire and associated them with the fire goddesses (1990: 269). The Uilta of Sakhalin, a peripheral Tungus-Manchu ethnic group, has a similar image. On the bone bow of a deer saddle, there was a carved ornament of figure eight with open ends, resembling snakes, which were interpreted by the local population as the goddesses of fire (REM, col. 8761-8017, 11452).

The 8-shaped items are most clearly associated with the image of the fire goddess among the Tungus-Manchu peoples of the Amur (Nanai, Negidals, Udege), the Uilta of Sakhalin, the Evens of the Okhotsk coast of the Far East, and the Evenks of Yakutia. The Nanai people made 8-shaped figures of Dzhulin—the ancestor of the ancestors, the spirit-master of the hearth (Sem, 2003: 172–173). Later, they began to be made in a flattened form with legs, a square body, and a round head, but the semantics remained. The Negidals carved the image of the owner of the house, Masi, from a tree in the form of two balls and wrapped them in bear skin (REM, photocol. 4701-46). Among the shamans, he was considered patron spirit of

initiation (Na grani mirov…, 2006: 64). An 8-shaped wooden figurine of the Udege ancestress, wrapped in shavings (a symbol of fire), was kept in a bark box. It has retained its most ancient appearance. According to the collection inventory of the Primorsk Museum of Local Lore, this goddess was associated with the domestic hearth and fire (Osokina, 1977: 100, fig. 5, *4*).

On the Even women's breast garments (an obligatory element of traditional clothing in combination with an open-fronted caftan), an 8-shaped ornament was embroidered with beads, which was considered a symbol of the goddess of fire, and it was combined with circles symbolizing the sun. In the worldview of the Tungus-Manchu people, these images were interconnected. Fire was considered to be a ray of the sun (Sem, 2015: 422, 426, 429). A similar ornament was on the hem of the women's caftans of the Yakut Evenks. The 8-shaped figures were at the level of the woman's reproductive organs. This position testified to their connection with the divine ancestress. The name of this ornament among the Evens signified "immortality", which, as I believe, was associated with the idea of the rebirth of souls (Ibid.: 302, 306, 440). Thus, the 8-shaped figure on the clothes of the Evens and Evenks is connected, on the one hand, with ideas about the human soul, and on the other, with the image of the divine ancestress. Among the Evens, her symbol was a spider, whose image was embroidered with beads on women's handbags. The spider was considered the grandmother-ancestress. A.A. Burykin compares these ideas with the mythology of the North American Indians, where the spider was the creator of the world, and sees an ancient substrate layer in Siberia therein (1985: 38, 41–44).

The Sakhalin Regional Museum of Local Lore contains an old bridal Uilta breast garment of the early 20th century, which has bronze pendants. Two of them are in the form of a circle with two curls and a leaf in the center—a symbol of the solar tree of life, of which the divine ancestress is considered to be a mistress; another one has circles placed in the form of a cross, symbolizing the four cardinal points and the sun. At the bottom of the breast garment, six claw pendants are sewn, which, according to local craftswomen, are symbols of the divine ancestress. In the center of the chest part, there is a 8-shaped pendant of a complicated form, with three small circles at the top, denoting the head and the female breast—also a symbol of the divine ancestress, probably associated with the hearth (SOKM, col. 2338-24) (Prokofiev, Cherpakova, 2009: 164). It is interesting to note that the 8-shaped ornament can be traced back to the Tungus population of South Sakhalin from the Jurchen era (9th–12th centuries). At the settlement of Belokamennaya-Chasi of the late period of the Okhotsk culture, minami-kaizuka-type pottery was found, which had an 8-shaped ornament combined with a zigzag and circles (Shubina, 1996: 235).

Thus, among the Tungus-Manchu peoples, the divine ancestress was identified with the goddess of fire. However, among the Yenisei Evenks, these two deities were separated. The fire goddess Togo-mushun was considered to be the helper of the goddess Bugada-enin—the mistress of the universe, ancestral mountains, and the tree of souls: the latter grew the souls of people and animals on the ancestral tree, and the fire goddess kept these souls and raised them in the ancestral hearth (Anisimov, 1958: 99–101). According to the beliefs of the Udege, the mistress of the solar tree of souls, as well as the mistress of animals and vegetation, was Tagu-mama, who lived with her husband Kanda-mafa, the master of animals and the moon tree of the weather, on a huge mountain, reaching the heavens (a symbol of the world mountain) (Folklor udegeitsev…, 1998: 33, 469).

According to the ideas of the Trans-Baikal Evenks, the soul of a shaman is born in a ritual hearth, the owner of which is the first ancestor in the form of a bear, and his guardian-helpers are four little people, the *anyakan*, the embodiment of the souls of the deceased ancestors, *khanya* (REM, col. 5093-147) (Na grani mirov…, 2006: 119). Interestingly, among the peoples of the Amur and Sakhalin (Udege, Uilta, Nanai), the bear was considered the ancestor of the clan, the husband of the divine ancestress and mistress of fertility; the bear was the master of fire, whose figurines were also made of wood (REM, col. 11429-7,8) (Sem, 2015: 285).

The shamanic medicine kit of the Ussuri Nanai included wooden figurines of the goddess of fertility Maidya-mama (who is also the divine ancestress, the mistress of the tree of life), wearing clothes made of the skin of a roe deer or a musk deer, whose form she could take; as well as her husband Ayami in the form of a bear; and a figurine of their assistant Chadilangi, made of grass, with a snake in her hand. All of them were associated with the cult of fire. Maidya-mama, Ayami, or the deity of fertility Erkhiy-mergen were responsible for the birth of children's souls that grew up on the ancestral solar tree of life (Ibid.: 285, 296). In this regard, it is interesting to compare the previously mentioned Negidal shamanic initiation image of Masi, the master of the hearth. His wooden 8-shaped figure was wrapped in the skin of a bear. As we can see, there is a dual semantic of the connection with fire.

The image of the divine ancestress, associated among the Tungus-Manchu ethnic groups with the fire of the hearth, has analogs in the beliefs of the Turkic-speaking peoples of Southern Siberia (Umai, May-ene) (Alekseev N.A., 1984: 162–163; Potapov, 1973: 275). Dzhulin of the Nanai people is comparable to Dzayachi, the creator god of the Turkic-Mongolian ethnic groups (Potapov, 1991: 200; Neklyudov, 1994).

Ancestral lineage. The image of *musu*, the ancestral lineage, was preserved among the Tungus-Manchu

peoples in the ideas of the goddesses of fertility and divine ancestresses. For example, among the Manchus, the symbol of the divine ancestress (Fodo-mama) was a genealogical rope, depicting a tree of life, with pendants—tufts of hair, models of bows, pig's metatarsal bones (Guo Shuyung, Wang Hong-gang, 2001: 141–142). And in the representations of the Nanai, her image looked like a vertical line of figures of goddesses, following one after another. Such a multi-level image of the divine ancestress, represented as ancestral lineage, was found on a Nanai birch-bark vessel and on a woman's headdress (Sem, 2015: 291, 293). It is interesting that this image, in its geometric representation, is found on the petroglyphs of Mongolia and in the hieroglyphic writing of the ancient Chinese (Novgorodova, 1989: 100–101). The Sungari Nanai people set up poles with masks on the street next to the house—symbols of the ancestral lineage (Lattimore, 1933: Fig. 6). Among the Yenisei Evenks, such symbols were multi-level anthropomorphic figures of Khomokon (MAE, col. 1004-6) (Ivanov, 1970: 172).

In the shamanism of the Nanai and Evenks, *musu* is understood as the power of nature's fertility. The shamans of these peoples performed the *uundi* rite, the purpose of which was to obtain happiness for the participants from the supreme gods of the sky, to renew and strengthen shamanic power. The shaman made a procession around the village, entered the dwellings of his relatives, and circled around the fire, which was considered a place of concentration of the souls of people. The participants in the ritual held on to the shaman's belt, to which a ten-meter-long buckskin strap was attached, in the form of a snake's torso and heads, and colored scraps of fabric were suspended from it, giving it bird symbolism. Thus, the belt with an attached strap symbolized the bird-snake, the main shamanic patron-spirit. With his help, the shaman drove away evil spirits and attracted the forces of nature's fertility. Smolyak connects this rite with the ancestral lineage (1991: 173, 179). The Evenks also had ideas about *musun*—the power of movement inherent in any natural phenomenon. The spirits-masters of various natural objects, elements, ritual items possessed that power. The word *musun* is included in the names of the deities of nature, for example, Togo-mushun—the goddess of fire (Vasilevich, 1969: 227–228).

Ideas about the soul-embryo and the ancestral tree of souls. Among the Tungus-Manchu peoples, the images of the divine ancestress, the first ancestor, the deity of fertility are associated with the images of soul-embryos, which are depicted in the shape of a comma, like the East Asian magatama. Such curls are often found in the curvilinear ornament of the peoples of the Lower Amur (Nanai, Ulchi, Udege), next to images of birds, trees of souls, and their mistress—the goddess of fertility (Kraski…, 1982: 85, 94). In 1927, Kimonko, an Udege shaman, made three figures as symbols of the development of the human soul, for the collector E.R. Schneider. The first is a C-shaped type of magatama, with a button in its center, depicting the soul-life of an *erga*; the second is in the form of a dragonfly without wings; the third is an anthropomorphic figure with wings instead of hands, as the development of the *omi* soul (birds on the trees of souls) to the soul-shadow or double, *khanya* (REM, col. 5656-180/1-3) (Na grani mirov…, 2006: 91). So, in the Amur region, the image of soul had a metaphorical development from an embryo to an insect and a bird-man.

In the traditional beliefs of the Tungus-Manchu peoples of the Amur (Nanai and Ulchi), Primorye (Udege), and Siberia (Evenk, Even, and Orochon), there were ideas about ancestral trees of souls, or trees of life (Lipskaya-Walrond, 1925: 6; Mazin, 1984: 11), whose masters were a pair of fertility gods in the hypostasis of deer. An obligatory element of the wedding gowns of the Nanai, Ulchi, Negidals, and Uilta are embroidered (with colored threads in the Nanai, and with reindeer breast hair in the others) images of ancestral trees of life with birds that personify the souls of people on the branches; gods of fertility and their zoomorphic hypostases in the form of two deer. In some cases, trees are depicted entwined with snakes—a symbol of the axis of the world (REM, col. 2566-20, 21; 7005-62). The embroideries are traditionally made in a curvilinear style. This tradition is very enduring. At present, the plot of the ancestral tree of souls is repeated on modern panel pictures (clan symbolic artifacts of the Nanai) and on the dressing gowns of children's dolls. These dolls are probably the personification of the great goddess, who sends the forces of fertility to people in the form of the embryos of souls (Chadaeva, 1986: 39), symbols of family and clan guardians (Rosugbu, 1998). In the New Year shamanic ritual of the Evenks and Evens, the shaman, on behalf of the participants, beseeches the supreme goddess for the power of nature's fertility for a whole year (Mazin, 1984: 91; Alekseev A.A., 1993: 17, 41).

It is interesting that in the medieval burial of the Jurchens, the ancestors of the Tungus-Manchu peoples, archaeologists found a metal pommel on a horse's head, in the form of a ancestral tree of souls, with birds on its branches (Shavkunov, 1990: 266). Apparently, it was put on a horse, on which the bride rode to the groom's house, where, having crossed the threshold, she stood on a horse saddle belonging to the groom, thus joining the family of her husband (Starikov, 1965: 681). The Evenks carried the bride to the groom's house on a wedding deer (Tugolukov, 1980: 56).

Another interesting analogy is the Scythian pommel from Lysaya Mountain in the form of ancestral tree of life, with birds on its branches and the figure of the ancestor-elder Targitaus on the middle branch (Raevsky, 1977: 85). In Evenk folklore, the images of the ancestor-

elder, the blacksmith Torontai and the bear-ancestor Torganey, are preserved. The names of these figures are comparable to those of the Scythians (Romanova, Myreeva, 1971: 212). It is known that in ancient times the ancestors of the Tungus-Manchu peoples contacted the Altai Scythians who advanced to Manchuria. This was reflected in the formation of Siberian shamanism, which has many parallels with the religious beliefs of the Scythians (Kurochkin, 1994). On the carpet from 5th Pazyryk mound, a scene of the meeting of a goddess with a horseman is depicted, with eight repetitions. These are interpreted as images of the goddess of fire, Tabiti, and the son of the great ancestor, Kolaksai, the sun deity, who came to receive the gift. The goddess is depicted on a throne, from the leg of which a tree with flowers seems to grow. Therefore, she is interpreted as the mistress of the tree of life (Polosmak, Barkova, 2005: 146–147).

According to the Nanai shamanistic beliefs and to a drawing of the great shaman Bogdan Onenko, the shaman flew to heaven to the goddess of fertility, where a tree of souls with birds grew, for the soul of a child for her future parents. On the way, he rested on a two-color red and blue stone, a symbol of life and death, and flew further into the possession of the mistress of the solar tree (Sem, 2003: 163–164). The Evens considered her as the wife of the master of the sky, and both of them as the main supreme deities (Alekseev A.A., 1993: 17). According to the Evenk beliefs, the mistress of the solar tree of life was the goddess Bugady-enin, who was also the mistress of the ancestral mountains and forests, the souls of people and animals; and her husband was the lunar elder, the master of the weather tree. Some shamans have painted (for A.F. Anisimov) a tree and two gods under it—a solar woman and a lunar man (Anisimov, 1958: 29, fig. 2). According to Udege mythology, Tagu-mama was the mistress of the sun mountain and the tree, and her husband, the old man Kanda-mafa, was the master of the tree of frost and animals (Folklor udegeitsev…, 1998: 455). The goddess of fertility was usually depicted at the base of a tree, in the form of a lyre-like figure, schematically rendering the woman's chest, thighs, and womb. The image of the male deity of fertility was in the form of Jomon figures *dogu* and was located in the crown of the tree of souls. There is evidence that groups of the population from the mainland of East Asia, Transbaikal, Mongolia, and the Amur migrated to Japan in the Paleolithic, Neolithic, and in the Middle Ages; also, there were later migrations in the opposite direction (Vasilyevsky, 1981: 153). Therefore, it is not surprising that a figure of the *dogu* type is found in the ornament of the Amur peoples (Nanai, Udege) as the preservation of the cultural memory of the peoples of the nearby East Asian region. In this regard, the ancient Korean material is interesting. The golden crown of the Silla kingdom, dating to the 5th century, depicts three ancestral trees with magatamas—the soul-embryos of people (Lim Sang Jeong, 1980: Col. fig. 15). This is the earliest depiction of the ancestral tree of souls in East Asia. Later Korean materials testify to the continuation of the tradition. On pillows and shawls, Koreans embroidered trees with birds on the branches (Pojagi…, 1989: 9).

Thus, the ideas of the soul-embryos and the tree of life among the Tungus-Manchu ethnic groups have analogs in the beliefs of the peoples of Central and East Asia (Scythians, Jurchens, ancient Koreans).

Results and discussion

A systemic hermeneutic analysis of the religious and mythological beliefs of the Tungus-Manchu peoples showed that at the end of the 19th to 20th centuries they had a complex of ideas about the cult of fertility, associated with the image of the divine ancestress, characterizing the creation of the world and the first people, the mistress of the hearth and fire, trees of souls and images of soul-embryos, the ancestral lineage. In the mythology of the Manchus and Nanai, the divine ancestress was the creator of the world and the first people. According to the traditional beliefs of all the Tungus-speaking peoples of Siberia and the Amur, she was the mistress of the hearth and fire. The 8-shaped image of the deity is presented in ritual sculpture and decorative and applied art of the Nanai, Ulchi, Uilta, Negidals, Evenks, and Evens. The ancestral lineage found expression in the symbolism of the image of the divine ancestress herself. For the Manchus, this is a rope with pendants, symbolizing the ancestral tree of life; for the Amur Nanai, this is a multi-level figure, which meant numerous women in childbirth; for the Sungarian Nanai and Evenks, this is a column with masks. The Tungus-Manchu peoples of the Amur had a special attitude to the matrilineal succession of their ancestors, which was reflected in the New Year ceremonies *uundi*.

The image of the divine ancestress is associated with the ideas of the tree of life or the ancestral tree of souls and of the soul-embryos in the form of curls of the magatama type, with their further development into images of birds and men. They were widespread in the beliefs of the Evenks, Evens, Nanai, Ulchi, and Udege. The ancestral tree of souls was depicted with birds on the branches and two deer below—its symbolic masters. In the decorative and applied art of the Nanai, Ulchi, and Udege, images of soul-embryos, known to Koreans and Japanese, have been preserved. These were depicted on wedding gowns, family panels, birch-bark utensils, and dressing gowns for dolls. The image of the ancestral tree of life has analogs in the wedding rituals of the Jurchens, in the religious ideas of the Scythians.

