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Lakhuti-IV: A New Site of the Loessic Paleolithic in Tajikistan

We present the findings of excavations at the Early Paleolithic site of Lakhuti-IV in the middle reaches of the Obi-Mazar River, Republic of Tajikistan. The geological and geomorphological situation in the area is reconstructed, and Pleistocene deposits are described. On the basis of the available chronostratigraphic constraints, we can determine time of formation of the cultural layer that is associated with deposits of the fifth buried soil (pedocomplex 5, dated to ~0.5 Ma ago). Characteristics of archaeological finds (662 artifacts) from eight cultural horizons are discussed. Primary reduction is dominated by the simplest parallel, radial, and slice cores. Among flakes, "citrus slices" and decortication chips are the most frequent. Tools include numerous flakes and retouched fragments. Single-edged side-scrapers on large flakes, denticulate-notched tools, and unifaces are abundant. The concentration of artifacts is very high for the Khovaling Loess Plateau. Lakhuti IV is the first site of the Loessic Paleolithic where artifacts occur in distinct archaeological horizons. Industries associated with pedocomplexes 6–4 in the region (Obi-Mazar-VI, Lakhuti-I, -IV, etc.) show common features, such as primary reduction techniques (slice, radial, simple parallel) and the composition of the toolkits (choppers, unifaces, single-edged side-scrapers, etc.). The findings allow us to draw more reliable parallels with contemporaneous industries of other regions. The closest similarities to industries of the Karatau culture are seen among the Soanian industries in northern Hindustan and the Early Paleolithic assemblages of southwestern China.

Keywords: *Tajikistan, Early Paleolithic, assemblage, stratigraphy, loess, soil complex.*

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Introduction

Currently, many Early Paleolithic sites are known in Eurasia. They are unevenly distributed across the continent, and differ in the degree to which they have been studied. While in Eastern Europe, Near East (Levant), Hindustan Peninsula, Southeast Asia, and in the Caucasus, Early Paleolithic sites are numerous, they are much fewer in the center of the continent—although this was where the migration routes taken by humans passed throughout the Pleistocene. On the basis of modern archaeological and paleogeographic data, several major migration corridors have been reconstructed, one of which crosses Central Asia, branching toward the Caspian, Siberia, and China. During the second half of the 20th century, in Tajikistan, which is located in the center of the region, over a dozen Paleolithic sites were discovered, including those attributable to its earliest stages. Most of the sites were found in association with loess paleosol deposits (Ranov, Schäfer, 2000).

In Central Asia, the high sensitivity of landscapes to climate changes—primarily, to humidity—resulted in formation of series of interglacial polygenetic paleosols, whose deposits are represented by corresponding pedocomplexes (PC). These were formed during warm and humid periods, while loess formation proceeded under dry and cold conditions. The probable length of one loess-soil cycle in the Pleistocene equaled ~100 ka years (Dodonov, 2002). The most complete loess-paleosol sequences (up to 200 m thick) known in Tajikistan comprise up to 40 PCs; they form the basis for the detailed stratigraphic scheme of the Pleistocene for the entire region (Ibid.; Ding et al., 2002). Those deposits correlate with the earliest archaeological records of human presence in Central Asia during the period known as the Loessic Paleolithic (Ranov, Schäfer, 2000; Ranov, 1995).

V.A. Ranov—the discoverer of loess sites in Tajikistan—used this term to describe Early and Middle Paleolithic industries bound up with watershed loesses and paleosols buried within them. Complexes of this sort were recorded in various regions—Central Asia, China, Eastern Europe, and others. According to Ranov, these complexes share several common traits: association of archaeological materials primarily with paleosols; artifact scatters, which normally do not form distinct archaeological horizons; lithic assemblages dominated by primary reduction products; scarcity of tools; and an almost complete absence of faunal remains (Ranov, Schäfer, 2000). Typical Loessic Paleolithic industries, found at some sites in Tajikistan, particularly, in the Obi-Mazar River valley, in the southeastern part of the country, on the Khovaling Loess Plateau, were discovered by Ranov in the 1970s and studied by him, with short breaks, until his death in 2006 (Lazarenko, Ranov, 1977; Ranov, Zhukov, 1982; Ranov, 1986; Ranov, 1995; Ranov, Schäfer, 2000; Ding et al., 2002; Schäfer et al., 2003; Ranov, Karimova, 2005). The studies were resumed in 2019. In 2021, a new Paleolithic site of Lakhuti IV was discovered in the Obi-Mazar River valley (Anoikin et al., 2021). The objective of this study is to introduce the first findings of interdisciplinary studies at this site, and to assess the place of its lithic industry in the general context of the Early Paleolithic of the region.

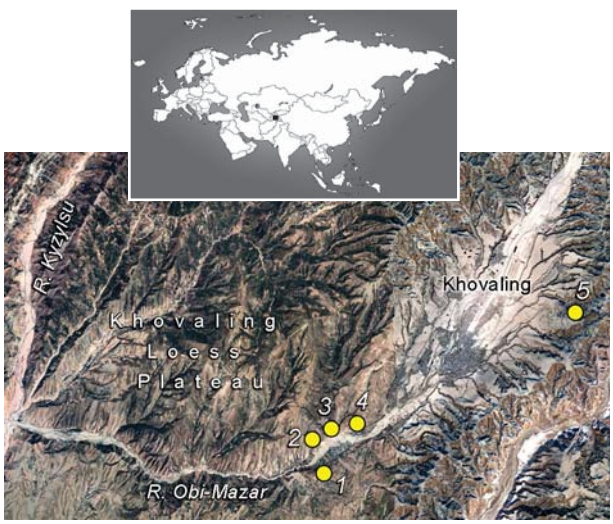

Fig. 1. Map showing location of the key Loessic Paleolithic sites in the Obi-Mazar valley.
1 – Kuldara; *2* – Obi-Mazar; *3* – Lakhuti IV; *4* – Lakhuti I; *5* – Khonako I–III.

Findings

In summer of 2021, members of the Joint Russian-Tajik Geoarchaeological Expedition carried out investigations in the middle reaches of the Obi-Mazar River, in the environs of Lakhuti village (Fig. 1). Archaeological reconnaissance was also conducted in a 1 km long exposure on the right side of the valley, where in the 1970s to 1990s Paleolithic sites of Obi-Mazar IV, Obi-Mazar VI, and Lakhuti I were discovered (Ranov, 2005; Ranov, Karimova, 2005). A large landslide that occurred there in 2016 significantly altered the landscape. Today, the central part of the exposure looks like a cirque with distinct Upper and Middle Pleistocene paleosols (Fig. 2). During reconnaissance work, P.M. Sosin found

Fig. 2. Location of Lakhuti IV, Obi-Mazar, and Lakhuti I within Obi-Mazar exposure.

an accumulation of lithic artifacts, occurring *in situ* in the wall of the exposure within PCs 5 and 6. Later on, reconnaissance excavations were conducted in the place of the highest concentration of archaeological remains within PC 5. They confirmed the presence of an Early Paleolithic site, which was named Lakhuti IV (Anoikin et al., 2021).

The site is located on the right bank of the Obi-Mazar River, at a height of ~50 m above the modern water level and at an altitude of ~1300 m above sea level. In this area, the river erodes a thick sequence of Quaternary sediments comprising ancient alluvium (30–40 m thick) overlain by loess and paleosol series. The base of the section is composed primarily of alluvial pebbles. The thickness of these sediments is maximal in the southwestern part; its surface declines towards the northeast, sinking under the modern alluvium level. The subaerial complex consists of thick loess and paleosol series (up to 70 m) including up to seven PCs.

All the archaeological remains excavated at Lakhuti IV in 2021 were found within PC 5, whose total thickness in that place does not exceed 3.8 m. A pedocomplex is normally a polygenetic body formed by several buried soils. Some of them are separated by thin loess horizons, while others are superimposed. Each paleosol corresponds to a warming/wetting phase within an interglacial. The profile of a PC comprises sediments of the initial (Boreal) stage of soil formation in its lower part (horizons LB+Bca); then follow the sediments of optimal (horizons Bt and Bm) and final (horizon BL) stages (Lomov, Sosin, Sosnovskaya, 1982).

Culture-bearing layers are overlain by sediments of the final stage of soil formation (carbonized, porous, dense loam of brownish-yellow color); their visible thickness is up to 0.8 m. The PC itself includes three distinct paleosols. The upper paleosol is lumpy-cloddy, brownish-yellow, medium loam, with carbonates in small pores, rodent burrows up to 5 cm in diameter, and concretions reaching 8 cm; the thickness is 0.5 m. The middle paleosol is lumpy-nutty, brown, heavy loam, with rare carbonate concretions up to 3 cm in size; the thickness is 1.4 m. The bottom of the PC rests on a thick carbonate crust (Sca), which had formed in the earliest paleosol by eventual decarbonization at the optimal stage of pedogenesis. It is a loess-like loam, strongly impregnated with carbonates, which adds a whitish-brown hue to the sediment; the thickness is 0.7 m. Generally speaking, the appearance of this profile corresponds to the characteristics of PC 5 described for loess-paleosol series of Tajikistan (Dodonov, 2002). According to existing geological data, the age of PC 5 in the Obi-Mazar valley is ~0.5 Ma (Ranov, Schäfer, 2000; Dodonov, 2002).

In 2021, a pilot pit (4.0 × 1.5 m), oriented along the slope, revealed the main part of the PC 5 profile down

Fig. 3. Lakhuti IV site.
1 – northwestern wall of the 2021 excavation; *2* – concentration of hammerstones in cultural horizon 6.

to the carbonate crust level. The total excavation depth was 2.5 m (Fig. 3, *1*). Owing to the abrupt slope of the exposure (~50–60º), the excavated area (6 m^2 on the pit floor) on the upper levels was much smaller. Within the final and optimal paleosols, lithic artifacts were found in subhorizontal positions, following the general extension of the sediments. They were recorded in eight provisional cultural horizons, separated by archaeologically sterile zones (Fig. 4). No differences in the lithological composition of the layer were found between culture-bearing and sterile sediments.

The archaeological collection from Lakhuti IV consists of 662 artifacts. They were found in one PC and do not differ in technical and typological characteristics, which allows us to consider them as a single industry. Because the artifacts are rather few, they can be analyzed only in toto.

Analysis of the collection has demonstrated that core-shaped pieces form a significant share of primary reduction products (18 spec., ~8 % without debitage) (see *Table*). Several planar techniques were employed: radial single-faced (7 spec.) (Fig. 5, *2*, *4*, *7*, *9*), slice akin to the last (2 spec.) (Fig. 6, *2*, *6*), and simple unidirectional parallel (4 spec.) (see Fig. 5, *1*). No preliminary preparation of cores was carried out, or it

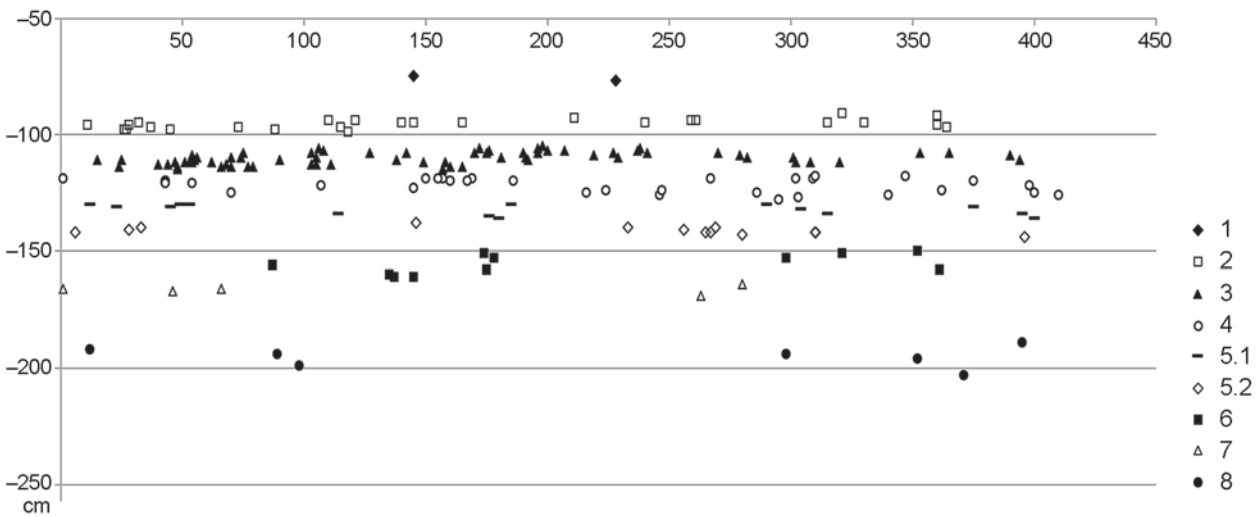

Fig. 4. Projection of artifacts at Lakhuti IV on the northwestern wall of the 2021 excavation (depth, 1.5 m). Figures accompanying conventions refer to cultural horizons.

Composition of lithic industry from Lakhuti IV

Category/group	Cultural horizon								Total	
	1	2	3	4	5	6	7	8	spec.	%
Pebbles	–	–	2	1	3	5	–	–	11	1.7
Split pebbles	–	2	3	2	1	–	1	–	9	1.4
Cores	–	1	10	2	2	1	1	1	18	2.7
Core-shaped pieces	–	–	1	2	2	–	1	–	6	0.9
Flakes:	6	55	77	42	40	8	4	15	247	37.3
cortical	–	5	5	3	2	–	–	2	17	2.6
large	–	2	3	1	–	–	–	1	7	1.1
medium	–	3	–	2	2	–	–	1	8	1.2
small	–	–	2	–	–	–	–	–	2	0.3
semi-cortical	–	5	2	1	5	1	1	1	16	2.4
large	–	2	1	–	3	–	–	1	7	1.1
medium	–	1	1	1	2	1	–	–	6	0.9
small	–	2	–	–	–	–	1	–	3	0.5
non-cortical	6	45	70	38	33	7	3	12	214	32.3
large	–	2	18	12	7	1	–	4	44	6.6
medium	2	11	34	19	10	3	3	2	84	12.7
small	4	32	18	7	16	3	–	6	86	13.0
Small flakes (≤1.5 cm)	2	24	26	18	12	4	–	1	87	13.1
Fragments	8	56	47	27	19	4	7	4	172	26.0
Chips	2	10	20	14	6	3	4	–	59	8.9
Scales	4	19	11	9	10	–	–	–	53	8.0
Total	22	167	197	117	95	25	18	21	662	100

was carried out at a minimal level, when just one or two flakes were detached. Convenient natural planes were used as striking platforms. Flaking surfaces were not prepared; core-trimming elements or rejuvenation spalls are absent. Cores on large massive flakes (2 spec.) were knapped within the framework of the same strategy. Their ventral faces were used as ready-made planes for the detachment of blanks (see Fig. 6, *5*, *7*). No traces of any preparation or rejuvenation are visible on such cores either. The collection comprises heavily exhausted cores (3 spec.).

The larger part of the debitage consists of waste (~70 %); which, apart from fragments and chips, includes small flakes (<1.5 cm in size) and scales, which can be regarded as evidence of secondary reduction of blanks at the site. Blade forms are absent. In the category of flakes, "citrus slices" of various sizes account for ~10 % (see Fig. 5, *10*); one fifth of them are "wedges". Flakes of this kind were first identified by Ranov, who described them as longitudinally fragmented "citrons", triangular in longitudinal section, and considered them as typical products of the slice technique. Among flakes, decortication chips reflecting the initial stage of core reduction amount to ~5 %; however, ~75 % of flakes retain cortex to some degree. Medium and small flakes form roughly equal percentages; large flakes are somewhat less numerous. Most striking platforms are natural (76 %); plain platforms are rare. The assemblage contains hammerstones (8 spec.) fashioned on elongated pebbles, varying in size and weight and showing traces of microflaking on one or two ends.

The toolkit (~8 % of the assemblage, without debitage and hammerstones), along with retouched fragments (5 spec.), comprises single-edged side-scrapers on large flakes (4 spec.) (see Fig. 5, *8*; 6, *1*), denticulate-notched (5 spec.) (see Fig. 5, *3*, *6*), and unifaces (4 spec.) (see Fig. 5, *5*; 6, *3*), occurring in roughly equal proportions. Some parallel cores can be

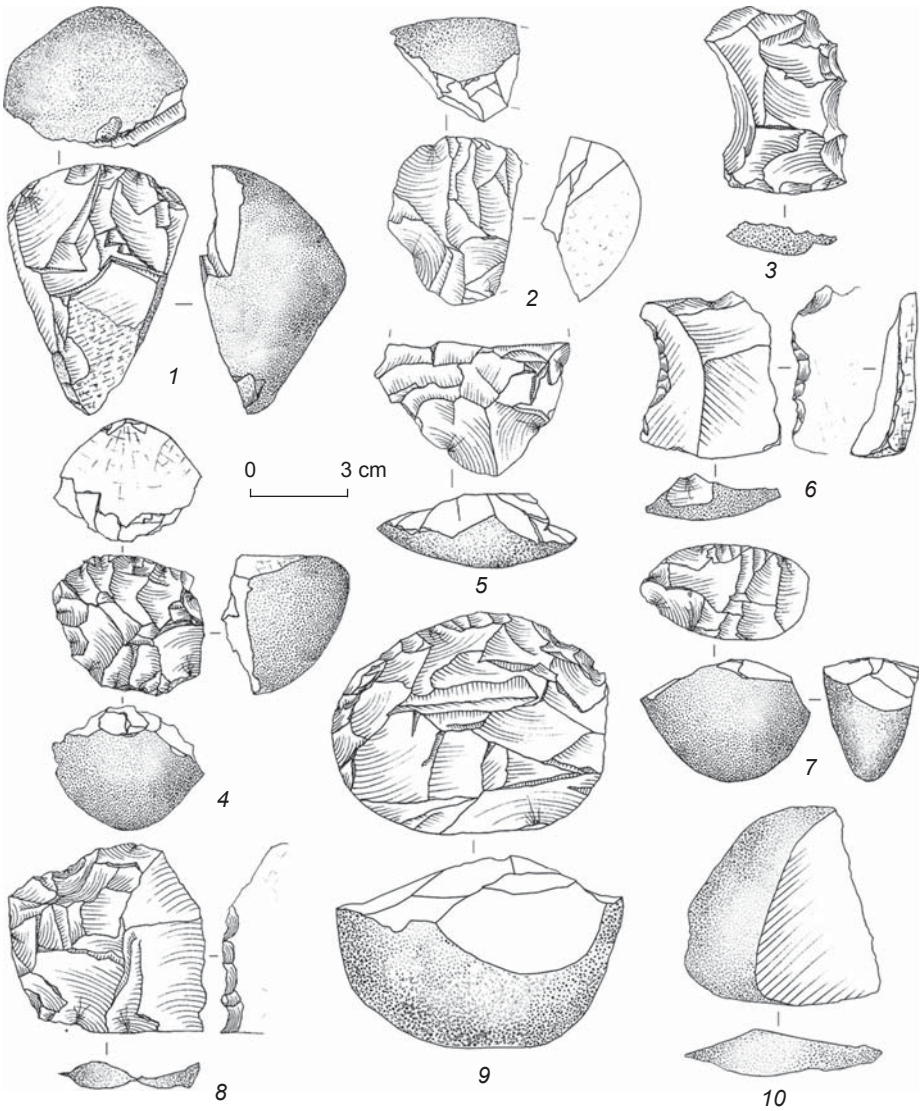

Fig. 5. Lithic artifacts from cultural horizons 2 (*2*, *10*) and 3 (*1*, *3–9*) of Lakhuti IV. *Drawings by T.U. Khudjageldiev*.
1, *2*, *4*, *7*, *9* – cores; *3* – denticulate tool; *5* – fragment of uniface; *6* – notched tool; *8* – side-scraper; *10* – "citrus slice".

interpreted as choppers, with working edges located at an angle of ~60º (see Fig. 6, *4*). The collection also contains two atypical end-scrapes and a retouched knife.

Uniфaces—small, plano-convex, rounded implements—are the most impressive type of tools. Their convex surfaces retain cortex, while the plane (or slightly convex) faces bear scars of flattening centripetal removals, varying in size, that resemble relatively thin flakes of shaping rather than traces of the detachment of target blanks produced by radial technique.

Thus, in terms of primary reduction and composition of toolkit, the Lakhuti IV complex conforms to the technological and typological characteristics of Early Paleolithic industries, and this conclusion is supported by the age of enclosing deposits. This lithic industry is invariable throughout its existence, falling within the period when PC 5 formed, i.e., MIS 13 (530–480 ka BP). Differences in the total number of artifacts and in the share of certain types of implements in various horizons (core-shaped pieces in horizon 2, hammerstones in horizon 6, etc.) are likely caused by various subsistence activities and their intensity, as well as by the fact that the excavation area is small.