Conclusion

As a result of the study it was established that the Tungus-Manchu peoples developed archetypal signs of the fertility cult, associated with the images of the divine ancestresses. They had their own ethnocultural specificity among different peoples. These beliefs mentally reflected the intergenerational cultural memory about the mythological creators of the world and the first people, the patrons of the house and fire, the tree of souls and the soul-embryo, and the ancestral lineage. These ideas, which make up an integral whole, have been preserved in folklore, rituals, family and clan cult practice, childbirth rituals, shamanism, ludic culture, arts and crafts. The formation of this complex was influenced by the Central Asian (Turkic-Mongolian and Scythian) and East Asian (Korean-Japanese, Jurchen) cultural traditions. In conclusion, it should be noted that the cult of fertility is a qualitative valuable unique feature of the beliefs, ritual practices, and art of the Tungus-Manchu peoples.

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Urbanization Processes in the Indigenous Population of the Altai Republic: Stages, Factors, Prospects

This article explores the specificity of the urbanization process in the native population of the Altai Republic and assesses its principal trends over the course of the years 1926–2020. The focus is on quantitative aspects such as the growth of urban settlements and their population. I look at the ways the urban network has developed in the Altai Mountains. The only urban administrative center shows a potential for agglomerative growth and continues to accumulate the rural population. Townships that had emerged during the Soviet period were unattractive for natives. Three stages in the urbanization process are described: 1926–1950s, 1960–1980s, and 1990 to the present. Over the entire period in question, urbanization was extensive, i.e. caused by migration from rural areas. At the first stage, the key factor was political (collectivization). In the second stage, the factors were socio-cultural (attractiveness of urban lifestyle), economic (higher income and greater availability of jobs), and political (the abolition of "futureless" villages). The main factor at the third stage was socio-economic crisis. A conclusion is made that the potential for extensive urbanization in the native population of the Altai Republic has not yet been exhausted. The most attractive places to migrate are still the region's capital and its suburbs. However, migration to other cities of Russia is likely to rise. A prediction is made that the role of intensive factors of urbanization in the indigenous population of the Altai Republic will increase.

Keywords: *Urbanization, migration, stages, factors, indigenous population, Altai Republic.*

Introduction

Russia is a country with a high level of urbanization. According to the 2010 census, 73 % of the country's inhabitants live in urban areas. The urban transition (the excess of the urban population over the rural) in Russia as a whole took place in 1958, and in some areas of the European portion it took place in the first third of the 20th century (Gorod…, 2001: 155, 161). At the same time, the process of urbanization in individual regions of the country and among different peoples is not the same. This concerns both the chronology of the beginning of urbanization and the rates and levels it achieved at different stages.

One of the Russian regions where the course of the urbanization process particularly differs from the average Russian standard is the Altai Mountains, which lies within the administrative boundaries of the Altai Republic. The beginning of urbanization here dates back to the 2nd decade of 20th century. Since then, the urban population in the region has steadily increased, but it is still far from the magnitude of the urban transition. For

example, in the period from 1926 to 2010 it increased 10 times (from 5691 to 56,933 people), and the proportion of urban dwellers increased from 5.7 % to 27.6 % (calculated after (Vsesoyuznaya perepis…, 1928: 60–61; Natsionalniy sostav…, 2013: 8)).

Urbanization in the territory of the Altai Mountains has, to a greater or lesser extent, affected all the peoples of the region. Today, the share of city dwellers among Russians is 33.6 %, and among the indigenous population of northern Altai (Kumandins, Tubalars, Chelkans) and southern Altai (Altai-kizhi, Telengits, Teleuts) 18.8 %. At the same time, in terms of urbanization, the Kumandins surpass both the rest of the Altai ethnic groups and the Russians, with 41.4 % (calculated after (Natsionalniy sostav…, 2013: 9, 13, 15, 17)).

The urbanization trends of the individual peoples of the Altai Republic are of great interest from the point of view of studying the patterns and specifics of urbanization processes in the region. However, this problem remains practically unexplored, since the Russian science traditionally pays more attention to the development of the population of large cities. This work contributes to the study of urbanization processes in the Altai Mountains. It is dedicated to the identification of the features and main trends of urbanization among the indigenous population of the region. Notably, our attention will be focused on quantitative indicators (growth of urban settlements and urban population). Qualitative changes (urban lifestyle, culture) will not be not considered here. To achieve this task, it is necessary to study the formation of an urban settlement network in the region, to identify and substantiate the stages of urbanization of the indigenous population, and to identify the main factors that determined the urbanization process.

State of knowledge about the issue, sources

The issue of the urbanization of the indigenous population of the Altai Mountains cannot be considered in isolation from studies relating to the analysis of the urban development of the region. In the works devoted to the classification of Russian regions according to an achieved level of urbanization, the Altai Republic belongs to the group of extremely poorly urbanized regions (Popov, 2005; Efimova, 2014). The problem of urbanization of the population of the Altai Mountains is briefly addressed in the studies concerning the analysis of general trends in urbanization processes in Siberia. For example, the monograph of V.A. Isupov indicates that in the period from 1939 to 1959 the number of city dwellers in the Gorno-Altai Autonomous Oblast, a predominantly agrarian region, grew at a slow pace (1991: 32). In the work of E.E. Tinikova, who reveals the main trends of urbanization in the republics of Altai, Tuva, and Khakassia from 1945 to 2017, it is noted that in Soviet times the Altai Mountains region remained poorly urbanized owing to economic specialization in distant pasture animal husbandry, and in the post-Soviet period the number of city dwellers in the region grew on account of the internal migration of the population (2018: 241, 251). According to the research by A.S. Breslavsky, in 1989–2019, the urbanization processes in the republics of southern Siberia (Altai, Buryatia, Tuva, Khakassia) covered mainly capital cities and their suburban areas, and relied on intraregional migration (2019).

The analysis of urbanization of the indigenous population of the Altai Mountains is presented only in a few works. Among them, a collective monograph devoted to the problem of the development of the Western Siberia population stands out. It contains data on the dynamics of the number of urban Altai citizens in 1939–1989. It is noted that "the Altai population, albeit small in size, was drawn into the process of urbanization" and "at the same time, the change in the proportion of the urban population was gradual and smooth" (Naseleniye…, 1997: 159–160). In the work of A.A. Cherkasov, devoted to the typology of Russian ethnic groups by level of urbanization, the Altai peoples are attributed to the fourth type—with a failed urban transition (2018). The publication by Tinikova analyzes the ethnic composition of the urban population of southern Siberia in 1945–2017. Tinikova notes that the urbanization of the Altai people began much later than that of the East Slavs. As a result, the Altai people remain a weakly urbanized ethnic group, in which the proportion of city dwellers has not attained 50 % (Tinikova, 2019). Noteworthy is the study by V.V. Nikolaev, which describes ethno-demographic processes in the Altai in 2002–2010. The author notes that the level of urbanization and the history of the formation of urban groups of the indigenous population differ significantly. The most urbanized people of the Altai are the Kumandins (Nikolaev, 2017).

As one can see, the issue of urbanization of the population of Altai Republic, including the indigenous population, did not receive comprehensive coverage in the scientific literature. There are no generalizing studies among the works considered. Existing publications do not cover many aspects of urbanization: the influence of the state on this process, the development of the urban network, the reasons for the resettlement of rural residents into the cities, etc.

The source base of this work was the materials of six USSR population censuses (1926, 1939, 1959, 1970, 1979, 1989) and two Russian Federation population censuses (2002, 2010), characterizing the quantitative parameters of urbanization in the Altai.

Formation of urban settlements in the Altai Republic

The history of the first (and so far the only) city in the Altai Republic dates back to the beginning of the 19th century. On the site of modern Gorno-Altaysk, there was a small Altai settlement, Ulala (Altaian, 'Ulalu'). Over time, Russian settlers began to move to the village, followed by Orthodox missionaries. In 1830, in Ulala, the main camp of the Altai spiritual mission was founded (Ulala…, 1997: 16–18, 130). At first, the population of Ulala grew rather slowly, since not everyone who desired to could live here: only newly baptized Altaians and Russian settlers who received permission from the head of the mission. This state of affairs changed after the abolition of serfdom in 1861 and the adoption of the 1865 law that allowed the peasants of the central provinces to settle on the lands of the Altai Mountains region. Ulala's advantageous position led to an influx of peasant, handicraft, and commercial immigrants here (Satlaev, 1995: 121; Ulala…, 1997: 20, 24). By the end of the 19th century, the settlement was a regional center of the Altai Mountains, performing commercial, economic, cultural, religious, and educational functions.

In June 1922, Ulala became the administrative center of the new Oyrot Autonomous Oblast (later, the Gorno-Altai Autonomous Oblast; now, the Altai Republic), and on February 27, 1928, it received the status of city. In the next two decades, the city changed its name twice: on July 4, 1932, it was renamed Oyrot-Tura, and on January 7, 1948, Gorno-Altaysk (Ulala…, 1997: 133–134, 138). The transformation of Ulala into a city marked the beginning of urbanization processes in the Altai Republic. Over time, several more urban-type settlements appeared in the region. In 1957, the village of Aktash, and in 1966, the village of Veselaya Seika received the status of workers' settlements. Then, in 1970, the village of Chemal received the status of resort settlement (Gorno-Altayskoy avtonomnoy oblasti 60 let, 1982: 3). The transformation of villages into workers' settlements was associated with the industrial development of the territories of the Altai Mountains. During the World War II, in the vicinity of the village of Aktash, the cinnabar deposit began to be developed. Later, a metallurgical plant was built here for the extraction and processing of mercury ore. In the early 1950s, near Veselaya Seika, gold mining began to develop, and a gold recovery plant was built. The development of the mines led to an influx of qualified specialists and skilled workers, an increase in the population, and a change in the face of both settlements through extensive housing construction and the development of rural infrastructure. The transformation of Chemal into a resort settlement was associated with the establishment of an anti-tuberculosis sanatorium on its territory.

In different years, from 1700 to 3600 people lived in each of the settlements under consideration (Gorniy Altai, 1990: 9–10). The resort settlement of Chemal remained in its new status until 1988, and the workers' settlements of Aktash and Veselaya Seika upheld until 1994. Then, they were again transformed into rural settlements. Therefore, the population of Aktash was considered an urban one during the All-Union (USSR) censuses of 1959, 1970, 1979, and 1989; Veselaya Seika of 1970, 1979, and 1989, and Chemal only of 1979.

Main stages and outcomes of the urbanization of indigenous population of the Altai Republic

A clear idea of the scale of urbanization of the indigenous population of the Altai Republic is provided by the materials of the censuses of 1926–2010, which make it possible to analyze the growth in the number and proportion of the urban population. Notably, ethnic groups of the northern and southern indigenous inhabitants of the Altai in some censuses were counted as a single people, in others as separate ones. In this paper, they are considered in their totality. Let us turn to the census materials (see *Table*).

Analysis of the data presented in the table makes it possible to distinguish three stages in the urbanization of the indigenous population of the Altai Mountains: 1926–1950, 1960–1980, and from 1990 to the present. The main criteria for their identification were trends in the changing number of citizens (growth or decline) and the factors determining these trends. The initial stage (1926–1950s) was very complex and contradictory in its content: the growth in the number of citizens and the level of urbanization was extremely uneven. In this regard, two periods can be distinguished: 1926–1930s and 1940–1950s.

In the first period (1926–1930s), an urban group emerged as part of the indigenous population of the Altai Mountains. Although at the time of the 1926 census, Ulala was not yet a city; nevertheless, in the results of the census published two years later, Ulala residents were already counted as city dwellers. Among them, there were 969 representatives of the indigenous population, which was 2.3 % of its total number. By 1939, the number of Altaians in Ulala increased 2.9 times, and the level of urbanization rose to 7.1 %. The increase in the number of city dwellers was mainly due to the migration of the population from rural areas.

The active growth in the number of Altaians in Ulala fell in the years of the first "five-year plans", when the country embarked on a course of forced industrialization and the demand for workers in the cities increased significantly. During these years, Ulala also developed

Dynamics of the number of the indigenous population of the Altai Republic in the 20th–21st centuries (according to population censuses)*

Year	Total	Urban		Rural	
		Number	%	Number	%
1926	42,278	969	2.3	41,309	97.7
1939	39,285	2807	7.1	36,478	92.9
1959	38,019	2379	6.2	35,640	93.8
1970	46,750	3610	7.7	43,140	92.3
1979	50,203	4700	9.4	45,503	90.6
1989	59,130	6215	10.5	52,915	89.5
2002	67,886	10,947	16.1	56,939	83.9
2010	69,913	13,154	18.8	56,759	81.2

*Calculated according to: (Vsesoyuznaya perepis…, 1928: 60–62; 1992: 59; Itogi Vsesoyuznoy perepisi naseleniya 1959 goda…, (s.a.): Fol. 110, 113–116; Itogi Vsesoyuznoy perepisi naseleniya 1970 goda…, (s.a.): 89–91; Chislennost…, 1984: 84; Natsionalniy sostav…, 2005: 13–14; 2013: 9, 13, 17; Respublika Altai…, (s.a.): 59).

intensively. The number of industrial enterprises that produced mainly consumer goods (bread-baking complex, meat-packing plant, brick factory, etc.) grew rapidly in the city. At the same time, changes in the organization of the production process took place: small handicraft enterprises were replaced by large-scale state and cooperative ones, with partial replacement of manual labor by machine technology (Baeva, Makoshev, 1994: 73–74). Along with this, the network of educational and cultural institutions expanded in Ulala. In addition to new schools and a cinema, a veterinary school, a workers' school, a medical school, a pedagogical school were opened there (Ulala…, 1997: 93). Undoubtedly, Ulala attracted rural dwellers with opportunities for employment in new enterprises and obtaining vocational education. However, the massive migration of the indigenous population to the city was only to a small extent due to the process of industrialization of the country. The Altaians, who had been engaged in agricultural labor for centuries, could not rapidly reorient themselves to non-traditional types of occupation.

Analysis of the data in the table shows that the increase in the number of city dwellers in the 1926–1939 period took place along with a decrease in the number of both the rural and the whole indigenous population of the region. The main reasons for this demographic decline were not structural, but political factors: primarily, the implementation of a policy of complete collectivization in the countryside. In the Altai Mountains, as early as March of 1930, peasants were almost without exception driven into "communes" and stripped of all belongings (Naseleniye…, 1997: 24). Forced collectivization was accompanied by dispossession and repressions, devastation and hunger. In this regard, for many Altai people, moving from a village to a city was a forced measure, an escape from the discriminatory policy of the state. It should be noted that this situation was observed in the 1930s throughout the country (Kessler, 2003: 77; Nefedov, 2013: 48). Collectivization, the transformation of peasants into donors at whose expense the forced industrialization was ensured, contributed to the migration activity of rural residents. Mass migration of the population from villages to cities was stopped only by the tough measures of the Soviet leadership (deprivation of rural residents of passports; registration system; a ban on leaving collective farm production without special permission from the administration; criminal prosecution of those living in cities without registration and passports) (Naseleniye…, 1997: 27).

In the second period (1940–1950s), the urbanization development of the indigenous population of the Altai Mountains underwent negative changes. Since the beginning of the 1940s, there appeared the tendency of situational deurbanization, which persisted up to the end of the 1950s. By 1959, the number of the urban Altai population decreased to 2379 people, the share of urban residents among the Altaians decreased to 6.2 %. This was due to a number of social factors. With the adoption of the aforementioned restrictive measures aimed at reducing migration from villages to cities, the inflow of the rural population to Gorno-Altaysk (former Ulala) has significantly decreased. Most of the collective farmers could not leave their homes, since it was difficult to get a certificate to leave for work in the city from the collective farm board. Living in the city without a passport and registration entailed the imposition of a fine and expulsion by the police back to the village. Another significant factor was the World War II. It disrupted the regular reproduction processes among the entire indigenous population of the Altai Mountains. The misbalance of the sex/age population structure, caused by mass conscription of men into the army and their

death during the hostilities, led to a decrease in the birth rate and natural population growth. The consequences of the demographic catastrophe of the war years were felt for a long time. Therefore, even by the end of the 1950s, the number of the indigenous population of the Altai Republic did not reach the pre-war level.

Notably, the transformation of village Aktash into an urban-type settlement in 1957 had little effect on the dynamics of the number of city dwellers among the Altai natives. Our calculations based on the results of the 1959 census show that in Aktash, where 2300 people lived, representatives of the indigenous population were in the minority—161 people (calculated after (Gorno-Altaysk…, 2013: 20; Gorniy Altai…, 1990: 10)).

During the period under review, despite the war and the difficulties of the post-war period, Gorno-Altaysk continued to develop. A number of important socio-economic projects were implemented in the city, which further contributed to the increase of its role in the life of the region and the growth of the urban population. For example, in Gorno-Altaysk, a sewing (1941), curtain-tulle (1954), weaving (1956) and shoe (1958) factories were established; works were carried out on housing construction and improvement of the city (Ulala…, 1997: 137; Pakhaev, Fedotov, Yablochkov, 1965: 35, 44–48). Qualitative changes have also taken place in the field of education. In 1949, the Gorno-Altaysk Teachers' Institute was founded (in 1952, it was transformed into a Pedagogical Institute; in 1993, into the Gorno-Altaysk State University) (Ulala…, 1997: 138). In the same year, the Regional National Secondary School was created, designed to train qualified personnel from the indigenous population. For students who came from all over the Altai Mountains, a boarding school was opened at the school (Istoriya gimnazii, (s.a.)). This school, unique for the region, has been operating to this day (now, the Republican gymnasium of Plakas), and continues to fulfill its mission. Undoubtedly, the opening of the pedagogical institute and the secondary school contributed to the movement of Altai youth to the city and their assimilation into urban society.

At the second stage (1960–1980s) of the urbanization development of the indigenous population of the Altai Republic, a progressive growth of the urban group was observed. From 1959 (2379 people) to 1989 (6215 people), its number increased 2.6 times, and the level of urbanization increased to 10.5 % (see *Table*). The growth of the urban population at this stage was accompanied by an increase in the number of the entire indigenous population of the region. Nevertheless, in these years, a trend towards a decrease in the share of rural residents among the Altai people was already clear.

The main source of replenishment of the urban Altai population was migration from the villages. The main flow of rural residents was directed to Gorno-Altaysk. Urban-type settlements did not have migration attractiveness; hence population size grew slowly there. According to our calculations based on the results of the censuses, the number of Altai natives in urban-type settlements in 1970 was 301 people (Aktash, Veselaya Seika); in 1979, 828 (Aktash, Veselaya Seika, Chemal); and in 1989, 709 people (Aktash, Veselaya Seika) (calculated after (Gorno-Altaysk…, 2013: 20–21)).

At the stage under consideration, the migration of the rural Altai population to Gorno-Altaysk was driven by a number of closely interrelated factors. Of these, primarily, sociocultural factors should be noted. The city attracted villagers with a higher standard of living. In the capital of the region, the quality of health care, housing conditions, and cultural services were significantly higher than in the countryside. In addition, Gorno-Altaysk, being a scientific and educational center, attracted rural youth with opportunities for education and professional fulfillment.

Economic factors also became important reasons for the migration of the indigenous population to the city: a higher level of income and a variety of jobs (industry, capital construction, transport, communications, etc.). The development of industry in Gorno-Altaysk contributed to the gradual involvement of the urban Altai population in industrial labor. Some of the women, after moving to the city, were employed at a weaving, curtain-tulle, and sewing factories. Men worked at shoe and furniture factories, brick factories, reinforced concrete products, and electrical appliances.

Political factors also played a significant role in the migration growth of the urban group of the indigenous population. In the 1960–1970s, the state policy of systematic enlargement of the existing system of rural settlements and the elimination of "unpromising" small villages was implemented in the country. As a result, approximately 90 settlements, or ¼ part of all settlements, disappeared in the Altai Mountains region (Baeva, Makoshev, 1994: 13). As a result of the elimination of "unpromising" villages, those rural residents who had not been disposed to change their place of residence before were involved in forced migration. Most of them moved to larger villages and regional centers. However, part of the villagers, bypassing the "promising" villages, rushed irectly to Gorno-Altaysk.

Notably, among the indigenous population, the Kumandins showed the greatest migration activity. Many of them moved to Gorno-Altaysk and Biysk, as well as large settlements in the nearby Tashtagolsky District of the Kemerovo Region. The Kumandins migrated to Gorno-Altaysk not only from the villages of the Altai Republic, but also from Krasnogorsky and Soltonsky districts of the neighboring Altai Territory. As a result, they became the most urbanized ethnic group in the region.

The third stage (from 1990 to the present) of the urbanization development of the indigenous population

of the Altai Republic is characterized by the continued growth of the urban group. The table shows the growth in both absolute and percentage terms. During the period from 1989 to 2010, the number of city dwellers increased by a factor of 2.1, and the level of urbanization by 8.3 %. On the contrary, the proportion of the rural Altai population continues to decline. Moreover, in the period of 2002–2010, for the first time in the past 50 years, a decrease in its absolute number, albeit insignificant, was recorded.

In the post-Soviet period, the number of urban dwellers among the indigenous population continued to grow owing to intraregional rural-urban migration. However, the reasons for the migration activity of villagers have changed a lot. One important reason became the economic factor, namely the severe socio-economic crisis of the 1990s. The Altai Republic, being an agricultural region, turned out to be especially vulnerable to market reforms. The elimination of the administrative system of the command economy, as well as the privatization of property, led to economic destabilization in the region, the collapse of collective farms, unemployment, and a drop in the population's income. Gorno-Altaysk, which at that time became the only urban settlement in the region, also found itself in a difficult economic situation. Almost all large industrial enterprises in the city were gradually closed. In these market conditions, only the concrete product plant survived. However, despite all the economic difficulties, the level and quality of life of the population in Gorno-Altaysk remained higher than in the countryside. As a result, the capital of the region continued to attract rural residents. Representatives of the indigenous population migrated from village to city, realizing that here they have more chances to find a job (including in the informal sector), engage in commercial activities, have a stable income, and provide their family with an acceptable standard of living. In addition to economic reasons, an important motive for their move to Gorno-Altaysk was the desire to give their children a good education—not only special or higher, but also secondary.

Rural residents who moved to the city were not always able to adapt to new forms of life. Owing to the inability to find work and the high prices for food and housing, some of them returned to the village. At the same time, adapting to modern realities, many rural households began to intensify their activities in subsidiary farming. As a result, families often got separated during the children's study time: the mother and children lived in the city, while the father was engaged in animal husbandry in the village.

In some cases, the migration flow went from town to village. For example, in 1992, the Kosh-Agachsky and Ulaganky districts were assigned to the regions of the Far North, which led to an increase in wages ("northern" allowances) for the working residents. This became a financial incentive for attracting and retaining specialists, including those from the city, in rural budgetary institutions of these districts. Nevertheless, the migration of the Altai population from the Kosh-Agachsky and Ulagansky districts to Gorno-Altaysk did not stop, and continues to this day. This is largely facilitated by the implementation (since the early 2000s) of the federal program for the resettlement of citizens from the regions of the Far North and equivalent areas. Under this program, certain categories of residents are eligible for subsidies for the purchase of housing. By the beginning of 2020, more than four thousand such citizens were registered (Obespecheniye zhilyem…, (s.a.)). In different years, the total number of recipients of housing certificates can vary greatly—from 35 to 200 people. In most cases, they try to buy housing in Gorno-Altaysk.

Today, Gorno-Altaysk, as a regional capital, continues to accumulate rural population. At the same time, it develops more and more in an agglomerative form, and pulls into its orbit the nearby villages of Alferovo, Kyzyl-Ozek, Maima, Karlushka, Dubrovka. Many residents of these settlements are involved in commuting. Every day, they travel to the capital to work or study, and back. In connection with the current situation, the Government of the Altai Republic has announced the future adoption of a decision to create the Gorno-Altaysk urban agglomeration (Sozdaniye i razvitiye…, (s.a.)). In recent years, more and more inhabitants of the Altai have been settling in the suburban area of the capital. Therefore, it can be predicted that the next vector of urbanization development of the indigenous population will be its concentration within the urban agglomeration.

Another important trend will be the increase in the number of Altai natives in cities outside the region. This is due to the fact that students studying in such cities are increasingly striving to remain there after graduation. In addition, in the post-Soviet period, in the Altai Republic, seasonal migrant labor became widespread. Inhabitants of the region travel for work to large cities, as well as urban and rural settlements, in the North and the Far East. Over time, some of the migrant workers decide to settle at their place of work, and move their families.

Conclusions

At the present stage, the Altai Republic is a poorly urbanized region. Initially, there were no preconditions for its rapid urbanization development. Alpine terrain, difficult accessibility to transportation, and an economy centered on animal husbandry did not contribute to the emergence of large industrial centers in the Altai Mountains. The first, and to this day the only, city in the region, Gorno-Altaysk, emerged and is developing as an

administrative, scientific, educational, and cultural center. None of the three urban-type settlements that appeared in the region during the Soviet period became centers of urbanization. All of them were eventually transformed into rural settlements.

In the last century, the quantity of the urban group of the indigenous population of the Altai Republic has been gradually increasing, but has not yet reached the level of urban transition. Urbanization is proceeding in an extensive way, on accounts of rural migration. It is closely interconnected with social, economic, and political processes in the country.

The proportion of the urban population as part of the indigenous population of the Altai Mountains region will increase in the future. This is due to the fact that the reserves of extensive development have not yet been exhausted. The most attractive city to move to will remain the capital of the region and its suburban area. At the same time, unequal wages in various regions will contribute to increased migration of the indigenous population to the "rich" cities outside the republic.

The logic of the development of urbanization processes in the world suggests that in the future the role of intensive factors of urbanization of the indigenous population of the Altai Republic will significantly increase. The quantitative growth of the urban Altai population will be accompanied by the changes in its qualitative characteristics: increase in the educational level, differentiation of the social and professional structure, assimilation of the standards of urban culture, system of values, and norms of behavior. Furthermore, urban lifestyles will increasingly spread to rural areas.

Undoubtedly, the transition to the intensive stage depends on the solution of the social problems of the regional capital, associated with the increase in the level and quality of life of the population, the development of the cultural and educational sphere, the formation of a comfortable urban environment, the expansion of housing construction, etc. Nevertheless, there is no doubt that urbanization will continue, and in this regard, the indigenous population of the Altai Republic is moving in the same direction with the rest of the world.

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The Ratio of Indigenous to Immigrant Populations in the Western Steppe During the Bronze Age (Based on Cranial Data)

Measurements of ~730 male crania from cemeteries associated with Bronze Age cultures of the steppe and forest-steppe zone of Eastern Europe (Yamnaya, Catacomb, Poltavka, Babino, Lola, and Timber-Grave) were subjected to multivariate analyses. D^2 distances between sample centroids were calculated, and non-metric multidimensional scaling was carried out. The results are used to evaluate the proportion of indigenous and immigrant groups during four successive periods—Early Bronze Age, Middle Bronze Age, Middle to Late Bronze Age transition, and Late Bronze Age. The differences between Yamnaya populations are comparable to those between recent groups inhabiting vast territories of Eastern Europe, from Karelia to the Northern Caucasus. The role of the substrate component in the origin of Early and Middle Bronze Age groups was considerable. However, virtually no continuity was observed at the Middle to Late Bronze Age transition, when post-Catacomb cultures originated. Continuity with Middle Bronze Age groups is observed in Late Bronze Age samples representing the Timber-Grave people, who combined features of the Catacomb and post-Catacomb people. Factors accounting for such a process may include "pendulum migrations" and temporary reversal of funerary tradition from kurgans to "invisible" flat burials.

Keywords: *Physical anthropology, craniology, craniometry, Bronze Age, Eastern Europe, human populations.*

Introduction

Ascertainment of the complexity of the composition of populations of all historical periods is one of the most frequent conclusions found in Russian craniometric studies (Shirobokov, 2019: 144). The multicomponent nature of the population is often suggested even when studying cranial samples from a single archaeological culture (Shevchenko, 1986, 1993; Batieva, 2010; Balabanova, 2016; Khokhlov, 2017; Khokhlov, Kitov, 2019; and others). Such conclusions, though not always convincingly confirmed, are probably not completely unreasonable, as the admixed composition of most ancient and modern populations has also been confirmed by the paleogenetic studies of the last two decades (Reich, 2020).

The aim of the present study is to detect only the substrate components of the Bronze Age steppe populations of Eastern Europe. Thus, primary attention is paid, not to the influence of new migrant populations and their origin, but to the role of the local inhabitants in the formation of new archaeological cultures and cultural-historical communities.

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The area of research includes the steppe and, partially, forest-steppe zones of Eastern Europe, from the lower Dnieper River in the west to the middle Ural River in the east.

Material and methods

Individual measurements and sample means of ~730 male Bronze Age skulls were employed, including the following craniometric variables: cranial length, maximum cranial breadth, cranial height (basion-bregma), bizygomatic breadth, minimal frontal breadth, upper facial height, nasal height and breadth, orbital height and breadth, nasomalar and zygomaxillary angles, simotic index, and nasal protrusion angle (Martin, Saller, 1957; Alekseev, Debets, 1964). The measurements of more than 1300 male skulls representing modern populations were employed as well. As female cranial samples are not available for many periods of the Bronze Age, and, if present, are substantially smaller, these were not analyzed in the study. Most data were taken from previous publications, while the unpublished data from several skulls were obtained from the archive of the Department of Anthropology of the Peter the Great Museum of Anthropology and Ethnography RAS (hereinafter, DA MAE RAS).

Intergroup comparisons of the cranial samples were carried out using squared Mahalanobis distances (D^2), with an adjustment for the sample size in CANON (Kozintsev, 2007). The distances were further visualized in two-dimensional plots by multidimensional scaling (Guttman's algorithm). The statistical significance of the pair-wise interpopulation differences in single variables was assessed using Student's t-test. This test was also employed for comparing D^2 means, whereas normality of the distributions was tested via the Shapiro-Wilk test. Those three statistical procedures were carried out in Statistica 12.0.

Results and discussion

At the first stage of the study, the influence of the Chalcolithic groups (represented by cranial samples, not single skulls) on the formation of the Early Bronze Age population was assessed. This question is of interest in the context of the relevant archaeological debates (Telegin, 1973; Merpert, 1974; Vasiliev, 1981, 2003; Ivanova, 2006; Ivanova, Nikitin, Kiosak, 2018). An aggregate sample was employed, including skulls from the following sites from the middle Dnieper and Seversky Donets rivers: Igren, Kamennye Potoki, and Alexandriya (Gerasimov, 1955; Surnina, 1963; Zinevich, 1967; Potekhina, 1983). In craniological publications, these sites are typically assumed to represent the Sredni Stog culture. Two samples from the Khvalynsk I and Khvalynsk II sites were used as well. The sites are located in the north of the Saratov Region and belong to the homonymous archaeological culture (Mkrtchyan, 1988; Vasiliev, 2003; Khokhlov, 2010, 2017). The population of the Early Bronze Age is represented by more abundant cranial collections, which were grouped

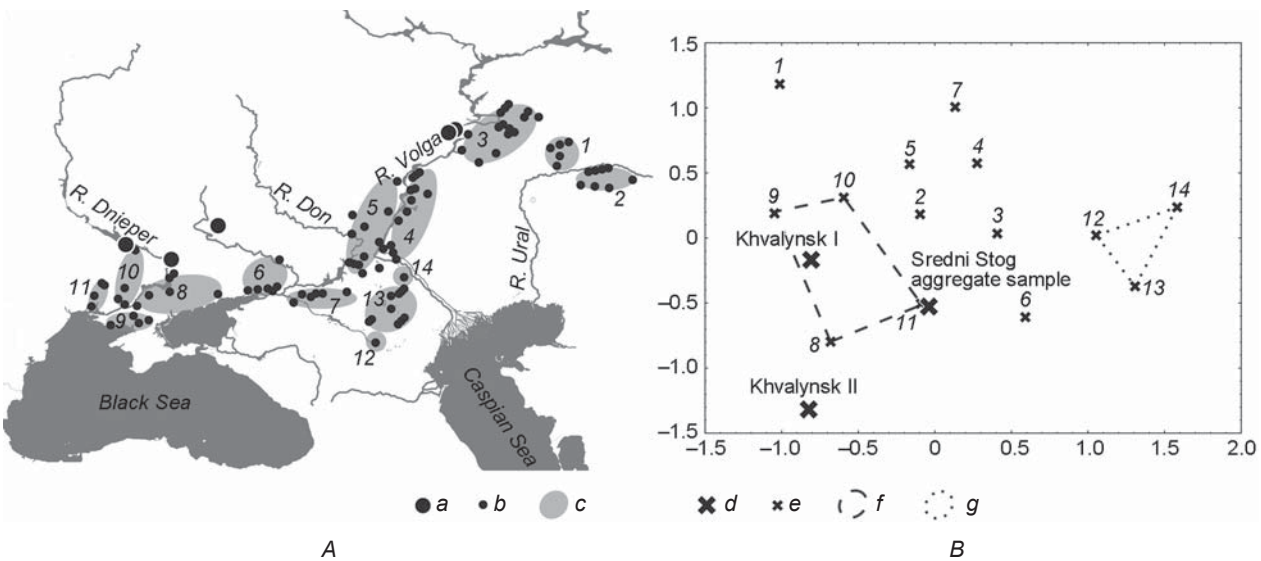

Fig. 1. Chalcolithic and Early Bronze Age sites (*A*), and the distribution of respective cranial samples in the morphospace of two axes of a non-metric multidimensional scaling of D^2 between them (*B*).

a – Chalcolithic sites; *b* – Yamnaya culture sites; *c* – local groups of the Yamnaya culture; *d* – Chalcolithic cranial samples; *e* – Yamnaya cranial samples; *f* – western (Lower Dnieper) Yamnaya samples; *g* – southeastern (Caspian) Yamnaya samples. See the main text for the names of the numbered samples.

into 14 samples according to their geographic location (Fig. 1, *A*): *1* – Ural (Tamar-Utkul), right bank of the Ural River (Khokhlov, 2017); *2* – Ural (Tamar-Utkul), left bank of the Ural River (Ibid.); *3* – Samara, left bank of the Volga River, around and to the south from the Samara Bend (Debets, 1936; Fierstein, 1967; Khokhlov, 2017); *4* – Lower Volga, left bank of the Volga River (Debets, 1936; Ginzburg, 1959; Glazkova, Chtetsov, 1960; Fierstein, 1967; Balabanova, 2016; Khokhlov, 2017); *5* – Volga-Don, interfluve of the Volga and Don rivers (Balabanova, 2016; Khokhlov, 2017) (Archive of the DA MAE RAS); *6* – Lower Don, right bank of the Don River (Batieva, 2010); *7* – Lower Don, left bank of the Don River (Ibid.); *8* – Lower Dnieper, eastern (Zinevich, 1967; Kruts, 1984); *9* – Lower Dnieper, southern (Kruts, 1984); *10* – Lower Dnieper, western (Ibid.); *11* – Ingul (Ibid.); *12* – cemeteries of the East Manych River (Shevchenko, 1986; Kazarnitsky, 2012); *13* – Kalmykia (cemeteries of northern and central Kalmykia) (Shevchenko, 1986; Kazarnitsky, 2012); *14* – Astrakhan (Shevchenko, 1986; Kazarnitsky, 2012).