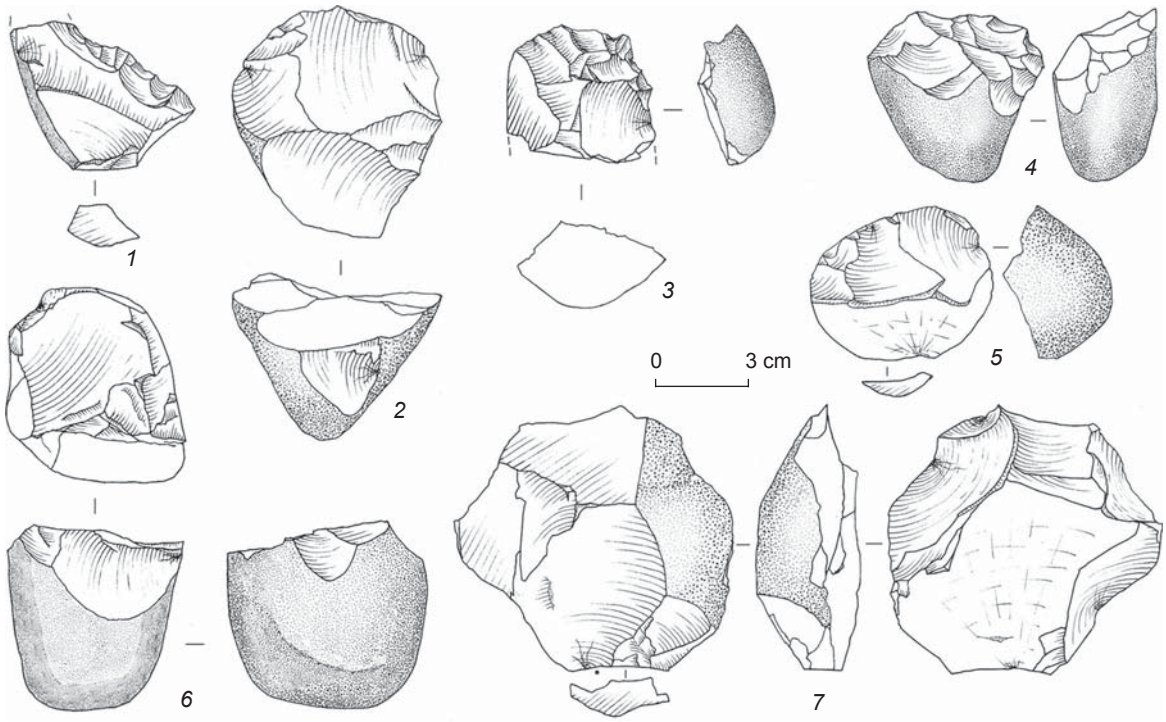

Fig. 6. Lithic artifacts from cultural horizons 4 (*1*, 9*3*, *6*), 5 (*2*), 6 (*4*), and 8 (*5*, *7*) of Lakhuti IV. *Drawings by T.U. Khudjageldiev*.
1 – side-scraper; *2*, *5–7* – cores; *3* – fragment of uniface; *4* – chopper.

Discussion

At present, aside from Lakhuti IV, six Paleolithic sites abundant in archaeological remains are known in the Obi-Mazar valley: Kuldara (PCs 12 and 11), Obi-Mazar VI (PC 6), Lakhuti I (PC 5), Obi-Mazar IV (PC 4), Khonako III (PCs 2 and 4), and Dusti (PC 1). The total excavated area exceeds ~400 m^2, and the accumulated collection of artifacts is relatively small, ~5000 specimens (Ranov, Schäfer, 2000). On the basis of data obtained by paleomagnetic analysis of sediments and correlation of pedocomplexes with the oxygen isotope scale, the ages of the sites were estimated: PCs 12 and 11 – ~0.9 Ma; PCs 6–4 – ~0.6–0.4 Ma; PCs 2 and 1 – ~0.2–0.1 Ma (Ibid.; Ranov, Karimova, 2005).

Technocomplexes from Obi-Mazar IV and VI, Lakhuti I, and Khonako III (PC 4) are chronologically closest to the Lakhuti IV assemblage.

The industry from Obi-Mazar VI, with an age of ~0.6 Ma, is the earliest among the mentioned sites. The excavated area there totals 115 m^2, the number of finds is 148 specimens (Ranov, Schäfer, 2000; Khudjageldiev, 2007). Manuports and flaked pebbles form a fairly high percentage (~15 %). Cores are few (~3 %). Two of them are of the slice variety; three cores are irregular parallel, with multiple striking faces. The cores are unprepared. Debitage comprises a large portion of waste (~30 %): fragments, small flakes, and chips. Some flakes are elongated. Most flakes are large. Striking platforms are normally plain; natural platforms are less common. Cortical flakes are numerous (>40 %); "citrus slices" and "wedges" are present. The toolkit is dominated by side-scrapers made on pebbles or large flakes, deliberately fashioned by removals of fine flakes. The assemblage contains several choppers, as well as isolated notched implements and atypical end-scrapers (Khudjageldiev, 2007).

The assemblage at Lakhuti I is associated with PC 5, i.e. its age is ~0.5 Ma. The excavated area totals 100 m^2; 1047 artifacts were discovered (Ranov, Schäfer, 2000; Schäfer et al., 2003). Manuports form a high percentage (~25 %), some of these were probably used as hammerstones. The group of cores (~2 %) is dominated by simple parallel forms (irregular, with one flaking surface); however, there appeared rare artifacts with prepared platforms and conjugate flaking surfaces. The assemblage comprises slice cores. Few cores display the radial system of flaking.

Waste products are numerous in the debitage. Most flakes are 3–5 cm in size. Several items resemble blades in terms of proportions. Striking platforms are mostly plain; natural platforms are less common; some of

them are dihedral. Cortical flakes, "citrus slices", and "wedges" are numerous. Choppers constitute one third (~11 %) of the tools. The toolkit comprises numerous side-scrapers on small pebbles or flakes, including "citrus slices", deliberately shaped by fine flaking and irregular retouching. There were found denticulate-notched implements; some pointed items, including Tayacian points; atypical end-scrapers; and knives. A few finely crafted unifaces were also identified (Ranov, 1986; Ranov, Schäfer, 2000).

The artifact collection (1341 spec.) from Obi-Mazar IV is the most numerous of all Loessic Paleolithic assemblages in Tajikistan. The total excavated area reaches 40 m^2. The artifacts were found in PC 4, whose age is ~0.4 Ma. The share of manuports in the assemblage is insignificant (~5 %). Cores (~3 %) are small, most of them measure 3–5 cm. Most cores were utilized by radial technique, with one flaking face used. There are many small parallel cores, with various numbers of faces and platforms for detaching small flakes (some of them elongated). The assemblage contains a few slice cores. Many core-shaped pieces demonstrate traces of preliminary preparation with subsequent technical trimming. Waste products constitute ~70 % of the collection. Flakes are normally small, rarely medium-sized. Many of them are fragmented. Decortication chips form ~15 %. Most striking platforms are plain; natural platforms are numerous; some platforms are dihedral. "Citrus slices" and "wedges" are few in number. There are about a dozen small blades of regular geometric shape. The category of tools (~3 %) is dominated by notched implements and atypical end-scrapers. Indistinct denticulate and pointed implements are negligible in number. Choppers are absent (Ranov, Schäfer, 2000; Ranov, 2005).

The Obi-Mazar IV assemblage is chronologically close to a small collection of artifacts (183 spec.) found in PC 4 at Khonako III. The excavated area at that site measures 33 m^2. The share of manuports there is significantly higher (~11 %) than at Obi-Mazar IV. Core-shaped pieces (~2 %) consist of typologically unidentifiable fragments and various-sized radial single-faced cores. Waste products constitute ~30 % of the assemblage. Most flakes are small; medium-sized ones are less frequent. The share of decortication chips reaches ~25 %. Most striking platforms are natural or plain, though dihedral platforms form an appreciable percentage. "Citrus slices" and "wedges" account to ~7 %. There are several small blades. Among tools (~20 %), the most representative categories are side- and end-scrapers (together with combined forms). Notched implements, choppers, and burins are slightly less numerous. Indistinct knives, as well as denticulate and pointed implements, are few in number. The assemblage contains a proto-handaxe (?) on a large flake, and a proto-limace (Ranov, Khudjageldiev, Schäfer, 2004).

Another site, which is relatively contemporaneous with Lakhuti IV, though located outside the Obi-Mazar valley, is Karatau (Yavan Region in the upper reaches of the Vakhsh River). The excavated area at the site measures ~500 m^2. Archaeological material (931 spec.) was found in PCs 5 and 6 (~0.6 Ma ago). Primary reduction was characterized by simple parallel and slice techniques. Cores were unprepared. Debitage comprises numerous waste products (~50 %), mostly fragments. The category of flakes contains numerous decortication chips, and some "citrus slices" and "wedges" (~8 %). Tools (~9 %) consist mostly of choppers; then follow atypical end-scrapers and notched implements. Side-scrapers are unstandardized, though some specimens are deliberately fashioned by stepped retouch. There are a few notched and pointed implements, and unifaces (6 spec.) (Ranov, 1988).

Ranov attributed all these industries, as well as small collections from the Kuldara and Karamaidan sites, to a single Karatau culture (Ibid.; Dodonov, Ranov, Sharapov, 1989), which, in his view, existed in the region in the Early and Middle Pleistocene, ~0.9–0.4 Ma years ago (Ranov, Schäfer, 2000; Ranov, Karimova, 2005). Its late stage, corresponding to 0.6–0.4 Ma ago, can be characterized as follows. Primary reduction was based on unidirectional parallel technique, with one or several flaking faces utilized; cores were unprepared or underwent just a minimal treatment, when one or two elements were detached. Slice technique was also employed. Younger assemblages demonstrate radial flaking. Manuports and waste products, consisting mostly of fragments, form a high percentage (up to 70 %). Most flakes are large or medium-sized; blades are few and random. Decortication chips are numerous; other technical variants are absent. "Citrus slices" are numerous, as are "wedges", apparently resulting from the fragmentation of the former (Ranov, 2005). Striking platforms are plain; natural platforms are numerous; eventually, dihedral ones appear, and their number rises over time. Tools consist primarily of choppers and various simple side-scrapers, including those fashioned on pebbles. There are plenty of notched implements and atypical end-scrapers. "Younger" assemblages comprise points, including the Tayacian variety. Flakes and fragments with irregular retouch are numerous. A specific feature is the presence of unifaces of a standard shape, with traces of secondary treatment; they are represented both by isolated pieces and by small series. The Lakhuti IV industry shows a good agreement with this context.

As compared to other industries of the Loessic Paleolithic of Tajikistan, Lakhuti IV shows a much higher concentration of artifacts—approximately 110 specimens per 1 m^2. This is thrice higher than at the most representative site, Obi-Mazar IV; at other sites, the concentration is usually ~1–6 specimens per 1 m^2. The reason behind such a high concentration of finds at Lakhuti IV is not clear, one of the possibilities being the nature of the paleorelief at the time when the site functioned.