The cranial type of the Khvalynsk and Sredni Stog samples finds direct analogs only among the westernmost Yamnaya culture groups from the lower Dnieper and Ingulets rivers (Fig. 1, *B*, *8–11*). The common cranial features are dolichocrany, and a relatively narrow nose and face. The range of variation of other Early Bronze Age populations is substantially wider. The Yamnaya culture sample from the right bank of the Ural (Fig. 1, *B*, *1*) exhibits the strongest dolichocrany, the most clinognathic face, and the widest and tallest piriform aperture. Notably, the sample from the opposite bank of the Ural (Fig. 1, *B*, *2*) displays morphology more typical of the Yamnaya groups from the Don and Volga, located in the central part of the plot (Fig. 1, *B*, *3–7*). The southeastern groups from the Northwestern Caspian region (East Manych, Kalmykia, and Astrakhan samples (Fig. 1, *B*, *12–14*)) are separated along the y-axis owing to the large transverse dimensions of their face and cranial vault.

Thus, the widely accepted conclusion regarding the population diversity of Yamnaya culture groups is confirmed (Shevchenko, 1986; Kruts, 1997; Ivanova, 2015; Khokhlov, 2017). How wide this diversity actually is can be assessed against a background of the craniometric variation of modern populations of various origins (Fig. 2). Two comparative analyses were carried out. The first included samples from a very vast area from the Baltic region to Transbaikalia (Alekseev, 1969, 1974; Ismagulov, 1970; Shirobokov et al., 2017), while the second only employed Eastern European data (Fig. 3). The mean and median sizes of the modern and Yamnaya samples were 30 and 15 individuals, respectively.

The mean D^2 among modern Eurasian groups is 8.115, among European 3.556. The same value inside the regional groups of closely related populations ranges from 1.5 to 2.3. The mean D^2 among the samples

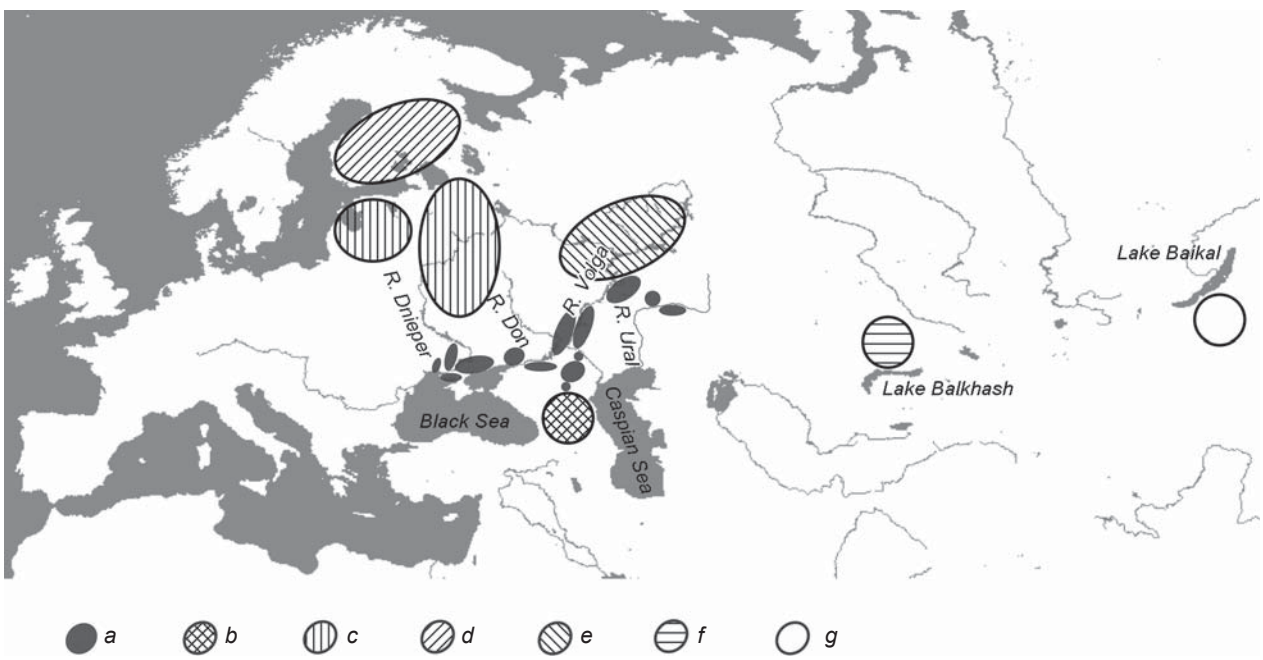

Fig. 2. Locations of the cranial samples of the Yamnaya culture and recent populations.
a – Yamnaya culture people; *b* – Ossetians and Ingush; *c* – Russians and Latvians; *d* – Karelians and Finns; *e* – Chuvash, Mari, Mordva, Udmurt; *f* – Kazakh; *g* – Buryat.

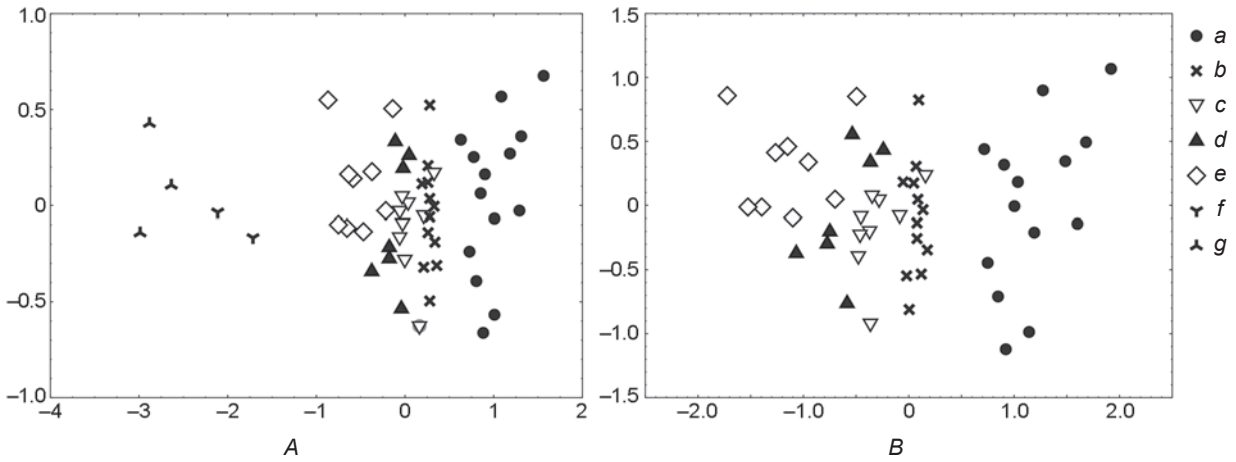

Fig. 3. Multidimensional scaling of D^2 among the Yamnaya samples as compared to the recent Eurasian (*A*) and European (*B*) samples.
a – Yamnaya culture people; *b* – Ossetians and Ingush; *c* – Russians and Latvians; *d* – Karelians and Finns; *e* – Chuvash, Mari, Mordva, Udmurt; *f* – Kazakh; *g* – Buryat.

of the Yamnaya culture is 4.059. Therefore, the plots of the scaled Mahalanobis distances show that the range of the coordinates of the Yamnaya samples is less than the differences between the Asian and European samples (Fig. 3, *A*). But it is about the scale of variation of the modern European groups, which speak languages of several families and populate a huge area from Karelia to the Caucasus and from the Baltic Sea to the Middle Volga and Urals. Clearly, cranial morphology varies widely among these modern European populations (Fig. 3, *B*).

Thus, the relatively higher morphological diversity of the Yamnaya groups than that of the Chalcolithic populations precludes ascertaining the people of the Khvalynsk-Sredni Stog burial traditions as a substrate for the whole Early Bronze Age steppe population (Vasiliev, 1981; Khokhlov, 2017). A substantial influence of the Khvalynsk-Sredni Stog groups is traceable mainly in the western part of the Yamanaya culture area. In the other Yamnaya populations, individuals of a different origin prevail. Among these, there are at least three regional clusters: Don-Volga (including the left bank of the Ural), Caspian, and Ural (right bank). Did all of them take part in the formation of the population of the next historical period?

In order to answer this question, the following analysis was carried out, excluding the Chalcolithic samples, but including those from the Middle Bronze Age*. These are samples from the Poltavka culture (Khokhlov, 2017) (Fig. 4, *A*, *1*), and from several territorial groups belonging to the Catacomb cultural circle (Fig. 4, *A*): *2* – Volga-Don; *3* – Lower Don, right bank; *4* – Lower Don, left bank (Kazarnitsky, 2012); *5* – Zaporozhye; *6* – Kherson; *7* – Ingul (Kruts, 1984); *8* – Samara-Orel (Melnik, 1982; Kruts, 2017); *9* – Crimea (Dyachenko, Pokas, 1986; Kruts, 2017); *10* – East Manych, southern; *11* – East Manych, central, and *12* – East Manych, northern (Kazarnitsky, 2012). The mean and median sample size was 18 individuals.

This analysis has shown the population continuity between the Poltavka and Catacomb cultures and between the Don-Volga (Fig. 4, *B*, *3–6*) and Lower Dnieper (*8–11*) groups of the Yamnaya culture. The scales of their variation are similar in general, but often differ at the local level. For instance, the Poltavka and Lower Don Catacomb groups (*1–4*) display a clear similarity with the geographically proximate Don-Volga samples of the Yamnaya culture, but the Yamnaya (*8–11*) and Catacomb (*5–9*) groups from the Lower Dnieper are much less similar. This observation suggests the appearance of large new groups of migrants of different origins in the Northern Black Sea region during the Middle Bronze Age.

The Caspian groups of the Catacomb culture (Fig. 4, *B*, *10–12*), though inhabiting a relatively small area, exhibit a high level of morphological variation displaying features similar to both the Don-Volga and Lower Dnieper, but not Caspian, Yamnaya samples (Fig. 4, *B*, *12–14*). Thus, the Northwestern Caspian region (vicinity of the Ergeni Upland) experienced the most intense population turnover during the Middle Bronze Age. The Caspian and Ural (right bank) Yamnaya groups likely did not leave a noticeable trace in the composition

*Such a grouping of the skulls from Middle and Late Bronze Age burials was employed earlier; for more details on the sample composition, names of the cemeteries, and field abbreviations, see (Kazarnitsky, 2020)).

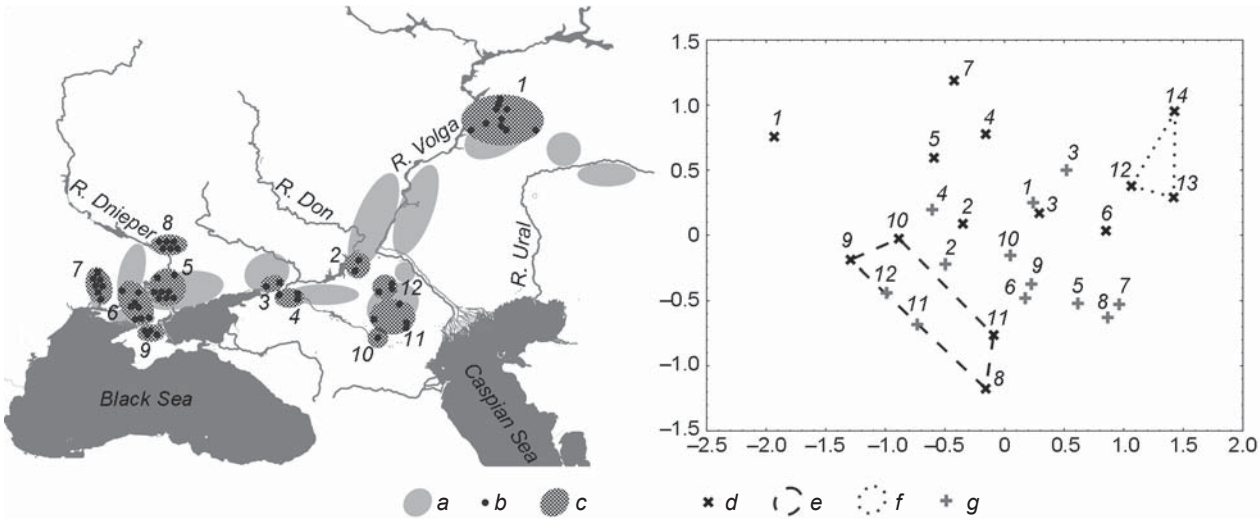

Fig. 4. Early and Middle Bronze Age sites (*A*), and the distribution of respective cranial samples in the morphospace of two axes of non-metric multidimensional scaling of D^2 between them (*B*).
a – local groups of sites of the Yamnaya culture; *b* – Middle Bronze Age sites; *c* – local groups of sites of the Middle Bronze Age; *d* – Yamnaya samples; *e* – western (Lower Dnieper) Yamnaya samples; *f* – southeastern (Caspian) Yamnaya samples; *g* – Catacomb and Poltavka samples. See the main text for the names of the numbered samples.

of the later population of the respective regions. This also probably led to the lower level of craniometric variation among the Catacomb and Poltavka samples: the mean D^2 between them is only 1.964, which is comparable to the degree of similarity of modern closely related populations.

The post-Catacomb (Babino and Lola) archaeological cultures, which emerged in the area of the Catacomb cultural-historical community later, belong to the next chronological period. Though this period is described as a junction between the two historical eras, it was only slightly shorter than each of those eras (Litvinenko, 2011; Mimokhod, 2013, 2018). The post-Catacomb population is represented by relatively small cranial samples (mean and median size is 9 individuals), which were combined into seven groups (Fig. 5): *1* – Babino Dnieper-Prut and/or Dnieper-Don (local groups disregarded), *2* – Babino Dnieper-Prut, *3* – Babino Dnieper-Don, *4* – Babino Dnestr-Prut, *5* – Babino Volga-Don, *6* – Lola, eastern (Kalmykia), *7* – Lola, western (Stavropol-Rostov) (Kruts, 1984; Batieva, 2011; Velikanova, 1975; Gerasimova, Kalmykov, 2007; Khokhlov, Mimokhod, 2008; Kazarnitsky, 2010, 2020).

The post-Catacomb samples display a high level of diversity, which can be related not only to their true population differences but to the low sample size as well. All these samples differ from the steppe population of the preceding periods by longer and narrower skull vaults, a narrower and more clinognathic face, and taller nose and orbits (Fig. 5, *B*). The differences in the variables listed above between aggregate samples of the Catacomb and post-Catacomb cultures reach a high level of statistical significance ($p < 0.01$). Apparently, in this period, the role of substrate groups in the formation of the population of the new historical era was minimal for the entire Bronze Age (Kazarnitsky, 2020). However, the cranial features of the steppe populations of the Middle Bronze Age did not disappear without a trace in Eastern Europe.

The skulls from the burials belonging the Timber-Grave culture, the final stage of the Bronze Age, were combined into 13 local samples (including two special chronological samples from Early Timber-Grave sites) (Fig. 6, *A*): *1* – Bashkiria, *2* – Samara, northern and central, *3* – Samara, northwestern and southwestern, *4* – Samara, early, *5* – Ulyanovsk and Tatarstan, *6* – Saratov, *7* – Volgograd, northern, *8* – Volgograd, western and southern, *9* – Rostov, *10* – Rostov, early, *11* – Astrakhan, *12* – Kalmykia, *13* – Lower Dnieper (Batieva, 2011; Debets, 1954; Gerasimova, 1958; Zinevich, Kruts, 1968; Kazarnitsky, 2012; Kruts, 1984; Shevchenko, Yusupov, 1991; Fierstein, 1967; Khokhlov, 1998, 2017; Khokhlov, Mimokhod, 2008) (Archive of the DA MAE RAS). The mean and median sample size is 16/17 individuals.

All the Late Bronze Age samples, excluding the two Early Timber-Grave groups, differ from the populations of the Catacomb culture in the same variables as are typical of the post-Catacomb groups but to a lesser degree (Fig. 6, *B*). Paradoxically, the differences from the preceding populations of the Middle Bronze Age have decreased over time rather than increased. The

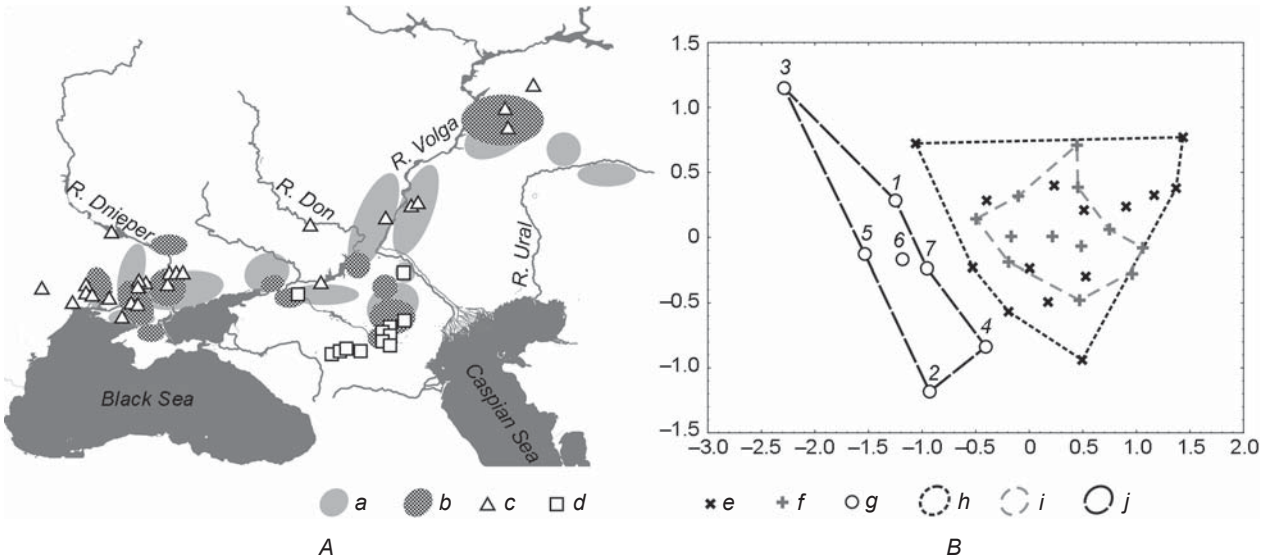

Fig. 5. Sites of the Early and Middle Bronze Ages and of the Middle to Late Bronze Age transition (*A*), and the distribution of respective cranial samples in the morphospace of two axes of a non-metric multidimensional scaling of D^2 between them (*B*). *a* – local groups of sites of the Yamnaya culture; *b* – local groups of sites of the Catacomb and Poltavka cultures; *c* – sites of the Babino culture; *d* – sites of the Lola culture; *e* – Yamnaya samples; *f* – Catacomb and Poltavka samples; *g* – post-Catacomb samples; *h* – range of variation of the Yamnaya samples; *i* – range of variation of the Catacomb and Poltavka samples; *j* – range of variation of the post-Catacomb samples. See the main text for the names of the numbered samples.

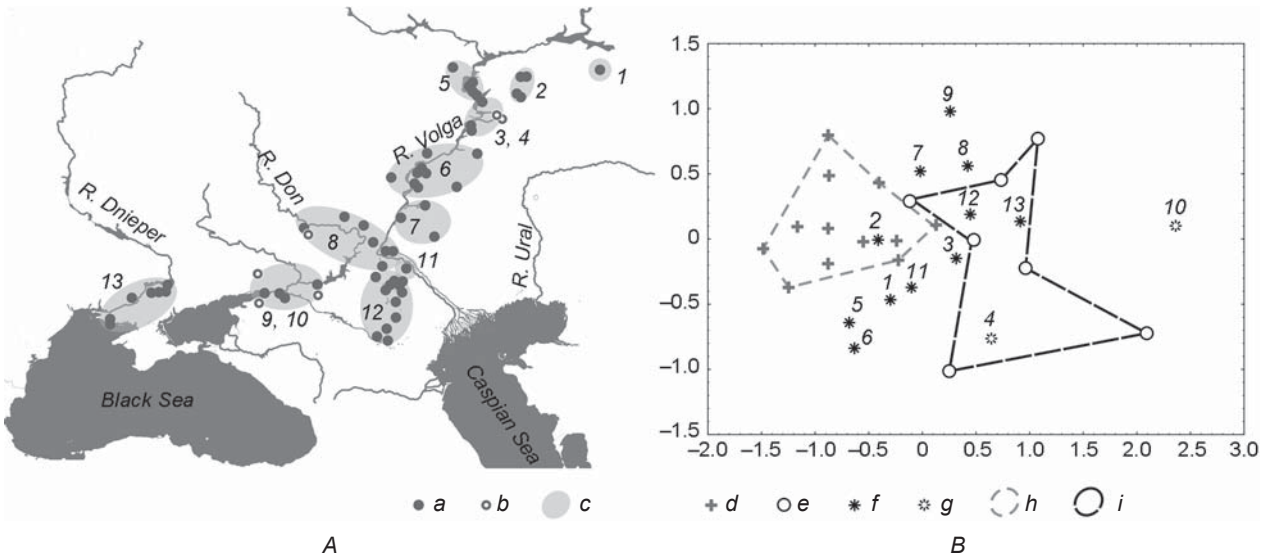

Fig. 6. Late Bronze Age sites (*A*), and the distribution of respective cranial samples in the morphospace of two axes of a non-metric multidimensional scaling of D^2 between them against a background of the Catacomb and post-Catacomb samples (*B*). *a* – sites of the Timber-Grave culture; *b* – early sites of the Timber-Grave culture; *c* – local groups of the sites of the Timber-Grave culture; *d* – Catacomb and Poltavka samples; *e* – post-Catacomb samples; *f* – Timber-Grave samples; *g* – Early Timber-Grave samples; *h* – range of variation of the Catacomb and Poltavka samples; *i* – range of variation of the post-Catacomb samples. See the main text for the names of the numbered samples.

morphological diversity of the Timber-Grave samples, according to the mean D^2, is significantly higher ($p = 0.03$) than that of the Catacomb and Poltavka populations. Notably, the number and size of the samples are similar between the two periods.

The hypothesis of "pendulum migrations", according to which the vectors of population movements change systematically down to the opposite (Ivanova, Nikitin, Kiosak, 2018), can potentially explain this apparent paradox. As an alternative, it may be hypothesized that

the substrate populations abandoned the tradition of kurgan burials not only in Timber-Grave times (Kolev, 2003; Lunkova, Lunkov, 2014) but also during the post-Catacomb period, which could make them "invisible" among the representatives of the kurgan cultures.

The era of the Scytho-Sarmatian cultures of the Early Iron Age became the beginning of an entirely new stage of the population history of the region, when the representatives of the steppe cultures of the Bronze Age finally dissolved among migrants of Western and Southern Siberian origin (Kazarnitsky, 2017).

Conclusion

The influence of the populations of the Sredni Stog and Khvalynsk Chalcolithic cultures (at least those represented by cranial samples) is traceable mostly in the western part of the area of the Yamnaya cultural-historical community. The groups practicing the Yamnaya burial tradition are very diverse morphologically. The range of their variation is about the scale of that among the cranial samples of modern peoples of various origins populating the vast area from Karelia to the Caucasus and from the Baltic Sea to the Urals. Only some of the Yamnaya groups—mainly Don-Volga and Lower Dnieper—became part of the population of the subsequent Middle Bronze Age. Some of the Uralian and all of the Caspian Yamnaya groups were almost not involved in the formation of the Catacomb and Poltavka cultures, which led to a decrease in the mean interpopulation distances. But the most radical change in the population of post-Catacomb cultures occurred at the turn of the Middle and Late Bronze Age, when the influence of substrate population on the groups of the later period is barely traceable. But during the Late Bronze Age, the cranial features typical of the Catacomb population appeared again in the groups of the Timber-Grave cultural-historical community.

A similar model of the formation of ancient populations we suggested previously for an earlier historical period (Kazarnitsky, 2014): in Eastern Europe, the cranial morphology typical of the Mesolithic population is not found during the Neolithic, but the features of both periods are observed in various local groups of the Early Bronze Age. This observation can explain the high level of craniometric variation among Yamnaya cultures populations.

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A Digital X-Ray Analysis of Middle Bronze Age Skeletal Samples from the Baraba Forest-Steppe

We present the results of a comparative analysis of skeletal and dental pathologies in Middle Bronze Age individuals buried at Late Krotovo and Andronovo (Fedorovka) cemeteries in southwestern Siberia. This was the period when the Andronovo steppe tradition in Northern and Central Asia expanded in various directions, including the forest-steppe. Growth arrest lines on tibiae (Harris lines) and dental pathologies (enamel hypoplasia and caries) were recorded. To evaluate developmental anomalies in the bone tissue, digital X-ray analysis was used. The principal sample includes representatives of various sex and age groups buried at the largest cemetery in the region, Tartas-1 (Baraba forest-steppe). Harris lines and enamel hypoplasia result from a broad range of factors such as infections, occasional malnutrition, traumas, vitamin deficiencies, etc. Caries is caused by a high amount of carbohydrates in the diet, accompanied by low standards of oral hygiene. These pathologies occur at different ages: Harris lines and enamel hypoplasia evidence adverse factors during infancy and adolescence, whereas caries is typical of adulthood. Late Krotovo and Andronovo groups differ in terms of occurrence and combination of pathologies. Enamel hypoplasia is less frequent in the Andronovo sample, indicating a lesser stress level in children. Harris lines are less frequent in the Late Krotovo group, suggestive of lower stress level during adolescence. These differences may be tentatively attributed to various models of subsistence and cultural adaptation.

Keywords: *Digital X-ray analysis, Harris lines, enamel hypoplasia, Tartas-1 cemetery, Andronovo (Fedorovka) culture, Late Krotovo (Cherno-Ozerye) culture.*

Introduction

Human skeletal samples are a unique biological archive of individual features of life-long trends in health and development in ancient populations. Changes in the bone surface may provide information on occupational or craft activities, as well as on trauma and diseases striking bone tissue. The internal structure of bones is also a valuable source of information about morbid conditions and the status of physiological development.

This structure is studied using various diagnostic techniques: X-ray, magnetic resonance imaging (MRI), and 3D computed tomography (CT). All these methods are non-invasive and thus are broadly applied in the study of normal and pathological conditions in mummified human remains from Egypt, China, Europe, and South America (Murphy et al., 2003; Jackowski, Bolliger, Thali, 2008; Mai et al., 2016; Licata, Pinto, 2020).

The fixation of transversal (or Harris) lines of growth arrest in the cortical layer of the long bones, mainly at the distal tibia, is a popular method of studying the health and physiological development of ancient populations. The lines can be detected only via radiation diagnostics. They have been observed on X-ray images starting from the late 19th century, predominantly in patients who suffered rickets (Hughes, Heylings, Power, 1996). A special study of the lines was carried out by H.A. Harris during the First World War. The researcher called them "tombstones" that point to the illness suffered by the individual in the past (Ibid.). The factors leading to the appearance of Harris lines—systemic disorders, nutritional and vitamin (A, C, D) deficiency, physiological and psychological stress—have been subsequently studied using various experimental and clinical methods (Park, 1964; Huss-Ashmore, 1981; Hughes, Heylings, Power, 1996). It was shown that the time of the influence of a negative factor, i.e. the period during which the individual was stressed, rather than simply its presence, was the more influential on the formation of the lines. However, a number of studies have shown that Harris lines can be present even in the absence of those adverse conditions. In such cases, these can be considered sensitive signals during normal growth (Alfonso, Thompson, Standen, 2005; Papageorgopoulou et al., 2011). The experiments on the influence of nutritional deficiency on the formation of transversal lines in rabbits have demonstrated that the frequency of their appearance was higher in the group of periodically starving animals as compared to the permanently malnourished group (Alfonso-Durruty, 2011).

From a histological point of view, Harris lines are formed during the periods when cessation of growth in the epiphysis coincides with the continuing growth of the diaphysis (dissociation of the rates of chondroplasia and osteogenesis). With time, after the traumatic or stress episode, the pace of growth of both elements eventually recovers (Follis, Park, 1952). As a result, the medullar trabeculae form condensations of increased mineral density. The formation of the lines is associated with three periods of the most intense growth of the body, i.e. the first year of life, 5–7 years, 11–12 years (girls) and 15–16 years (boys). This is a physiological reaction of bone tissue on a spectrum of negative factors (Gindhart, 1973). According to some clinical studies, Harris lines can disappear in adults and elderly people as a result of remodeling of the cortical layer (Garn, Schwager, 1967).

The link between the appearance of Harris lines and adverse developmental conditions was established clinically, thus providing a theoretical base for X-ray studies of this marker in archaeological collections. The lines have been assumed to be "indicators or 'memory' of previous growth disruption and stress in an archeological population" (Goodman, Clark, 1981: 35) and were employed for assessing the health conditions of skeletal individuals during their childhood and adolescence (McHenry, 1968; Goodman, Clark, 1981; Hughes, Heylings, Power, 1996; Buzhilova et al., 2013; Mednikova, Engovatova, Tarasova, 2015). Thus, Harris lines have been used as markers of dietary and/or physiological stress. The number and frequency of the lines in the tibia can be utilized to determine the time of their formation during growth and to model the periods of physiological stress in individuals (Hummert, Van Gerven, 1985; Byers, 1991; Ameen et al., 2005).

In a study comparing the ancient and modern populations of the same area of Switzerland (Ameen et al., 2005), Harris lines were present in individuals older than 50 years in both samples. On the basis of this observation, the authors of the study hypothesized that the lines could form later in life (not during childhood or adolescence) and be related, not to growth arrests, but to chronic diseases (degenerative changes in the cortical layer, including osteoarthritis, osteoporosis, etc.) or trauma (lower limb fractures, etc.) (Ibid.). That study only reported the fact of detection of Harris lines in adults, but not the mechanism of their formation in such cases. Later, a comparison of X-ray images of the modern people of the Republic of Korea and the Joseon dynasty skeletal collection (16th–18th centuries AD) revealed a higher prevalence of the marker in the medieval sample (Beom et al., 2014). The frequency of Harris lines was higher in females, which was related to their poorer nutrition due to lower social status (Ibid.).

Notably, the assessment of health status in ancient populations should not be based solely on tracing Harris lines (Hughes, Heylings, Power, 1996), but other stress markers as well. These include dental diseases, e.g. enamel hypoplasia (Clarke, 1982; Alfonso, Thompson, Standen, 2005), which forms as a reaction

to morbid conditions or malnutrition (El-Najjar et al., 1976; El-Najjar, De Santi, Ozebek, 1978; Goodman, Armelagos, Rose, 1980; Duray, 1996).

The skeletal stress-indicators are employed in archaeological studies of the adaptive strategies in populations with various modes of subsistence. For example, two populations from Central Europe, representing the Neolithic and Bronze Ages, were analyzed in order to detect the biological changes in the human body during the transition to agriculture (Krenz-Niedbala, 2014). The population of the Linear Pottery culture (Neolithic) was purely agricultural, while the population of the Corded Ware culture (Bronze Age) was practicing a mixed subsistence economy based on agriculture, pastoralism, hunting, and gathering. The analysis of Harris lines, enamel hypoplasia, and *cribia orbitalia* has shown a higher prevalence of the pathological markers in the agriculturalists. This can be explained by the influence of adverse social conditions (high population density and a relatively sedentary lifestyle led to the rapid spread of infections) and poor nutrition (invariability of diet, dependence on a single food source).

Thus, while there are different views on the factors in the formation of Harris lines, the polyetiology of this lesion is broadly accepted. Many researchers suggest that physiological stress suffered during childhood, a maladaptive process, is the main cause. But Harris lines have also been interpreted as a marker of dietary disturbances and subadult injuries. The presence of the lines in elderly individuals (>50 years of age) was hypothesized to be explained by recent traumatic lesions (fractures) and other pathologies of the musculoskeletal system (Ameen et al., 2005). But in our opinion, such an interpretation is poorly based at present, and comprehensible additional studies of the postcranial skeleton are required. Thus, the main aim of the present study was to describe the paleopathological markers in the skeletons of the samples representing the Late Krotovo (Cherno-Ozerye) and Andronovo (Fedorovka) archaeological cultures of the Baraba forest-steppe from the Tartas-1 cemetery in the Vengerovo District of the Novosibirsk Region. The study protocol included various pathological manifestations of physiological stress and dietary disturbances associated with changes in a subsistence economy, both at the individual and population levels.

Tartas-1 site

The site has been studied since 2003 by the Institute of Archaeology and Ethnography SB RAS, in cooperation with the German Archaeological Institute, under the leadership of V.I. Molodin from the Russian part (Fig. 1). At present, it is the largest multi-temporal burial ground in Western Siberia (about 800 burials); the majority of graves belong to the Middle Bronze Age (Molodin et al., 2020). The studied sample of human remains includes two cultural groups that formed at Tartas-1 their separate necropolises: the Late Krotovo and Andronovo (Fedorovka) groups.