Another feature of Lakhuti IV is the distinct distribution of artifacts between several cultural horizons. This was not reported from other sites of the Loessic Paleolithic. Such a distribution allows one to reconstruct the stages in the peopling of the area in more detail, and to trace possible changes in primary reduction and in toolkit composition over relatively short timespans within a single PC.

Notably, the absence of cultural horizons is inherent in the notion of the Loessic Paleolithic. Ranov, who had proposed this term, pointed out that industries of the Loessic Paleolithic are characterized by mostly scattered finds and their "suspended position" (Ranov, Schäfer, 2000: 20). However, at one site—Obi-Mazar IV—the scholar found a distinct cultural horizon approximately 10 cm thick, though it was recorded on a short section only (pit No. 2 of 1984) (Ranov, 2005). The thickness of a cultural layer is usually 20–25 cm; elements of a normal cultural horizon, such as any structures or concentrations of wastes, are absent (Ibid.: 17). At Lakhuti IV, several distinct cultural horizons up to 10 cm thick were traced, as well as those up to 20 cm thick, the latter possibly evidencing multiple habitation episodes separated by short time-intervals unattested by deposition. In addition to that, cultural horizon 6 contained a local concentration (0.5 × 0.5 m) of pebbles, with evidence of their use as hammerstones. It is possible that these finds represent the remains of a production area (see Fig. 3, *2*).

As compared to other sites in the region, Paleolithic industries from PCs 6–4 in the Obi Mazar valley display some specificity. Almost all Early Paleolithic assemblages in the western and northern parts of Middle Asia were collected from surface. Their cultural and chronological attribution is determined primarily by the presence of large bifacial implements (Kazakhstan and Turkmenistan) (Vishnyatsky, 1996; Derevianko, 2017). Lithics of this sort are absent in industries of Tajikistan. The few stratified Early Paleolithic sites outside Tajikistan whose age is close to that of Lakhuti IV, such as Koshkurgan and Shoktas in southern Kazakhstan, display markedly different industries (Rannepaleoliticheskiye mikroindustrialnye kompleksy…, 2000).

At the southern border of Tajikistan, in Afghanistan, reliable Early Paleolithic sites are unknown. For example, collections of handaxes, cleavers, and choppers from the Dasht-i Nawar Lake area and from the Darra-i Dadil Gorge were not considered by Ranov as Paleolithic. In his opinion, the only assemblage in the region that could be correlated with the final stages of the Early Paleolithic is represented by solitary finds, including a bifacial implement, from the Hazar Sum valley (Ranov, Karimova, 2005).

Assemblages from the Karatau culture are distinguished by industrial specifics: wide application of slice, radial, and simple parallel techniques; a great number of choppers and unifaces; absence of distinct bifacial implements; a high percentage of tools fashioned on flakes (side-scrapers and notched pieces). The closest similarities to industries of the Karatau culture are seen among the Soanian industries in northern Hindustan and the Early Paleolithic assemblages of southwestern China.

Soanian pebble and flake industries, generally attributable to the Final Middle Pleistocene, are concentrated mostly in the piedmont zone of the southern Himalayas, and associated with sediments on high terraces in the upper reaches of the Indus, Soan, Satlej, etc., that is, geomorphologically they are close to the Loessic Paleolithic assemblages of Tajikistan (Sali, 1990; Petraglia, 2010). Soanian industries are based on similar raw material—alluvial pebbles. Some parallels can also be traced in their composition (Chauhan, 2005). Primary reduction is characterized by the prevalence of discoid (radial) and unidirectional parallel cores, as well as of multiplatform (irregular) nuclei derived from the latter. Slice flaking is normally not mentioned in relation to Soanian assemblages, though, judging by schemes given in some publications, certain choppers appear to be the exhausted cores of this type (Chauhan, 2007: 417), while implements interpreted as discoid cores/side-scrapers correspond to unifaces in Early Paleolithic assemblages of Tajikistan (Chauhan, 2005). The presence of rare and inexpressive implements showing some elements of bifacial treatment does not contradict the conclusion about similarity, since isolated pieces of this sort were also encountered in the Obi-Mazar valley (Lakhuti I, Khonako III) (Ranov, Zhukov, 1982; Ranov, Khudjageldiev, Schäfer, 2004). In Soanian industries, unifacial treatment was applied primarily, while bifacial technique was used seldom and unsystematically. This feature distinguishes Soanian industries from Acheulean assemblages spread in central and southern regions of Hindustan. As some specialists believe, the differences are not only cultural, but also caused by the choice of raw material (gravel

versus detritus) (Chauhan, 2005; Petraglia, 2010). For instance, the greater number of choppers and unifaces in these assemblages could have been determined by the pebble base of the Soanian industries. The unifaces were manufactured by techniques similar to those used for making bifacial tools in Acheulean industries (Petraglia, 2010). However, the original shape of a pebble allowed flaking from only one surface, in order to produce a planoconvex or biconvex tool. In the majority view, the choice of raw material is mostly due to cultural differences (Derevianko, 2018).

A similar composition of artifact assemblages and a similar strategy of pebble utilization were registered at certain Early Paleolithic sites of southwestern China, which are contemporaneous or older. There, in the manufacture of heavy-duty tools, along with bifacial technique, unifacial working was predominantly practiced (Lei et al., 2020). The findings relating to Early Paleolithic industries of Tajikistan, then, suggest a mostly southeastern direction of ties. This conclusion, however, is tentative and further studies are required to substantiate it.

The subsequent evolution of Paleolithic industries in Tajikistan can be traced on the basis of finds from Khonako sites, also located in the Obi-Mazar valley. Abundant archaeological material from the Middle Paleolithic was recorded there in several places in association with PCs 2 and 1. It differs radically in appearance from earlier assemblages (Schäfer, Ranov, Sosin, 1998).

In collections from PC 2, primary reduction was aimed at manufacturing blade blanks, representing 45 % of the detached pieces. Unidirectional parallel flaking prevailed. Several cores can be described as proto-prismatic. The main tool classes are single-edged side-scrapers and knives on blades. There is a Mousterian point in the collection (Ranov, Schäfer, 2000; Schäfer, Ranov, Sosin, 1998). The industry from PC 1 is less numerous; though, according to researchers, it is obviously Mousterian, with a significant share of Levallois products. The industry is oriented towards the production of flakes, and generally looks more archaic than materials from PC 2 (Schäfer, Ranov, Sosin, 1998: 133).

The connection of the assemblages to preceding Early Paleolithic complexes is not obvious. In some publications, Ranov attributed artifacts of PC 2 to the final Karatau culture (Ranov, Karimova, 2005: 166), while believing it more likely that early blade industries had been introduced to the region by migrants from the Near East (Ranov, Schäfer, 2000).

Conclusions

A new stage of excavations at the loess sites in Tajikistan has demonstrated that the Obi-Mazar valley, while being comparatively well explored, is a prospective zone in the search for new Early Paleolithic sites. Findings at Lakhuti IV, discovered there in 2021, extend the knowledge of the Loessic Paleolithic in the region, and show a good agreement with the general context of the Early Paleolithic in Tajikistan. The distinctive feature of the site is a high concentration of artifacts, associated with several cultural horizons. In the course of further studies, this will hopefully help in reconstructing, in more detail, the stages of the early peopling of that part of the valley. Also, the findings are relevant to detecting types and zones of subsistence activities, and to tracing possible changes in primary reduction, and in the toolkits, over a relatively short chronological interval. As the analysis has demonstrated, lithic assemblages associated with PCs 6–4 are similar in terms of both the most common primary knapping techniques (slice, radial, and simple parallel) and the composition of toolkit (choppers, unifaces, single-edged side-scrapers, etc.). The results will help to find parallels with contemporaneous industries of other regions, primarily of northern Hindustan (Soanian) and East Asia.

Acknowledgments

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The Emergence of Levallois Blade Industry in the Western Foothills of Tien Shan: Kulbulak Layer 24

We describe finds from layer 24 of Kulbulak, Western Tien Shan, excavated in 2018–2019. On the basis of the age of layer 16 (MIS 5e) and the geological context of the deposits, the profile of the site was subdivided into paleogeographic stages. Layers 25–22 likely correlate with the warming period in the second half of MIS 7. Primary reduction in layer 24 industry was based on parallel uni- and bidirectional techniques, with wide and narrow-faced cores, and following the Levallois strategy. Tools include various side-scrapers, a point on a heavily retouched blade, a retouched blade, an atypical angular end-scraper, and blanks of bifaces. Parallels are found between those finds and contemporaneous industries of the Near East. Technologically and likely chronologically, layer 24 is intermediate between Late Amudian and Early Middle Paleolithic assemblages of the Tabun D stage. This is evidenced by a combination of non-Levallois and Levallois flaking (the latter being predominant), by different types of blanks within the same reduction sequence, by a high share of blades among blanks, by bifacial pieces, by an elongated heavily retouched point, and by an atypical end-scraper.

Keywords: *Lithic industry, primary reduction, toolkit, scar pattern analysis, Middle Paleolithic, MIS 7, Western Tien Shan.*

Introduction

The typical feature of the Stone Age studies in the latest decade is the revision of cultural and chronological attributions of several key Paleolithic complexes in the western part of Central Asia. For example, the lithic industries of Selungur Cave (south of the Fergana Valley, Kyrgyzstan) and the lowermost layers of the site of Kulbulak (western spurs of the Tien Shan, Eastern Uzbekistan) (Fig. 1) were previously considered Lower Paleolithic, while they have currently been attributed to the Selungur

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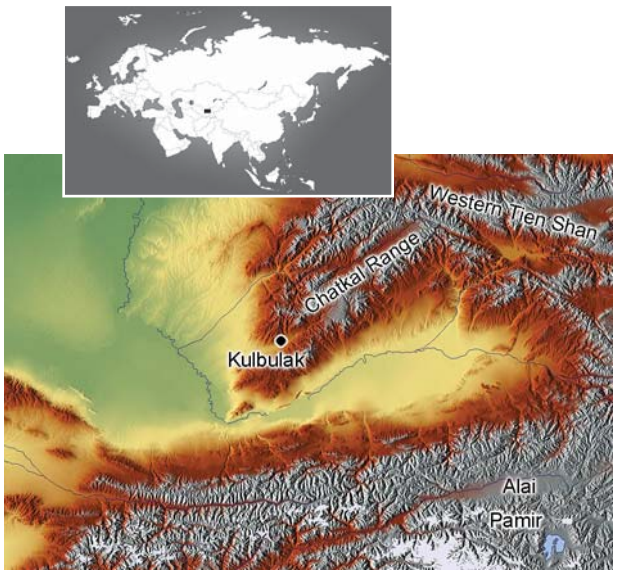

Fig.1. Map showing the location of the site of Kulbulak.

and blade Obi Rakhmat traditions of the Middle Paleolithic (Pavlenok K.K., Belousova, Rybin, 2011; Kolobova et al., 2018; Krivoshapkin et al., 2020; Vandenberghe et al., 2014). The reassessment of research concepts called for certain clarifications of the time of emergence of the first Middle Paleolithic industries in various parts of Central Asia.