The Late Krotovo (Cherno-Ozerye) culture was identified by V.I. Molodin and described by him as the latest form of existence of the autochthonous Krotovo culture, developed under the influence of

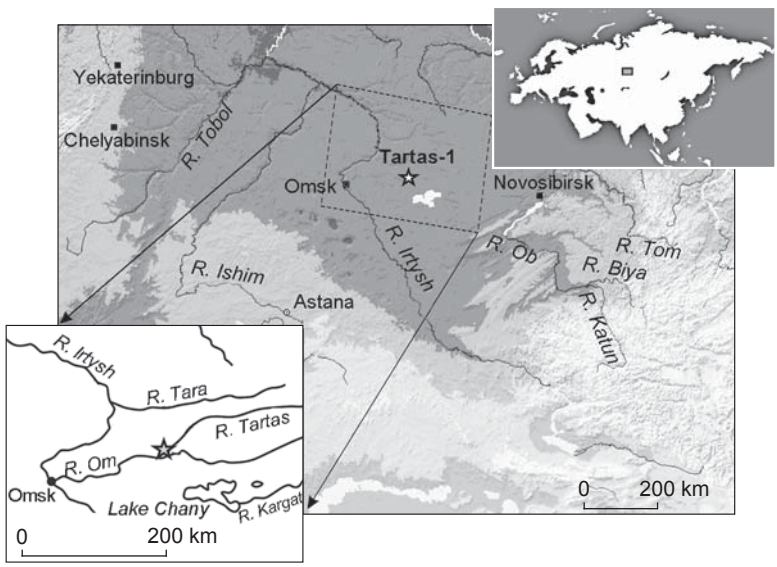

Fig. 1. Location of the Tartas-1 site.

the Andronovo steppe realm, which was reflected in the appearance of products of the Timber Grave-Andronovo affinity (bronze weapons and jewelry) (2014). In the anthropological features of the population and their ritual practice, this influence is not so vivid (Ibid.; Chikisheva, 2012: 109–110). In the spatial distribution of graves at the Tartas-1 cemetery, two clusters of the Late Krotovo burials are distinguished: northern and southern (Marchenko et al., 2021). Hypothetically, this reflects different micropopulations within the same cultural group. The Late Krotovo burial practice is characterized by shallow graves, most often individual ones. The buried were placed in an extended supine position, with their heads to the northeast. Ceramic vessels were placed in graves quite rarely. Men were usually accompanied by weapons (bronze daggers, dart-heads, bone arrowheads); women with bronze ornaments and awls. Horse phalanges and metacarpals of small ruminants have been occasionally found in burials.

The Late Krotovo people practiced a complex economy. The populations of the Baraba settlements of Vengerovo-2 and Preobrazhenka-3 were engaged in breeding small ruminants; cattle and horses to a lesser extent (Molodin, Mylnikova, Nesterova, 2017). Isotope analysis of anthropological materials showed a significant proportion of fish in the structure of human protein nutrition (Marchenko et al., 2021). The Late Krotovo burials at Tartas-1 date back to the 19th–17th centuries BC (Molodin et al., 2012).

The *Andronovo (Fedorovka) group* is the largest at the cemetery (ca 50 %) (Molodin et al., 2020: 486); it is characterized by the widespread use of ceramic vessels of the Andronovo or "syncretic" types in the ritual practice (Molodin, Mylnikova, Ivanova, 2014); the dead were placed in a flexed position on their sides (Molodin, 2011). Completely cremated remains are less common; some graves revealed cremated and non-cremated remains. The spatial distribution of the Andronovo (Fedorovka) burials is different in different parts of the cemetery: in dense rows, or sparsely, or with traces of the kurgan organization of space (Molodin et al., 2020). The following features atypical of the Andronovo tradition have been recorded: a significant percentage of communal graves, placing bronze daggers and horn dishes in graves, and the use of fish as funeral food (Ibid.). All these features together reflect the "barbarization" of the Andronovo culture in the Baraba forest-steppe and the heterogeneity of this population group at the cemetery (Ibid.). Cultures of the Andronovo affinity are traditionally considered pastoralist (Kuzmina, 1986: 32). However, in the burials of the group at Tartas-1, the use of fish in burial practice was noted in a significant number of cases, which indirectly indicates their consumption by the Baraba pastoralists (Molodin et al., 2015). The Andronovo (Fedorovka) burials of the cemetery date back to the 18th–15th centuries BC (Molodin et al., 2012).

Craniological materials from other Baraba burial grounds contemporaneous with Tartas-1 indicate that the population that left this necropolis experienced a difficult situation reflecting the "ethno-racial interaction of migrants and groups of the autochthonous population" (Chikisheva, 2012: 116, 117). The female subgroup of the Baraba forest-steppe is the most polymorphic as compared to all other Andronovo groups* (Ibid.: 116).

Material and methods

The Late Krotovo sample includes 17 individuals (9 males, 6 females, 2 sub-adults) of which 11 are the burials of the southern cluster. The Andronovo (Fedorovka) sample includes 27 individuals (16 males, 9 females, 2 sub-adults). The sexes of the deceased were determined on the basis of pelvic and cranial morphology (Alekseev, 1966: 27); the age-at-death was determined by the degree of cranial suture fusion and tooth wear (in adults), and the dental eruption status (in sub-adults) (Meindl, Lovejoy, 1985; Scott, 1979). The main age cohorts followed the standard gradations (Alekseev, Debets, 1964: 39): Infantilis I (before the eruption of the first permanent molars, ca 6–7 years); Infantilis II (before the eruption of the second permanent molars, ca 11–12 years); Juvenis (before the fusion of the spheno-occipital synchondrosis, ca 20 years); Adultus (younger than 35 years); Maturus (younger than 50–55 years); Senilis (older 55 years). The skeletal specimens were examined for the presence of Harris lines in the tibia, and some dental pathologies (caries, enamel hypoplasia).

Harris lines are transversally oriented strips observed in the growth zones of the long bones metaphyses and diaphyses. This lesion is polyetiological and can be a result of a stress episode in childhood, as well as of disturbances of endocrine and metabolic processes (Alfonso, Thompson, Standen, 2005; Shalina, Yarmolinskaya, Abashova, 2018). The

*A description of the anthropological characteristics of the Andronovo population that left burials at Tartas-1 is in preparation.

X-ray images of the tibia were obtained using the PRDU-02 device (CJSC "Eltech", St. Petersburg) at the Institute of Archaeology and Ethnography of SB RAS under the following protocol: voltage 45 kV, amperage 0.07 μA, exposition time 10 s. Visualization of the images was carried out in QuantorMed, ver. 2.0, using the FireCR scanner. Both tibiae of the individuals were examined at the distal and proximal ends, without magnification. The observed Harris lines were not counted, only their presence or absence and severity (weak, medium, strong) were assessed. The results of the assessment were additionally checked by a practicing radiologist.

Caries is a lesion of hard dental tissue (enamel, dentine, cement). The main cause of caries is the infectious cariogenic microflora (Borovsky et al., 2001: 190; Newbrun, 1982). The conditions stimulating the development of caries lesions are various. The main of these is the frequent consumption of food rich in carbohydrates, in particular fast (e.g. sucrose) (Newbrun, 1982; Larsen, Shavit, Griffin, 1991), and a low level of oral hygiene. An increasing layer of dental calculus stimulates the reproduction of bacteria and the decrease in the strength of the tooth enamel. Other factors favoring the development of caries are hypomineralization of enamel, decrease in the antimicrobial functions of saliva, general immunodeficiency of the body (Newbrun, 1982), diseases of the gastrointestinal tract, and, in general, serious metabolic disorders (Borovsky et al., 2001: 210–211; Kanchan et al., 2015).

Enamel hypoplasia is a deficit of the enamel layer due to a decreased activity of ameloblasts during the secretory phase of enamel formation (Skinner, Goodman, 1992). The pathology develops under the influence of various diseases during the formation of permanent teeth enamel (El-Najjar, De Santi, Ozebek, 1978; Borovsky et al., 2001: 134; Groshikov, 1985: 38). The main reasons for these morbid conditions are nutritional imbalance, deficiency of vitamins A, C, D, infections and hypocalcemia causing severe diseases (El-Najjar, De Santi, Ozebek, 1978; Borovsky et al., 2001: 82).

All the pathological dental and skeletal conditions analyzed in the present study do not appear simultaneously under the influence of a single factor, since the time of the formation of each of the markers is different. Enamel hypoplasia of permanent teeth develops at the age of 7–8 years, during the period of amelogenesis of the permanent incisors, canines, premolars, first and second molars. The most active growth of the long bones and, accordingly, the highest probability of the appearance of Harris lines fall on the first year of life and 9–12 years of age (Alfonso, Thompson, Standen, 2005). Unlike these, carious lesions can form at any age. Therefore, the pathological indicators employed in the present study can be viewed as a proxy for the individual biological adaptation to the changes in occupational activity or environment throughout life. The prevalence of these indicators in different cultural groups can help, in turn, to determine features varying at the population level.

Results and discussion

Harris lines in the tibia of the Late Krotovo sample were detected in 5 cases (29 %), in the metaphyseal area of the proximal and distal ends of the bones, which points to their formation mainly during late childhood. The number of the lines varies from one to three, severity is weak.

The dental pathologies of the Late Krotovo sample from Tartas-1 were thoroughly analyzed previously (Kishkurno, 2019). The sample employed in the present study displays a very high prevalence of caries (75 %). The lesions were mainly located on the occlusal surface of the upper and lower molars, less frequently on the buccal surface, and only in single cases on the distal and lingual surfaces (Table 1). Carious cavities were absent in five individuals: two from the southern cluster (55–60-year-old female and a 9 ± 2-year-old sub-adult), and three from the northern cluster (30–40-year-old males, Adultus–Maturus). The prevalence of enamel hypoplasia in the Late Krotovo sample is very high (94 %). Linear type dominated in the anterior teeth, but single lesions were detected in the molars. Point type is much less common and only found on the canines.

In five individuals, enamel hypoplasia and Harris lines were observed simultaneously (Table 2): three of these cases were males (from 20 to 45 years of age), one female (20–25 years), and one adolescent (12 ± 2.5 years). In all five individuals, carious lesions, mainly on the occlusal and buccal surfaces, were present as well. Much more often, hypoplasia and Harris lines were not observed in the same individuals (65 %), but in only one case were both markers absent (male, Adultus–Maturus). Harris lines were detected only in the skeletons from the southern planigraphic cluster (see Table 1), while enamel hypoplasia was equally frequent in both parts of the necropolis.

In the Andronovo (Fedorovka) sample, Harris lines were detected in 14 cases (52 %), up to 3–4 in one individual. The lines were weakly developed

Table 1. **Individual distribution of the frequency of the pathological markers in the Late Krotovo sample**

Burial/ skeleton No.	Sex	Age, years	Caries				Enamel hypoplasia		Harris lines
			Surface						
			occlusal	buccal	distal	lingual	linear	point	
Southern cluster									
8	Fem.	30–35	+UM1	+LM1, LM2	0	0	+UI1, UI2, UC, LI1, LI2, LC	+LC	0
11	Male	20–25	+LM1	+LM1, LM2	0	0	+UC, LI2	0	+
19	Fem.	20–25	+M1, M2	0	0	0	+I1, I2, C	0	0
20	"	20–25	+UM2	0	0	0	+UM1	0	+
25	Male	25–30	+LM1, LM3	+LM1, LM2, LM3	+LM1	+UM3	+UI1, UC, LC	0	+
29	–	9 (± 2)	0	0	0	0	+UI1, UC	0	0
36/1	Male	25–30	+UM2, UM3, LM3	+LM2	0	0	+UC, UP1, LI2, LC	0	0
36/2	Fem.	55–60	0	0	0	0	+UI1, UC, UM1, LI1, LI2, LC, LM1	0	0
39	Male	40–45	+LM3	0	0	0	LC	0	+
78	–	12 (± 2.5)	+UP2, M2	0	0	0	0	+UC, LC	+
94	Fem.	20–25	+UM1	0	0	0	+UM2	+LC	0
Northern cluster									
251	Male	Maturus	+LM3	+LM2	0	0	+LC	0	0
315	"	20–25	+UM1	0	0	0	0	+LC	0
318/2	"	35–40	0	0	0	0	+UI2, UC	0	0
325/1	"	30–35	0	0	0	0	+LI1, LC	0	0
325/2	"	Adultus–Maturus	+LM1	0	0	0	0	0	0
374/2	Fem.	Adultus–Maturus	+LM3	0	0	0	+LC	0	0

Table 2. **Summary data on the three pathological markers**

Cultural group	Caries	Enamel hypoplasia	Harris lines (HL)	HL and hypoplasia	Hypoplasia without HL	HL without hypoplasia	Individuals without HL and hypoplasia
Late Krotovo (*n* = 17)	13 (76 %)	16 (94 %)	5 (29 %)	5 (29 %)	11 (65 %)	0	1 (6 %)
Andronovo (Fedorovka) (*n* = 27)	19 (70 %)	16 (59 %)	14 (52 %)	8 (30 %)	8 (30 %)	6 (22 %)	5 (19 %)

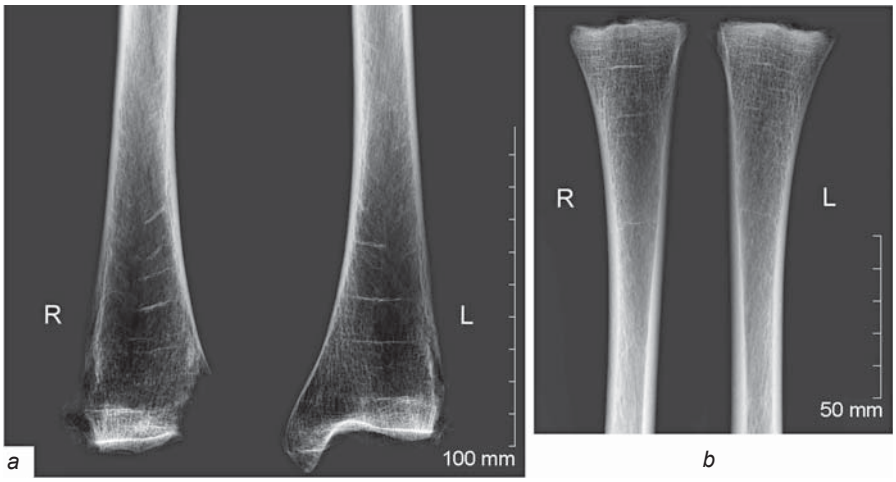

Fig. 2. X-ray images of the tibiae with Harris lines (orthogonal projection).
a – distal parts (burial 324); *b* – proximal parts (burial 287).

and typically observed in the metaphyseal area of the distal end of the bone (Fig. 2, *a*). Single cases of lines of medium or strong severity were also found in both metaphysis and diaphysis of both proximal and distal ends of the bone (Fig. 2, *b*).

The frequency of caries in the Andronovo (Fedorovka) sample is high (71 %). The cavities are typically located on the occlusal tooth surface, rarely on the buccal side, and only in single cases on the lingual and disto-vestibular surfaces (Table 3). Enamel hypoplasia was detected in 16 individuals (59 %). Unlike the Late Krotovo sample, this marker occurs on the incisors and canines only. The lineal type is prevalent, while the point type was found in just three individuals.

Eight cases (30 %) of the combination of hypoplasia and Harris lines (see Table 2) were observed: in three males (from 35 to 55 years of age), four females (from 20–25 years of age to Senilis), and one sub-adult (10 ± 2.5 years of age). The prevalence of individuals displaying hypoplasia without the lines was slightly higher (30 %) than the prevalence of those with an opposite combination (22 %). In five skeletons, both markers were absent (19 %): three males from 20 to 35 years of age, female (Juvenis), and a sub-adult (10 ± 2 years of age).

Stable isotope studies have shown that the protein part of the diet of the Late Krotovo population, as well as that of the preceding Odino culture groups, was still acquired by the consumption of fish and the meat of forest-steppe mammals. No substantial increase in the proportion of vegetable proteins was detected (Marchenko et al., 2016, 2021). The present study has demonstrated some differences in the distribution of pathological markers between the Late Krotovo and Andronovo (Fedorovka) samples (see Table 2). In the latter, the prevalence of caries is slightly lower (70 vs. 76 %), and of hypoplasia substantially lower (59 vs. 94 %). This can be attributed to the influence of various factors, but we preliminarily suggest that this observation points towards better dental health in the Andronovo population. In our previous work (Kishkurno, 2019) we hypothesized that the environmental conditions of the Late Krotovo population were extreme owing to some economical or ecological changes, which led to an increase in the proportion of plants in their diet. The high prevalence of enamel hypoplasia in this sample suggests physiological stress or severe illness suffered during childhood. Some researchers point to the link between early weaning and this marker in traditional societies (Masterson, Sabbah, 2015). The same could apply to the development of caries as well.

Notably, the frequency of Harris lines in the tibia manifests an opposite trend, being much higher in the Andronovo (Fedorovka) sample: 52 vs. 29 %. In the Late Krotovo individuals, this marker is always accompanied by enamel hypoplasia (Table 2), while in the Andronovo sample it is found both with (30 %) and without (22 %) hypoplasia. No clear association of the pathological markers with sex or age was detected in either population.