Owing to the objective lack of data, we have correlated the relative age of layer 24 with the closest date to these cultural strata—the TL-date of 111 ± ± 19 ka BP (UG-7094) derived for Kulbulak layer 16 by S. Fedorovich (Department of Geomorphology and Quaternary Geology, University of Gdańsk, Poland) (Pavlenok K.K., Pavlenok G.D., Kurbanov, 2020). On the basis of the age determination for layer 16, which corresponds to MIS 5e, the analytical data on the structures of deposits and the locations of horizons, as well as data on granulometry, a stratigraphic subdivision of the latest deposits was carried out, with the identification of the main paleogeographic stages of sedimentation (Taratunina et al., 2020). In accordance with the proposed paleogeographic reconstruction, layers 25–22 can be preliminarily correlated with an evident warming stage in the second half of MIS 7. During sedimentation of layer 24, the relief in the area of the site was stabilized: a reservoir with calm lacustrine sedimentation originated, and the activity of mudflow processes sharply decreased, as recorded in the sediments of layer 25. The terminal phase of MIS 7 is marked by the activation of mudflows.

Several complementary methods have been used as the main research tools in the analysis of the archaeological collection. The attributive analysis of the collection made it possible to identify non-random combinations of technologically significant features of lithic artifacts (Pavlenok K.K., Belousova, Rybin, 2011). Statistical tests processed in the Past software (4.03) (Hammer, Harper, Ryan, 2001) were used to confirm these observations and to compare individual groups of artifacts, and scatter plots were proposed. The nonparametric Mann-Whitney test has been chosen because of the small size of samples in the studied collection. Scar pattern analysis was used to reconstruct the sequence of operations with individual artifacts (Kot, 2014; Shalagina, Kolobova, Krivoshapkin, 2019).

The present article proposes a comprehensive description of the artifacts from Kulbulak layer 24 excavated by the team of the Joint Russian-Uzbekistan Archaeological Expedition in 2018–2019.

Archaeological finds from Kulbulak layer 24

The archaeological material of the layer is subdivided into two stratigraphically different assemblages—the upper (depth of finds from –1995 to –2030 cm) and the lower one (depth of finds from –2065 to –2145 cm) (Fig. 2). The upper assemblage is small (n=8) and includes a primary core-trimming element, three flake fragments, and 4 small flakes. The lower assemblage consists of 2654 specimens. The majority of the finds are production waste (scales, chips, shatters, small flakes, and fragments of flakes); the debitage share is 86 % of the entire collection (see *Table*).

There are 22 core-shaped artifacts, including 16 typologically distinct specimens.

Single-platform unifacial cores (*n*=4) (Fig. 3) typically have plain striking platforms prepared through a single removal, with one or two target negative scars with proportions of flakes or blades.

Double-platform unifacial cores (*n*=5) (Fig. 4) have either natural striking platforms or those prepared by one or two removals. All the cores were used for detachment of elongated spalls. Flaking was usually executed from one of the platforms. Bidirectional flaking was carried out mainly to maintain the lateral curvature of the flaking surface. The scar pattern analysis suggests phased, rather than alternating, flaking from the platforms.

Narrow-faced cores (*n*=3) (Fig. 5) were used to produce small laminar spalls. The cores show a thorough preparation of the base and a clear reduction-pattern: 1) preparation of the striking platform; 2) processing of the lateral sides; 3) removal of spalls from the flaking surface. The smallest (probably, most exhausted) core of this group shows traces of alternate use of striking platforms, as well as bidirectional knapping.

The Levallois core (Fig. 6) corresponds to the *preferential radial centripetal* type (Shea, 2013) used for detachment of a single elongated spall.

The collection also includes three core blanks: single-platform unifacial cores (*n*=2) and a radial core.

Core-trimming elements total to 89 items, which is 26 % of the number of identifiable spalls (Fig. 7, *1–9*). Their morphology correlates with the described reduction strategies—longitudinal and Levallois (*preferential radial centripetal*). Marginal flakes predominate. According to the proportions

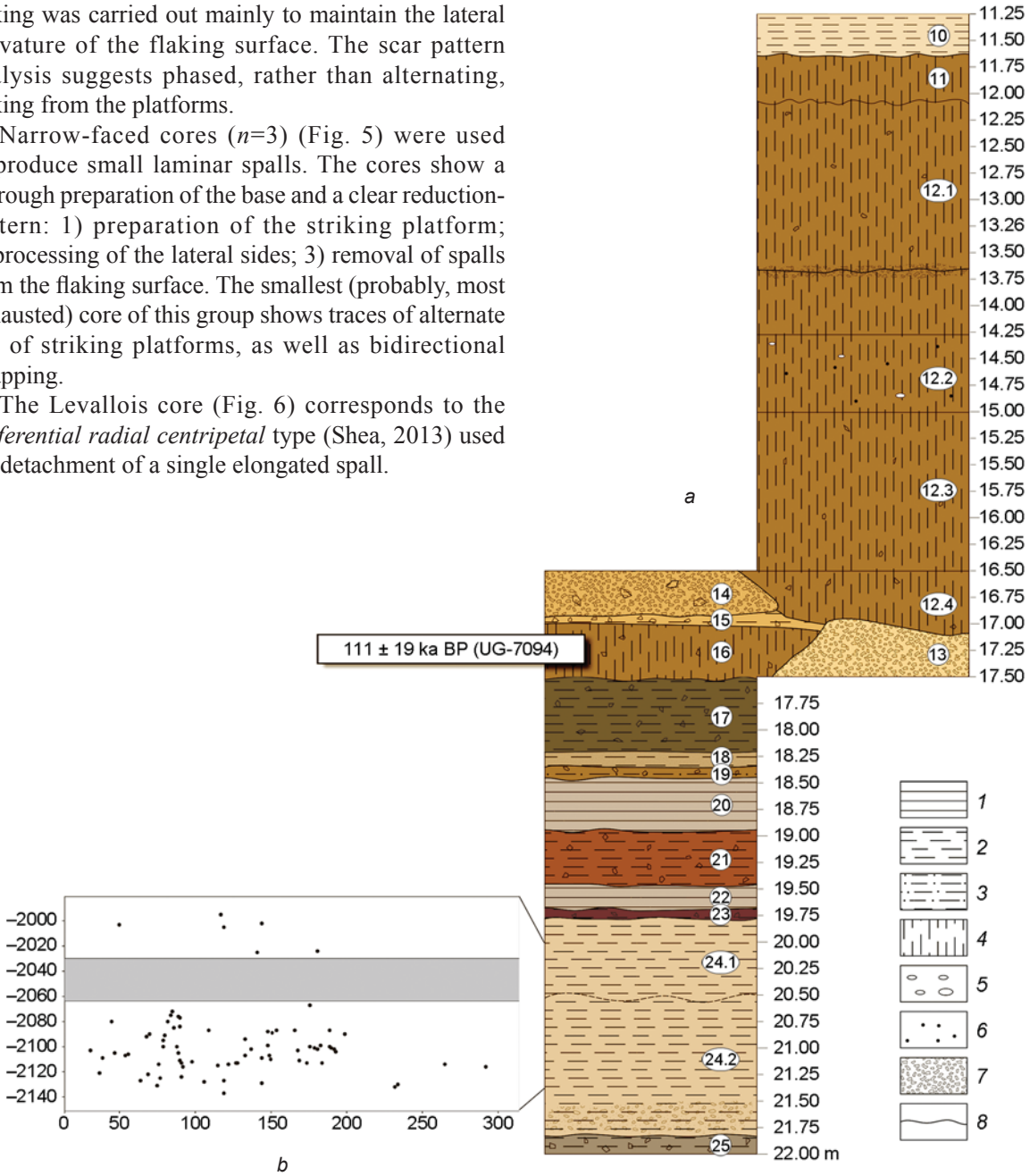

Fig. 2. Stratigraphic column of the southern wall of the excavation area (*a*) and location of artifacts within layer 24 (*b*) at Kulbulak.

1 – clay; *2* – loam; *3* – sandy loam; *4* – loessy loam; *5* – carbonate concretions; *6* – charcoal; *7* – detritus/ grus; *8* – erosion boundary.

Categories of lithic tools from Kulbulak layer 24

Categories	Spec.	%	% excluding waste
Upper assemblage			
Core-trimming elements	1	12.5	100.0
Fragments of flakes	3	37.5	–
Small flakes	4	50.0	–
Total	8	100.0	100.0
Lower assemblage			
Core-shaped artifacts:			
cores	16	0.6	4.4
core-shaped fragments	6	0.2	1.6
Spalls:			
flakes	147	5.5	40.4
blades	56	2.1	15.4
bladelets	29	1.1	8.0
points	4	0.2	1.1
Core-trimming elements	89	3.4	24.5
Tools	17	0.6	4.7
Production waste:		0.0	
scales	638	24.0	–
chips	1058	39.9	–
shatters	190	7.2	–
fragments of flakes	165	6.2	–
small flakes	239	9.0	–
Total	2654	100.0	100.0

and faceting of the "steep" side, the marginal flakes are divided into marginal cortical blades (MCB), marginal lateral blades (MLB), marginal ridge blades (MRB), marginal cortical flakes (MCFC), marginal lateral flakes (MLF), and marginal ridge flakes (MRF) (Kolobova et al., 2019).

In the industry of spalls, the following categories were distinguished: flakes (*n*=147, 43 % of the total number of spalls), blades (*n*=56, 16 %), bladelets (*n*=29, 8 %), and points (*n*=4, 1 %).

The flakes show various flaking patterns. Longitudinal and longitudinal-convergent patterns predominate; radial, orthogonal and bidirectional patterns are also rather numerous (scars of bidirectional removals are rarely shorter than 1/3 of the total length of the artifact). Longitudinal and longitudinal-convergent flaking patterns are most typical for blades and bladelets. The noticeable proportion of blades is orthogonal; products with bidirectional flaking scars are few.

In the category of flakes, the ratio of the artifacts with straight and non-straight side view (twisted

Fig. 3. Single-platform unifacial core from Kulbulak layer 24.

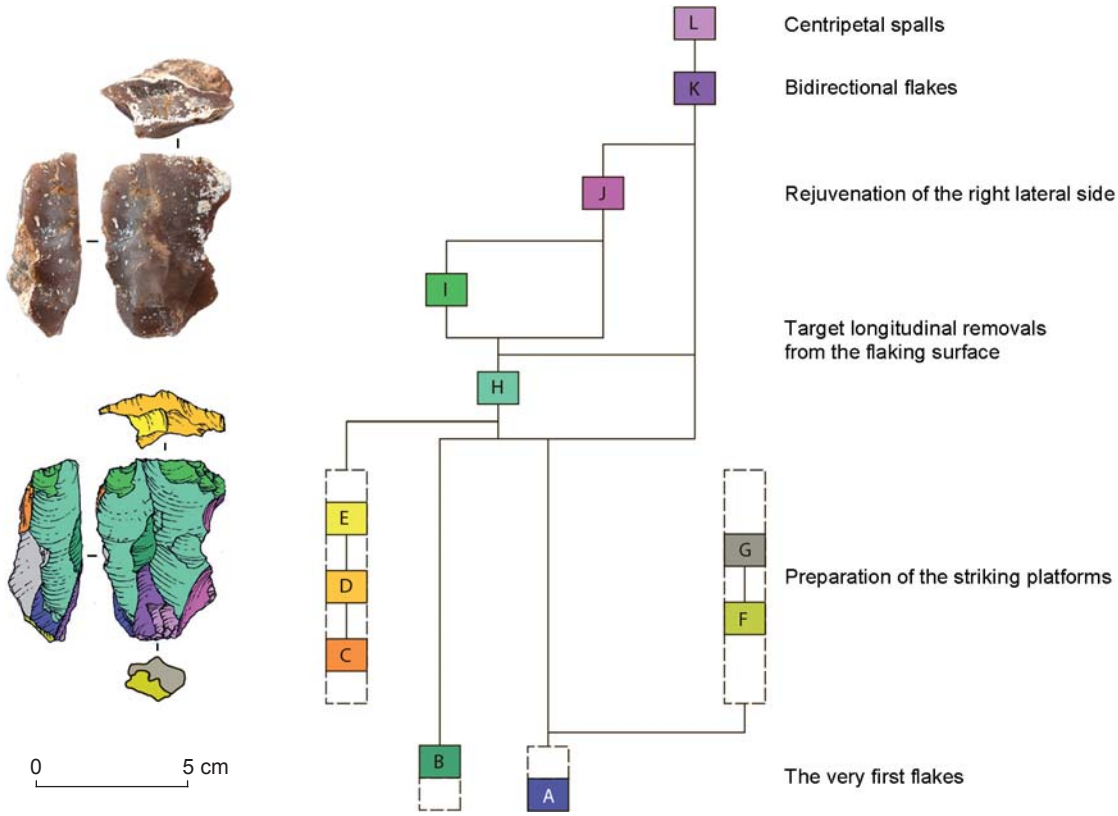

Fig. 4. Double-platform unifacial core from Kulbulak layer 24.

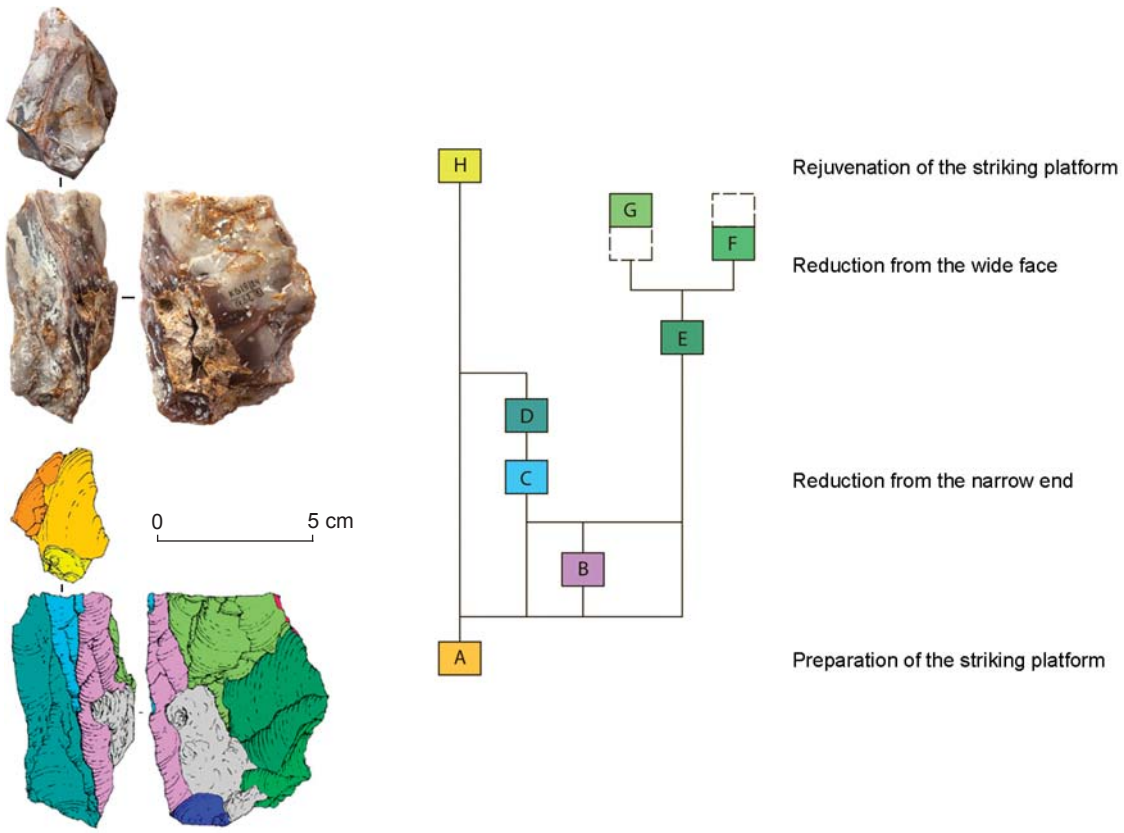

Fig. 5. Narrow-faced core from Kulbulak layer 24.

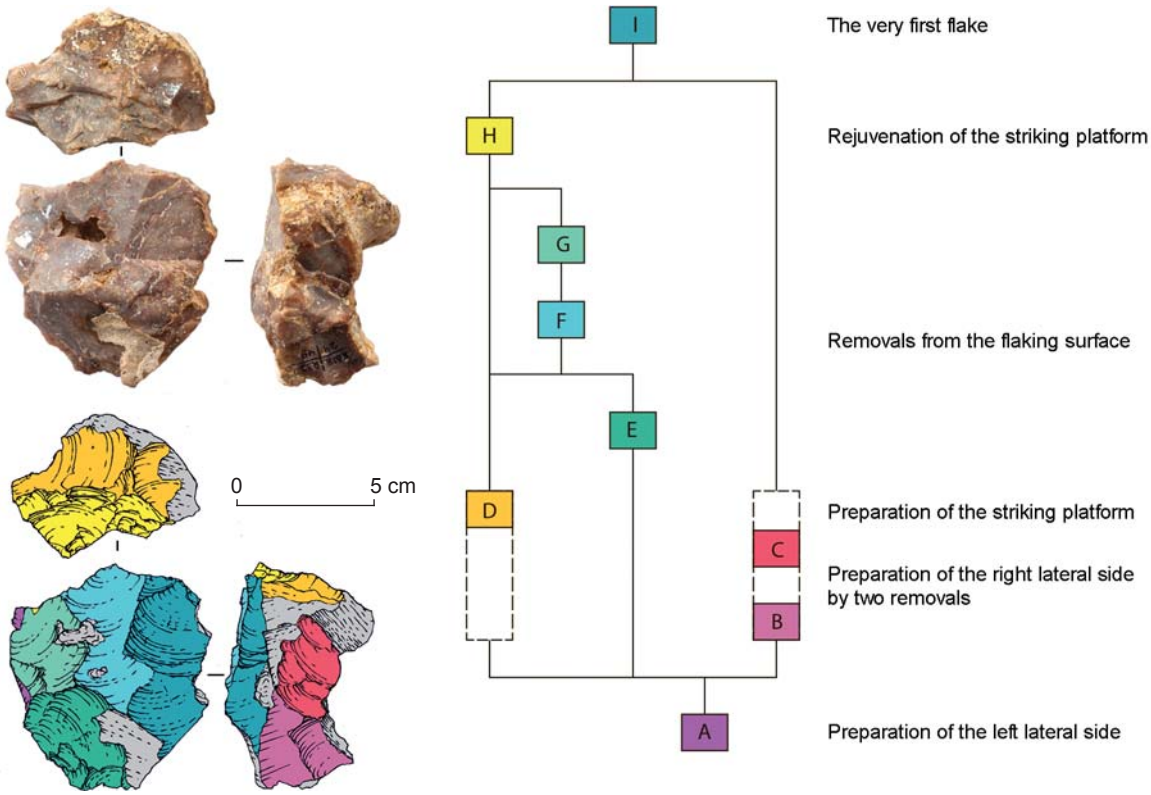

Fig. 6. Levallois core from Kulbulak layer 24.

and curved) is approximately 1 : 2; that in the group of blades is 1 : 3. In the category of bladelets, the compared indicators are almost equal.

Plain striking platforms are the most common in the industry: these have been recorded on 60 % of flakes and 45 % of blades. Dihedral platforms have been identified on 1/3 of the products. Polyhedral platforms are present on 10 % of the flakes and 23 % of the blades. Approximately 10 % of the flakes and 20 % of the blades were subjected to lateral-transverse preparation of the striking platform. Almost all the bladelets show plain platforms.

Notably, the collection contains flakes with the Levallois features: with centripetal, orthogonal and transverse, as well as convergent and longitudinal-convergent flaking patterns and convex di- and polyhedral platforms (Fig. 7, *10*, *11*).

The distribution of laminar spalls by width showed that the blades and bladelets were produced following the same chaîne opératoire, with the majority of removals 9 to 28 mm wide (Fig. 8).

Solitary points (*n*=4) include varieties of regular longitudinal-convergent flaking pattern, with a characteristic Y-shaped negative scar; but with the percussion point shifted to one of the edges. The blanks are usually straight and have thoroughly prepared slightly convex striking platforms.

Tools were fashioned mainly on flakes (*n*=11) or core-trimming elements with the proportions of flakes (*n*=2); blades and core-trimming elements with the proportions of blades were used less often (*n*=2 each). The toolkit (*n*=17) includes single side-scrapers (*n*=5); side-scraper fragments (*n*=3); a double longitudinal-transverse side-scraper; a point on a blade retouched on both edges, a blade retouched on two longitudinal edges, an atypical angular end-scraper on a blade (see Fig. 7, *12–21*). In addition, the toolkit includes flakes (*n*=5). The dorsal, scalar, semi-abrupt and moderate retouch was mostly used.