Conclusions

The results of the present study led us to the following, mainly preliminary, conclusions. A high prevalence

Table 3. **Individual distribution of the frequency of the pathological markers in the Andronovo (Fedorovka) sample**

Burial/ skeleton No.	Sex	Age, years	Caries				Enamel hypoplasia		Harris lines
			Surface						
			occlusal	buccal	distal	lingual	linear	point	
182/1	Male	45–55	+LM3	0	0	0	0	+UI1, LC	+
188	"	25–30	+UM1, UM2, LM2, LM3	0	0	0	0	0	+
196	"	25–30	+UP2, UM2, UM3, LP2, LM2, LM3	+LM1	0	0	0	0	+
263	–	10 (± 2)	0	0	0	0	0	0	0
281	Male (?)	16–18	0	0	+UM2	0	+UC	0	0
287	Fem.	15 (± 3)	0	0	0	0	0	+UI2	+
299	"	35–40	+UM1, UM2, UM3, LM1, LM2, LM3	0	0	0	0	+UC	0
302	Male	20–25	0	+LM2	0	0	+UI1, UI2, UC, UP2	0	0
307	"	16–18	0	0	0	0	0	0	+
311	"	35–40	+LM3	0	0	0	+UI1, UI2, UC	0	0
312	Fem.	20–25	0	+LM2	0	0	+UC, LC, LP1	0	+
314	"	20–25	+UP2, UM1, UM2, UM3, LM1, LM2	0	0	+UM1	+LC	0	0
324	"	Senilis	0	0	0	0	+LI2	0	+
338	"	25–30	+LM1	0	0	0	+ LI1,LI2, LC	0	0
343	"	18–20	+UM3	0	0	0	0	0	+
401	–	10 (± 2.5)	0	0	0	0	+LI2, LC, LP1	0	+
455	Male	Senilis	0	0	0	0	+LC	0	0
470	"	30–35	+LM3	0	0	0	+UI1, UI2, LI1, LI2	0	0
480	"	20–25	+LM2, LM3	0	0	0	0	0	0
522	"	25–35	+LM1	+LM1	0	0	0	0	0
525	Fem.	20–25	+UM1, UM2, LM1, LM2	0	0	0	+UI2, UC, LI1, LI2, LC	0	+
547/1	Male	20–25	0	0	0	0	0	0	+
547/2	Fem. (?)	Juvenis	0	0	0	0	0	0	0
548/1	Male	20–25	+UM1, UM2	0	0	0	0	0	0
586	"	45–50	+UM1, UM2, LM1	0	0	0	+LC	0	+
613	"	35–40	+UM1, LM2, LM3	+LM1	0	0	+LC	0	+
636	"	17–20	+LM2	0	0	0	0	0	+

of the studied stress markers was observed in the samples representing the Late Krotovo and Andronovo (Fedorovka) populations, the groups of different subsistence strategies. But a comparison between the samples has shown that dental health was worse in the Late Krotovo population, while Harris lines were more frequent in the tibiae of the Andronovo skeletons. Thus, different strategies of adaptation to the environment can be hypothesized for these different cultural groups. In general, the Andronovo population looks to some extent more adapted than the Late Krotovo group.

But for driving more solid conclusions regarding the prevalence and etiology of pathological manifestations in ancient skeletal samples, two methodological advances seem necessary. First, a larger number of markers should be studied employing state-of-the-art medical and anthropological techniques. Second, larger samples are required for a more thorough and detailed description of the intragroup paleopathological status.

The further development of the present project will be based on the complex use of radiological and osteoscopic methods for the study of the postcranial skeleton. This will help to clarify the conclusions drawn and expand the source-base for comparative interpopulation analysis.

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Cranial Traumas in a Sample from the Pucará de Tilcara Fortress (Jujuy Province, Argentina)

We analyze injuries in the cranial sample from the Pucará de Tilcara fortress, dating to the time of the Inca conquest. Analysis of violence markers, carried out by visual examination and computed tomography, and the comparison of results with those relating to samples from the Regional Development Period of the Quebrada de Humahuaca valley, suggest that although the violence level remained high, its nature could have changed after the arrival of the Inca. The female sample reveals just two perimortal injuries, no trophy skulls were found, and the frequency of nasal bone fractures is higher than in earlier samples. This may indicate lower level of between-group fighting for control over resources, and higher risk of interpersonal violence. The observed pattern suggests that having arrived in the Quebrada de Humahuaca region, the Inca eased political tension by establishing control over trade routes and the distribution of arable land areas, which had previously been the main cause of local armed clashes. The influence of artificial cranial modifications on the pathological and traumatic status of individuals was also analyzed. Two types of modification were recorded in the sample—fronto-occipital tabular oblique and fronto-occipital tabular straight. None of them caused pathological changes or a decrease in the thickness of cranial bones.

Keywords: *Pucará de Tilcara, Regional Development Period, Inca period, interpersonal violence, bioarchaeology, computed tomography.*

Introduction

This article continues the series of publications of the results of the bioarchaeological study of the cranial sample from the Pucará de Tilcara fortress from the collection of the MAE RAS. The fortress is located in Northwestern Argentina, the Quebrada de Humahuaca valley (modern Jujuy Province). The results of the analytical attribution of the archaeological and anthropological collections from this site were published previously (Dmitrenko, Zubova, 2020), as well as a description of a case of surgical extraction of a lower third molar of one of the individuals (Zubova, Pikhur, Obodovsky et al.,

2020), and the data on the prevalence of chronic maxillary sinusitis in the inhabitants of the fortress (Zubova, Ananyeva, Moiseyev et al., 2020). The main aim of the present study was to analyze the prevalence and distribution of cranial trauma in the sample and their association with the socio-political situation in the region.

The Pucará de Tilcara fortress is one of the main archaeological complexes of the Quebrada de Humahuaca valley. The stratigraphic context of the site is rather complex, owing to the long history of its habitation and development. First settlements at the location of the fortress were established by the Omaguaca Indians no earlier than the 8th century AD. By the end of the 15th century, the territory of Northwestern Argentina had been colonized by the Inca, and in 1536 occupied by the Spanish conquistadors led by Diego de Almagro (Zaburlín, 2009; Greco, Otero, 2015). The functioning of the Pucará de Tilcara fortress belongs to the Regional Development Period (1000–1430 AD) and Inca colonization (Seldes, Botta, 2014; Sprovieri, 2013: 26).

This period was one of the tensest in the history of the Quebrada de Humahuaca region. It was a time of rapid social and political changes due to the complication of political structures, intensification of agriculture and trade, and change in the population dispersal model. Besides traditional conglomerates of small villages localized near sites of concentration of natural resources, fortified settlements were emerging and becoming the centers of political control and trade. Population density and the competition for resources were growing accordingly. Thus, the number of military and interpersonal conflicts was also increasing, as suggested by both written sources and analysis of traumatic lesions in the skulls from the Yakoraite, Los Amarillos, and La Huerta sites in the northern part of the valley (Seldes, Botta, 2014: 88). These settlements were densely populated during the Regional Development Period; but with the advent of the Inca, Los Amarillos was abandoned, the population density at Yakoraite decreased, and only La Huerta retained its status as one of the regional centers of the empire.

The Pucará de Tilcara fortress did not lose its significance after the conquest by the Inca led by Túpac Yupanqui. Until the Spanish invasion in 1536, the fortress was an administrative center of the Inca Empire in the region. The Inca occupied the upper ("prestigious") part of the hill where luxury workshops and some administrative buildings became concentrated. A square of typical Inca architecture was located nearby, at the northernmost boundary of Pucará de Tilcara (Zaburlín, 2009: 94–95).

Material and methods

The main sample employed in the present study is the collection of skulls sent to the Kunstkamera in 1910 by the Argentinean archaeologist J.B. Ambrosetti, who had carried out the excavation of the Pucará de Tilcara fortress in 1908–1910. The exact location of the specimens and their stratigraphic context are unknown. But owing to the study of field documentation (Zaburlín, Otero, 2014: 207) and register notes (General Catalogue of the Ethnographic Museum of Buenos Aires, notes 4100–7600) it was firmly established that all the materials—both anthropological and archaeological—obtained during the 1909–1910 expeditions were from the northwestern part of the site. This part was inhabited after the Inca conquest, which is suggested by its layout and the presence of ceramics of the Inca type (Otero, 2013: 107), stone knives "tumi", various copper medical instruments, etc. in the archaeological record (Marino, Gonzales-Portillo, 2000: 947).

The sample includes 20 artificially deformed skulls: 18 adult (7 female, 11 male), one 6–8 years old subadult, and one 14–15 years old adolescent (Zubova, Ananyeva, Moiseyev et al., 2020: 146). The skulls were visually assessed for fixing ante- and perimortem lesions of the bones of the face and cranial vault. The descriptions of the lesions included the anatomical locations of the traumas with respect to the closest cranial sutures; size; and presence or absence of penetration into the cranial cavity, or signs of healing.

Computed tomography scans of all the individuals were obtained at the St. Petersburg Bekhterev Psychoneurological Research Institute, using a medical 64-channel scanner Philips Brilliance CT (PB64), under the following protocol: X-ray tube voltage 120 kV, amperage 100 μA, no filter, slice thickness 0.9 mm. Postprocessing of the images was carried out using a workstation Extended Brilliance Workspace for multiplanar (MPR) and volume (VR)

reconstructions. The localization of the detected traumas with respect to the brain structures and the pattern of possible damage to the brain tissues were described using the CT images. These data were employed to reconstruct possible clinical outcomes of the trauma for the individual.

In order to detect the influence of artificial deformation on the vulnerability of different skull regions to trauma, the thickness of the temporal, parietal, frontal, and occipital bones was measured. As the data on the variation of the skull bones' thickness for the native populations of Argentina were absent in the literature, we used various anthropologically contrasted samples from Eurasia as a reference, including: modern Nepalese (Thulung et al., 2019) and Malaysians (Mahinda, Murty, 2009), Russians of the Tula Region (Plitnichenko, Telkov, 2011), and a population from the Lower Volga region, which also practiced artificial skull deformation (Pererva, 2015). The following total ranges of variation were accepted: for the frontal bone – 3–12 mm, temporal – 2.0–6.7 mm, parietal – 4–12 mm, occipital – 4–13 mm.

Results

The influence of artificial deformation on the cranial vault's bone thickness. Two types of artificial modification are observed in the skulls from Pucará de Tilcara: fronto-occipital tabular straight and oblique, of which the latter is prevalent. In individuals with oblique deformation, the occipital part of the skull skews distally with respect to the vertical axis of the body, almost parallel to the axis of inclination of the frontal part (Fig. 1). This variant is observed in 65 % of all the cases, while straight deformation was found in eight male skulls.

A facial approximation of one of the individuals displaying oblique tabular deformation was carried out by D.V. Pozdnyakov from the Institute of Archaeology and Ethnography of the SB RAS (Zubova, Pikhur, Obodovsky et al., 2020: Fig. 1). This approximation was elaborated by I.G. Shirobokov (MAE RAS), using Artbreeder and Adobe Photoshop, to a photorealistic color portrait*. The Artbreeder neural network is a popular tool for generating portraits of various styles, and is not originally intended for making facial approximations. Even at the stage of uploading an original image, the facial traits can be slightly but unpredictably biased. During working with a portrait, the number of such errors grows substantially, which often leads to significant distortions of individual traits. Therefore, the image produced in Artbreeder was afterward modified in Adobe Photoshop in order to achieve a maximum similarity between the original and new portraits. Such similarity was assessed by the superimposition of reference landmarks.

No significant association between cranial deformation and any pathological conditions observed in the CT images was detected. Two individuals displayed digital impressions on the endocranial surface, while three others exhibited a deepening of the vascular grooves, mainly those of the diploic veins. But such changes are commonly found in many samples without an artificial cranial deformation; thus, these modifications cannot be a source of negative influence on the brain in the sample from Pucará de Tilcara.

The thickness of the calvarial bones in most skulls did not deviate from the norm: the deformation had only affected their shape. Skull No. 5148-7 was an exception, displaying a local thinning of the parietal bone by up to 1.5 mm, but this was not associated with a cranial modification. The thickness in the individuals with cranial traumas was normal.

Description of the traumatic lesions. As the sample is not large, we provide the descriptions of all the individual cases.

5148-2. Sex undetermined, juvenilis. A nasal bone fracture at the deepest point of the nasal bridge is observed. The blow was struck from the left side. Bone tissue at the location of the blow is sclerosed, while a right-side deviation of the internasal suture can be seen at the deepest point of the nasal bridge.

5148-3. Male, maturus. Signs of a completely healed fracture of the right nasal bone, without inflammation, are visible. A crushing perimortem fracture of the frontal bone was detected above the left browridge (Fig. 2). The traumatic defect is of a pentagonal shape and widens from the superciliary arch to the middle of the orbital margin. The compact layer is crushed across the whole area of the defect and broken down into

*The authors express their gratitude to I.G. Shirobokov for these data.

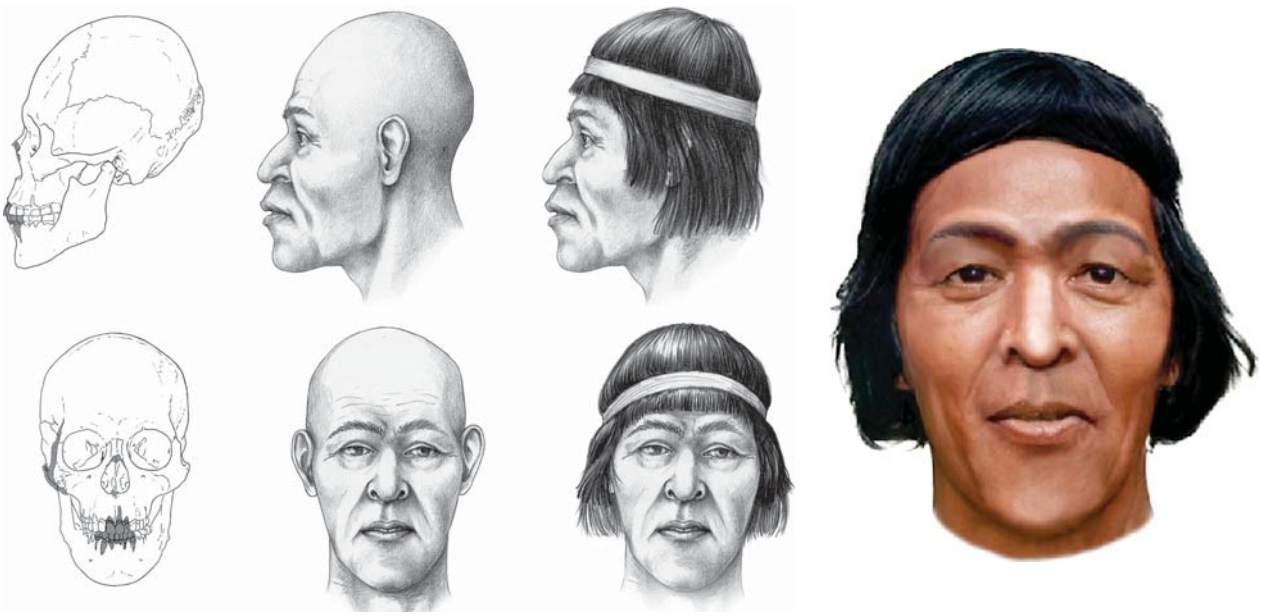

Fig. 1. Drawing of a skull with a tabular oblique deformation (No. 5148-9), and a facial approximation of the same individual.

15 fragments of an irregular shape, attached to the lower layer of the bone. The maximum length of the defect is 33 mm, width 12 mm. Five fissures radiate from the lesion. The largest pass through the browridge: one via the right superciliary arch toward the margin of the right orbit, and another crosses the left superciliary arch, terminating at the superorbital foramen.

Fig. 2. General view of the lesion of the frontal bone of skull No. 5148-3.

The blow was caused by a blunt object and likely through a headdress, since the fracture did not penetrate deep inside the bone, the radiating fissures are short, and there are no manifestations of direct contact with the tool at the surface of the bone. An accompanying lesion of the right frontal sinus—a linear defect of the right half of its posterior wall—was detected in the CT scan (Fig. 3). Signs of healing are absent, thus the individual died shortly after being injured.

Theoretically, this trauma could have had different consequences for the individual. If the brain was crushed or meningeal hematomas emerged, the injury might have been accompanied by loss of consciousness, and have ultimately led to death because of an axial interception of the brain complicated by the hematoma and impairment of its functions. If the brain was not seriously damaged, the trauma might have provoked pseudocerebellar static and coordination disorders—dizziness and difficulty concentrating. These would have made the individual less defensive, and then he could have received another trauma that led to death. This probable additional trauma could not be detected, owing to the absence of postcranial remains from Pucará de Tilcara in the collection of the MAE RAS.

Fig. 3. Computed tomography scan of skull No. 5148-3 (the area where the line of the fracture reaches the posterior wall of the right half of the frontal sinus is marked).

5148-8. Male, maturus. An oval traumatic penetration is visible in the right parietal bone, at the interface with the coronal suture, and 2 cm from the sagittal suture (Fig. 4). This trauma was caused by a weapon with a sharpened striking part. The external size of the lesion is 20 × 15 mm, internal is slightly larger. A bone-crushing and a semicircular fissure that mark the point of the initial application of force are observable on the right side of the penetration. A 1 cm long oblique fracture radiates from the left side of the perforation toward the sagittal suture. No manifestation of healing was detected, so the individual died shortly after the injury.