Two artifacts on large flakes have been identified as biface blanks. One of them is flat-convex in side view; the other is biconvex. The latter demonstrates the initial stage of preparation: its side view shows the blank morphology rather than the manufacturing technique.

Study results

The category of cores from Kulbulak layer 24 includes specimens looking asymmetric: both their flaking

Fig. 7. Archaeological materials from Kulbulak layer 24.
1–9 – core-trimming elements; *10*, *11* – Levallois spalls; *12–21* – tools.

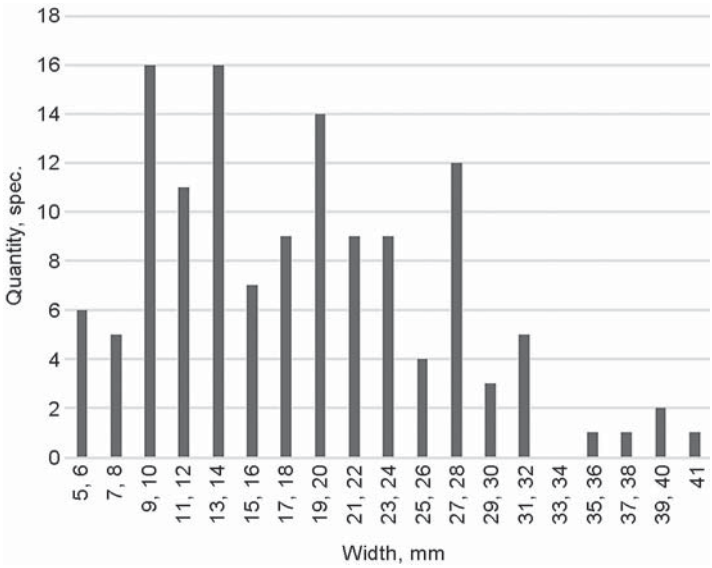

Fig. 8. Histogram of distribution of laminar spalls by width.

surface and one of the lateral sides were subjected to reduction. However, scar pattern analysis shows that these flaking zones were used independently of one another (see Fig. 4). Moreover, if we arrange the cores with traces of reduction on adjacent planes and the narrow-faced cores in a sequence from larger to smaller ones, then we can easily see that the largest specimen has negative scars only on its narrow end (see Fig. 5), the specimen of medium size on its flaking surface and narrow end (see Fig. 4), and the smallest specimen on both lateral sides and flaking surface (leading to its similarity to a subprismatic core).

To find out whether bidirectional flaking was a separate technological strategy, a scatter plot was constructed, showing the distribution of cores with one and two striking platforms by their length (Fig. 9, *1*). These two sets practically do not intersect, which is confirmed by the Mann-Whitney test ($U = 9$, $p = 0.04$). Signs of the use of a second striking platform and bidirectional flaking have been noted on the shortest specimens; most likely, the strategy was used involuntarily when the core was heavily exhausted.

Another scatter plot was constructed for considering the degree of exhaustion of cores based on the length of the cores for elongated flakes, blades and bladelets, and core-trimming elements with proportions of blades and bladelets (Fig. 9, *2*). The plot suggests that the analyzed cores represent the average and heavy degree of exhaustion, since the collection does not contain core-shaped items with a length close to the maximum length of core-trimming elements.

The comparison of the lengths of cores with traces of longitudinal flaking and the lengths of complete spalls with longitudinal faceting shows that there are statistical differences between these samples (Mann-Whitney test, $U = 68$, $p = 0.0001$) (Fig. 10). The plot reflects the situation when the lengths of the cores are much greater than the lengths of the flakes. Therefore, it can be assumed that the largest flakes with longitudinal negative scars were carried by people away from the site.

Predominantly plain (n=156) and dihedral (n=58) striking platforms of spalls match the residual platforms of cores. A significant part of the flakes (n=48, 26 %) and blades (n=17, 23 %), showing platforms rejuvenated from the lateral sides, can also be correlated with the morphology of the cores: in 6 out of 16 specimens, signs of lateral rejuvenation of the striking platform were identified.

No cores for the production of pointed flakes were found. However, the combination of features of a regular longitudinal-convergent flaking pattern with a

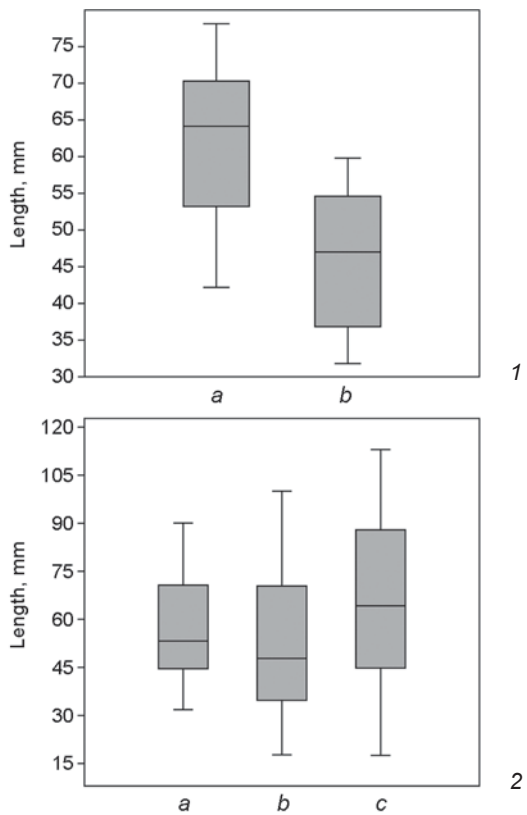

Fig. 9. Length distribution of single- (*a*) and double-platform (*b*) cores (*1*), cores for removal of laminar spalls (*a*), laminar (*b*) and core-trimming (*c*) elements (*2*).

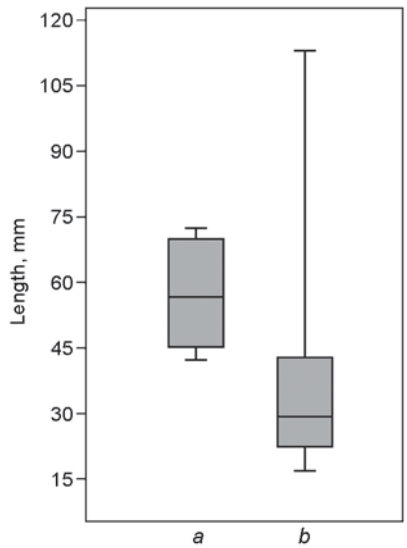

Fig. 10. Length distribution of cores with traces of longitudinal flaking (*a*) and spalls with longitudinal flaking pattern (*b*).

characteristic Y-shaped negative scar and a shift of the percussion point to one of the edges suggests the use of a modified pattern of Levallois point production known by the evidence from the sites of the Obi-Rakhmat affinity (Krivoshapkin, 2012).

Discussion

The place of the lithic industry of Kulbulak layer 24 among other industries of the region can be determined primarily through its comparison with the collection of overlying layer 23 (Krivoshapkin et al., 2010; Pavlenok K.K., Pavlenok G.D., Kurbanov, 2020). For the industry of this layer, tentatively assigned to the second half of MIS 7, the basic *chaîne opératoire* was previously reconstructed, which corresponds to the preferential Levallois technique, recently well described elsewhere (Pavlenok K.K., Pavlenok G.D., Kurbanov, 2020; Krajcarz et al., 2016; Pavlenok et al., 2022). The industry of layer 23 shows the use of the Levallois technique, along with the reduction strategy involving a simple parallel detachment of blades. The layer also revealed a few disc-shaped and radial cores, as well as nuclei for the production of bladelets. The latter category is represented by burin-cores, narrow-faced cores (including those with converging laterals), subconical, subcylindrical, and carinated cores.

The toolkit from layer 23 is dominated by heavily retouched blades, side-scrapers, and points. Among the side-scrapers, single-edged longitudinal forms are the most numerous; dejété and alternative side-scrapers occur in series; and there is an artifact of the "Selungur" type. Pointed forms are represented by points with one retouched edge, Mousterian points (including a specimen with the Tayacian retouch), and Levallois points (including those with ventral retouch). A separate group consists of tools of the Upper Paleolithic typological series: atypical end-scrapers, borers, and retouched bladelets. Truncated-faceted forms and bifacially processed tools have been identified. Flakes and blades with irregular retouch account for approx. 1/3 of the total number of artifacts.

Comparison of data on the lithic industries from layers 23 and 24 revealed the following differences:

in the industry of layer 24, simple parallel detachment of blades is common; in the industry of layer 23, the main array of cores shows various stages of the Levallois reduction strategy;

in the industry of layer 24, rare bladelets were removed from the cores simultaneously with blades; in the industry of layer 23, about 1/10 of the cores were used for the targeted production of bladelets through several splitting techniques;

only in the industry of layer 23 were the following rare items identified: a side-scraper of the "Selungur" type and a point with Tayacian retouch, both associated in a regional context with the Selungur line of the Middle Paleolithic development (Krivoshapkin et al., 2020).

The above analytical data suggest a preliminary conclusion that the collection of layer 23 represents a higher level of development of the Levallois blade tradition than that corresponding to the morphology of artifacts from layer 24. However, apparently, the industry of layer 23 is not absolutely homogeneous in cultural terms, owing to the occurrence of rare "Selungur" forms.

The site of Khonako-3 in Southern Tajikistan is chronologically and geographically close to Kulbulak, if we agree with the "new" stratigraphic sequence of this site, according to which the age of pedocomplex 2 (PC 2) is 186–242 ka BP (Ranov, Karimova, 2005). The site's researcher V.A. Ranov attributed the materials from PC 2 to the Levallois-Mousterian blade industry (the share of blades is 31 %). This industry is characterized by pyramidal cores intended for the production of long and narrow blades of Upper Paleolithic morphology, and by series of such removals (Ranov et al., 2003; Ranov, Schäfer, 2000). The toolkit includes side-scrapers on blades, atypical end-scrapers and knives, and a point. The noted features suggest that

the collection from PC 2 of Khonako-3 is closer to the industry of Kulbulak layer 23.