An extensive cleavage accompanied by the introduction of a bone fragment into the cranial cavity is visible at the endocranial surface in the left part of the lesion (Fig. 5). Depending on the depth of penetration into the cranial cavity of the weapon that caused the injury, the cause of death could have been either an interception of the brain, complicated by intracerebral and meningeal hematomas, or direct damage to vital centers of the brain stem, with respiratory and cardiac arrest.

5148-11. Female, senilis. A crushing injury 20 × 15 mm in size was detected in the right parietal tubercle. This is a healed trace of a blow caused by an item with a convex impact surface. No signs of trauma are present in the internal compact layer. Thus, the brain likely was not damaged. A blow to this area might have led to contusion of the right parietal lobe of the brain and, as a consequence, provoked symptoms of irritation, paresthesia, loss over time, partial seizures, and concussion.

5148-20. Male, adultus. A post-traumatic deformation of the right nasal bone is present. This deformation occurred long before the death of the individual. A crushing injury of an irregular shape

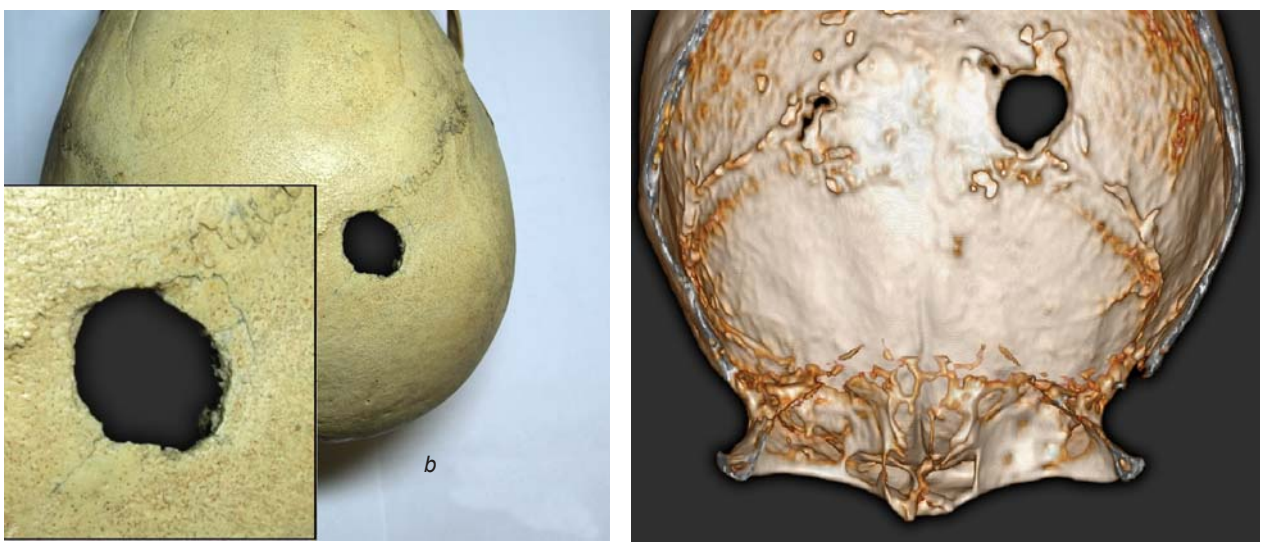

Fig. 4. General view and details of the lesion of the parietal bone of skull No. 5148-8.
a – bone lesions at the margins of the perforation; *b* – general view of the trauma from the outside; *c* – general view of the trauma on the endocranial surface.

a *b*

Fig. 5. Computed tomography scan of skull No. 5148-8.
a – lateral norm; *b* – occipital norm.

without signs of inflammation is visible in the center of the lower margin of the lesion.

Discussion

Traumatic lesions were detected in 5 out of the 20 skulls (25 %) from Pucará de Tilcara. In one case, a perimortem trauma of the cranial vault was accompanied by an earlier injury of the nose. Most of the lesions were antemortem (4 cases, 80 % of the total number of traumas), and in only two cases (40 %) were perimortem wounds that might have been the cause of death detected.

The antemortem traumas include nasal bone fractures (three cases, 50 % of the total number of traumas), and parietal bones injuries, which were struck with relatively little force, from the back, perhaps without the use of military weapons but with an object to hand. This allows the assumption of domestic conflicts with no relation to warfare. Two of the antemortem traumas were detected in male skulls, while one was observed in a female skull, and one in an adolescent individual of undetermined sex.

Both perimortem lesions were found in males older than 35 years. It is difficult to determine precisely the tools by which their traumas were caused, since some of the various types of weapons known from the archaeological complexes of the Quebrada de Humahuaca valley can leave wounds of similar shape. Stone or bone arrowheads and spearheads, stone or bronze club-heads, stone axes, balls for boleadoras or slingshots are all typical of the sites of the Omaguaca Indians (Handbook…, 1946: 627–628). The weaponry of the Inca was analogous, differing only in the variety of shapes and skill of making throwing-balls and pommels of battle-clubs (Marino, Gonzales-Portillo, 2000: 944). Stone six-pointed or round tops of war clubs (Zaburlín, Otero, 2014: 171, 200), bone arrowheads (Ibid.: 195), and stone weights for boleadoras (MAE, No. 1800-57, 58) are represented in the archaeological complex of Pucará de Tilcara.

The trauma detected in specimen No. 5148-3 definitely could not have been caused by any item leaving penetrating wounds of the head, e.g. arrows, spears, sharp-pointed maces, etc. This injury was struck by a weapon with a flat impact surface, such as bolas, boleadoras (Fig. 6), or stone axes (Fig. 7).

The traumatic perforation observed in specimen No. 5148-8 is similar to wounds caused by a pick-axe (Borodovsky et al., 2010: 41, 63), but the irregular margins of the defect and the presence of short radiating fissures suggest that the striking surface was fairly flat and rather blunt. It is highly likely that the injury was caused by a war-club with a pointed stone pommel or some similar weapon.

The comparison of the cranial collection from Pucará de Tilcara with the aggregate sample from the Quebrada de Humahuaca valley, including the skulls from the sites belonging to the Regional Development Period (Yakoraite, Los Amarillos, and La Huerta), has shown that the proportion

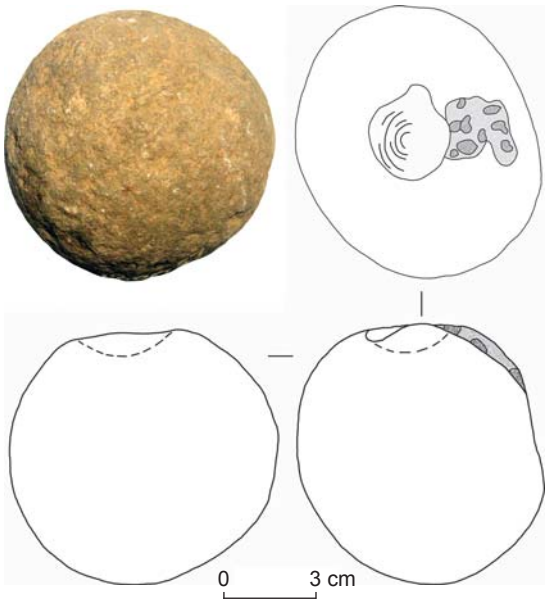

Fig. 6. Bolas stone cannonball (MAE, No. 1800-57) from the excavations of the fifth expedition of the Faculty of Philosophy and Literature at Pucará de Tilcara in 1909 (according to the General Catalogue of the Ambrosetti Ethnographic Museum).

of skulls with traumas differs little between the two samples: 25 % (including the subadult skull; subadult individuals were included in the reference samples as well) vs. 34.6 % (Table 1). The value of the χ^2 criterion is 0.74; thus, the difference is not significant.

The distribution of the lesions among parts of the skull is, nevertheless, specific in the Pucará de Tilcara collection as compared to the Regional Development Period samples (Table 2). First, the prevalence of nasal bone injuries is increased at Pucará de Tilcara: three cases (50 % of the total number of traumas) vs. one case at Yakoraite (4 %) and no cases at Los

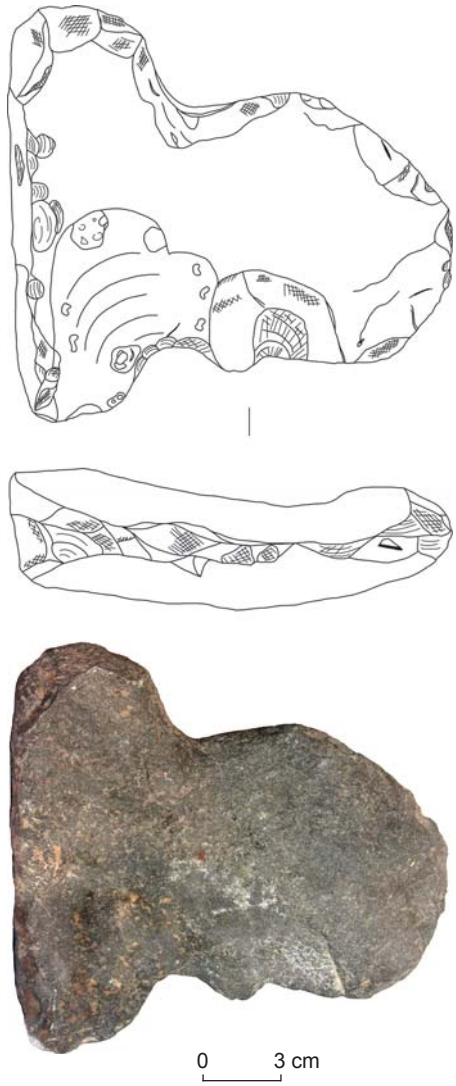

Fig. 7. Stone double-faced axe (MAE, No. 1800-55), probably fastened in the central part by clamping in a split wooden handle. From the excavations of the sixth expedition of the Faculty of Philosophy and Literature at Pucará de Tilcara in 1910 (according to the General Catalogue of the Ambrosetti Ethnographic Museum).

Table 1. **Distribution of cranial traumatic lesions in the samples from the Quebrada de Humahuaca valley**

Sample	Total number of skulls	Skulls with traumas		Skulls without traumas		Trophy skulls	
		Number	%	Number	%	Number	%
Los Amarillos*	60	13	21.7	42	70	4	6.7
La Huerta*	49	15	30.6	23	46.9	11	22.4
Yakoraite*	44	25	56.8	18	36.7	2	4.5
Aggregate*	153	53	34.6	83	54.2	17	11.1
Pucará de Tilcara	20	5	25	15	75	0	0

*Here and in Tables 2 and 3 data are according to (Seldes, Botta, 2014).

Table 2. **Distribution of various types of cranial traumas in the samples from the Quebrada de Humahuaca valley**

Type of trauma	Los Amarillos	La Huerta	Yakoraite	Aggregate	Pucará de Tilcara
Antemortem	12 (92.3)	9 (56.2)	22 (78.6)	43 (75.4)	4 (66.7)
Perimortem	1 (7.7)	7 (43.7)	6 (21.4)	14 (24.6)	2 (25)
Fractures	11 (84.6)	15 (100)	19 (70.4)	45 (81.8)	6 (100)
Cutting wounds	2 (15.4)	0	8 (29.6)	10 (18.2)	0
Traumas of the bones:					
frontal	4 (33.3)	11 (52.4)	4 (16)	19 (32.8)	1 (16.7)
parietal	7 (58.3)	5 (23.8)	13 (52)	25 (43.1)	2 (33.3)
occipital	1 (8.3)	4 (19)	3 (12)	8 (13.8)	0
maxilla	0	1 (4.75)	0	1 (1.73)	0
zygoma	0	0	1 (4.0)	1 (1.73)	0
nasal	0	0	1 (4.0)	1 (1.73)	3 (50)
temporal	0	0	3 (12)	3 (5.18)	0

Note. In parentheses, the percentage from the total number of skulls with traumas is given.

Table 3. **Sex-specific distribution of cranial traumas in the sample from Pucará de Tilcara and the aggregate sample from Los Amarillos, La Huerta, and Yakoraite**

Sample	Males		Females		Undetermined (including children and adolescents)	
	Total	With traumas	Total	With traumas	Total	With traumas
Pucará de Tilcara	11	3 (27.3)	7	1 (14.3)	2	1 (50)
Aggregate	88	28 (31.8)	43	16 (37.2)	24	9 (37.5)

Note. In parentheses, the percentage from the total number of the corresponding skulls is given.

Amarillos and La Huerta. Second, injuries to the occipital bone, which are typical of the Yakoraite, Los Amarillos, and La Huerta samples, were not found at Pucará de Tilcara.

Some differences are also observed in the number of female skulls with traumas: their percentage in the Pucará de Tilcara collection is almost 2.5 times lower than in the aggregate sample (Table 3). Though this difference is not statistically significant, this may indicate less involvement of women in armed clashes. Notably, the percentage of male skulls with traumas is roughly equal in both samples. It is also of note that trophy skulls, which are present in all the other samples, are absent in the Pucará de Tilcara collection (see Table 1).

Judging by the distribution of traumatic lesions in the studied sample and the pattern of differences with the cranial samples from the sites belonging to the Regional Development Period, it seems possible that the arrival of the Inca to Pucará de Tilcara had led to some social changes that directly affected the pattern of military and domestic traumatism in this group. The general level of violence remained high; however, in the later stages of the existence of the fortress, the number of mass military affairs involving the whole population decreased, while the prevalence of interpersonal violence, not associated with warfare, increased. This is suggested by the absence of trophy skulls in the sample, a decreased (as compared to the aggregate sample) percentage of injured female skulls, a lower number of cranial traumas in the general profile of traumatization of the population, and the prevalence of antemortem lesions of the nasal bones. Indirect evidence is also the absence of occipital bone traumas typically received when fleeing from an armed enemy.

Irrespective of the colonizing policy of the Inca, the number of combat weapons suitable

for inter-tribal warfare had not decreased in Inca's archaeological complexes as compared to Omaguaca sites (Pérez Pieroni, Becerra, 2018). The materials from the Pucará de Tilcara fortress, nevertheless, suggest a social character of the colonization related to the interest of the Incas in the extraction of mining raw materials and the production of luxury goods by local craftsmen. The advent and long-term presence of the Incas at Pucará de Tilcara led to the emergence of a new social layer of specialized craftsmen working at administrative centers and providing luxury goods to the elite (Zaburlín, 2009: 99–100). This is suggested by the architecture and archaeological complexes excavated by J.B. Ambrosetti named "House of the Jeweler" and "Copper House" ("La Casa del Joyero" and "La Casa de los Cobres") (Ibid.: 94–95). Representatives of this social group were likely emancipated from participation in mass warfare, which might have affected the pattern and prevalence of the traumatic lesions of the skulls from the fortress.

Conclusions

The results of our analysis of markers of violence in the cranial sample from the Pucará de Tilcara fortress suggest that at the late stages of its history, i.e. the time of the Incas' expansion in Argentina, the pattern of interpersonal violence in the Quebrada de Humahuaca valley has changed as compared to the previous Regional Development Period. In the Pucará de Tilcara cranial sample, only two traumas that can be considered combat-related were detected, trophy skulls are absent, and the prevalence of nasal bone fractures is increased as compared to the samples belonging to the Regional Development Period. These observations may evince a decrease in the number of mass warfare encounters aimed at establishing control over resources, and a shift toward domestic conflicts.

The observed picture can indirectly suggest that the arrival of the Incas to the Quebrada de Humahuaca region eased social tension and contributed to some stabilization of the political situation. These were achieved through establishing control over trade routes and fertile areas, which were previously the main cause of local armed conflicts (Seldes, Botta, 2014). This hypothesis requires further testing employing more numerous materials, since the skulls used in the present study do not represent a proper sample from the Pucará de Tilcara population. However, as a first approximation, anthropological data support this view.

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AN SSSR – USSR Academy of Sciences

ASGE – Archaeological Collection of the State Hermitage Museum

BAR – British Archaeological Reports

GANIIIYaL – Gorno-Altaysk Research Institute of History, Linguistics, and Literature (Gorno-Altaysk)

GIM – State Historical Museum (Moscow)

IA RAN – Institute of Archaeology, Russian Academy of Sciences (Moscow)

IAET SO RAN – Institute of Archaeology and Ethnography, Siberian Branch, Russian Academy of Sciences (Novosibirsk)

IIFF SO AN SSSR – Institute of History, Philology, and Philosophy, Siberian Branch, USSR Academy of Sciences (Novosibirsk)

IIMK RAN – Institute for the History of Material Culture, Russian Academy of Sciences (St. Petersburg)

KSIA – Brief Communications of the Institute of Archaeology, Russian Academy of Sciences

MAE RAN – Peter the Great Museum of Anthropology and Ethnography (Kunstkamera), Russian Academy of Sciences (St. Petersburg)

MIA – Materials and Investigations on Archaeology in the USSR

REM – Russian Museum of Ethnography (St. Petersburg)

RGIA – Russian State Historical Archive

SAI – Collection of Archaeological Sources

SOKM – Sakhalin Regional Museum of Local Lore (Yuzhno-Sakhalinsk)

TIE – Transactions of the Institute of Ethnography

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