No other industries that would be similar both in terms of production techniques and chronological affiliation have been found in the western part of Central Asia. In the Iranian Plateau (Zagros), sites of the developed Middle Paleolithic industries (MIS 4 to first half of MIS 3) are known, characterized by a high proportion of convergent side-scrapers, Mousterian points, and a relatively low proportion of Levallois products (The Paleolithic Prehistory…, 1993; Shidrang et al., 2016). In the southeast of Transcaucasia, the earliest Levallois-blade assemblages are associated with MIS 4. For example, in Khovk-1 Cave, the OSL-date for the lowermost unit of layers 12–8, generated on a sample from layer 8 (~104 ka BP), is over 100 ka BP. A few artifacts (~40 spec.) were found in these layers: elongated Levallois points, a side-scraper, and spalls (mainly blades), including those with faceted striking platforms (Pinhasi et al., 2012).

The established cultural sequences of Denisova Cave and the site of Ust-Karakol-1 suggest that in Southern Siberia, assemblages containing cores showing simple parallel reduction and Levallois strategies, as well as bifacially processed artifacts and the Upper Paleolithic types of tools, developed ca 150 ka BP, in the period corresponding to MIS 5 (Derevianko, 2022; Derevianko, Shunkov, Kozlikin, 2020).

The Near East is the only region with a similar lithic industry corresponding to MIS 7: its lithic reduction techniques, identified by the artifacts from Kulbulak layer 24, were used as early as in the Lower Paleolithic. The earliest evidence of the use of the Levallois primary reduction strategy both in this region and in Eurasia as a whole is provided by the technocomplex of Gesher Benot Yaakov, in the north of modern Israel (Goren-Inbar, 2011; Goren-Inbar et al., 2000). The earliest cultural strata here date back to ca 780 ka BP (MIS 18–20) (Feibel, 2004). Most of the Levallois cores (87.5 %) were intended for the detachment of flakes of various sizes. Large flakes were subsequently used in the manufacture of bifaces and cleavers (Goren-Inbar, Grosman, Sharon, 2011). This reduction technique was identified in the materials from the Late Acheulean site of Berekhat Ram in the Golan Heights (Goren-Inbar, 1985). Levallois artifacts were also reported from Qesem Cave (Derevianko, 2016a, b).

Laminar blanks emerged in the Near East at the multilayered sites of Yabrud and Tabun as early as in the Late Acheulean (Ibid.; Monigal, 2001). For example, layer G in Tabun Cave has yielded a small number of short pyramidal cores used for the detachment of blades and laminar flakes. At the terminal Acheulo-Yabrudian stage of the Late Acheulean, blade technology becomes one of the main approaches in lithic reduction. This technique was especially spread in the pre-Aurignacian, Amudian, and Hummalian industries, which belong to the range from ca 400 to 250 ka BP (Derevianko, 2016a; Schwarcz, Rink, 1998; Laukhin et al., 2000; Mercier et al., 2013; Mercier, Valladas, 2003; Barkai et al., 2003; Gopher et al., 2010). For example, in the Amudian industry of Qesem Cave (Hershkovitz et al., 2011; Shimelmitz, Barkai, Gopher, 2011), there are both cores for the manufacture of blades and those with negative scars of blade and flake removals. Blades were used for the production of end- and side-scrapers, burins, and notched-denticulate tools (Shimelmitz, Barkai, Gopher, 2011). In the Amudian horizons of Qesem Cave, several bifacially processed tools were also recorded.

The earliest Middle Paleolithic technocomplexes of the region, dated to the Tabun D stage, 260 (250)–165 (150) ka BP, clearly demonstrate the continuity with the Acheulo-Yabrudian industry of the Levant (Derevianko, 2016b). The main feature of the industries of this type is the abundance of blades and elongated points (among the spalls, they make up from 20 to 60 %). The industries aged 220–230 ka BP demonstrate, along with the Levallois techniques for making blades and elongated points (parallel and convergent unidirectional), simple parallel reduction techniques aimed at blade removal. The laminar spalls at all the sites, except for Hummal layer la, were accompanied by numerous flakes and points, which were made through various reduction techniques, ranging from the Levallois to disc-shaped, including blade removal from “burin-cores” (Monigal, 2001; Marks, Monigal, 1995).

The toolkits of lithic industries belonging to the Tabun D stage are characterized by the combination of numerous retouched blades and elongated points with Middle and Upper Paleolithic implements—Mousterian points, longitudinal side-scrapers, denticulate-notched tools, atypical end-scrapers, burins, borers, truncated tools, and others (Copeland, 1975; Jelinek, 1981; Marks, 1992; Meignen, 2000). At the late stages of development of these industries, the proportion of Middle Paleolithic tools is significantly reduced, up to their complete absence.

Thus, technologically and likely chronologically (MIS 7), the archaeological materials of Kulbulak layer 24 occupy a position between the latest Amudian complexes and the earliest Middle Paleolithic

assemblages of the Near East, belonging to the Tabun D stage. This assumption is supported by the following features of the industry: combination of traces of the use of the Levallois and non-Levallois (simple, parallel, and narrow face) reduction techniques, with a predominance of the latter; production of various types of spalls within the same reduction sequence; a significant proportion of blades among spall-blanks; presence of bifacially processed tools, an elongated retouched point bearing heavy dorsal retouch (can be classified as an Abu-Sif point), and an atypical angular end-scraper.

Conclusions

The Amudian and Tabun D Paleolithic assemblages are valuable information sources in the consideration of the issues relating to the distribution of the oldest Levallois-blade complexes over the continent. Some researchers associate the emergence of industries of the Tabun D type with the arrival of a new population in the Near East ca 250–220 ka BP—anatomically modern humans from Africa (Hershkovitz et al., 2018; Valladas et al., 2013). An alternative opinion is held by A.P. Derevianko (2016a, b): lithic assemblages of the Early Middle Paleolithic indicate an inseparable connection with the Lower Paleolithic Acheulo-Yabrudian industry; the archaeological records of the Levant do not show any clear evidence of penetration of human populations with other cultures into the region in the period corresponding to MIS 7.

The lack of anthropological remains hampers a clear identification of the creators of the earliest Middle Paleolithic industries in the foothills of Tien Shan, which are represented in the Kulbulak cultural sequence. The chronological position of the archaeological materials of layer 24 is also not absolutely clear. However, on the basis of the results of the comprehensive studies carried out, it can be inferred that in the Western Tien Shan there was the Levallois-blade industry technologically and likely chronologically corresponding to the boundary between the Lower and Middle Paleolithic of the Near East. This stage of research suggests that the cultural interaction of the ancient population of the Near East and the foothills of Tien Shan, which took place during the transition to the Upper Paleolithic (Krivoshapkin, 2012) and in the Upper Paleolithic (Kolobova et al., 2013), was rooted in a much earlier period, the time of development of the Middle Paleolithic traditions.

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The Kushevat Site and the Paleogeographic Context of the Initial Peopling of Northern Urals

On the basis of new materials excavated in 2019–2021 from the Upper Paleolithic site of Kushevat, this study addresses the problem of initial human occupation of the Subpolar Urals. Geological and geomorphological findings are presented along with new chronological and paleogeographical data. Archaeological and faunal materials are described, and results of the traceological analysis of reindeer antlers with cut and chop marks are presented. The findings suggest that Kushevat was a pioneer settlement of the northern Ob region. The obtained luminescence and radiocarbon ages suggest that the peopling of the Lower Ob region occurred prior to 30 ka BP. Climatic conditions during the first half of the Upper Paleolithic (55–25 ka BP) were favorable for humans in the subpolar zone. Geological and geomorphological situation at the Upper Paleolithic sites of northwestern Urals (the Pechora and Kama basins) can be used as a paleogeographic analogue of the conditions in the Lower Ob region during the Pleistocene. The principal Upper Paleolithic sites in the region are associated with accumulations of megafaunal remains in the mouths of ancient gullies. Archaeological sites apparently consisted of two areas differing in location, economic specialization, and toolkit. Areas of the first type include residential zones on leveled areas of the second river terraces adjacent to the ravines. Those of the second type are estuarine zones of modern valleys of streams and rivers, where huge accumulations of megafaunal remains are preserved at the bottoms of ancient ravines.

Keywords: *Northern Urals, Upper Paleolithic, Terminal Late Pleistocene, paleontology, paleogeography, traceology.*

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Introduction

The recent justification of the hypothesis that the northern West Siberian Plain was free from ice cover starting from ~50 ka BP (Astakhov, 2020: 356–357) suggest the fundamental possibility of human penetration into the lower reaches of the Ob River as early as after the Early Zyryanka glaciation (MIS 3). Formerly, a scarce Paleolithic-looking archaeological material collected in the valley of the Voikar River and on the banks of the flowing Lake Voykarsky Sor was an indirect evidence of the Late Pleistocene human habitation in the region (Kosinskaya, Fedorova, 1994: 36). Later, similar finds were made at the shoals of the right bank of the Lower Ob, along with numerous Pleistocene faunal remains, some of which showed signs of anthropogenic impact (Zolnikov et al., 2020; Zolnikov, Anoikin, Filatov et al., 2021) (Fig. 1). Among them, two fragments of tusks with cutting and scraping marks, with direct AMS ages of ≥45 ka BP, are of the greatest interest (Zolnikov, Anoikin, Rendu et al., 2021). These fragments suggest that early humans could have settled in the subpolar regions of the Ob River valley during the period corresponding to the initial stage of MIS 3. The relatively recent discovery of stratified complexes in the Lower Ob region (the sites of Lugovskoye and Komudvany) showed younger ^{14}C- and AMS-ages, within MIS 2 (Zenin et al., 2006; Makarov et al., 2022). The available data allow the distinguishing of two types of Paleolithic industries in the region: a microblade lithic industry at stratified sites, and a more archaic pebble industry (Makarov et al., 2021), which suggests the possibility of at least two stages of peopling of this region in the Pleistocene. However, until recently, there was no convincing evidence of human presence in the Lower Ob prior to the latest glacial maximum (LGM, MIS 2); available "archaic"-looking artifacts were collected mainly from the surface. Meanwhile, two reconnaissance trenches in the Pleistocene sediments at the Synya River (left tributary of the Ob) revealed solitary artifacts (Zolnikov, Anoikin, Filatov et al., 2021) (Fig. 1). In subaerial sediments at the Un-Soim locality, a shatter with negative scars was found in association with a small fragment of a tubular bone, for which two AMS ages were obtained: 34,228–32,372 (GV-3034) and 31,205–30,920 (AAR-33844) BP. The Yam-Gort-4 Pleistocene deposits yielded a blank of an unidentified tool, bearing multidirectional negative scars (Ibid.). A series of four OSL ages obtained in Aarhus University (Denmark) on soil samples from the section indicates that the age of the soil containing the artifact is ~60 ka.

The data from the studies at Kushevat discovered in 2020 (Ibid.) provide a more substantiated assumption about the early peopling of the northern part of the Ob valley in the Early Upper Paleolithic. This article presents the materials obtained at this site in the recent years, as well as general issues related to the topic of the pioneer human settlement of the region.

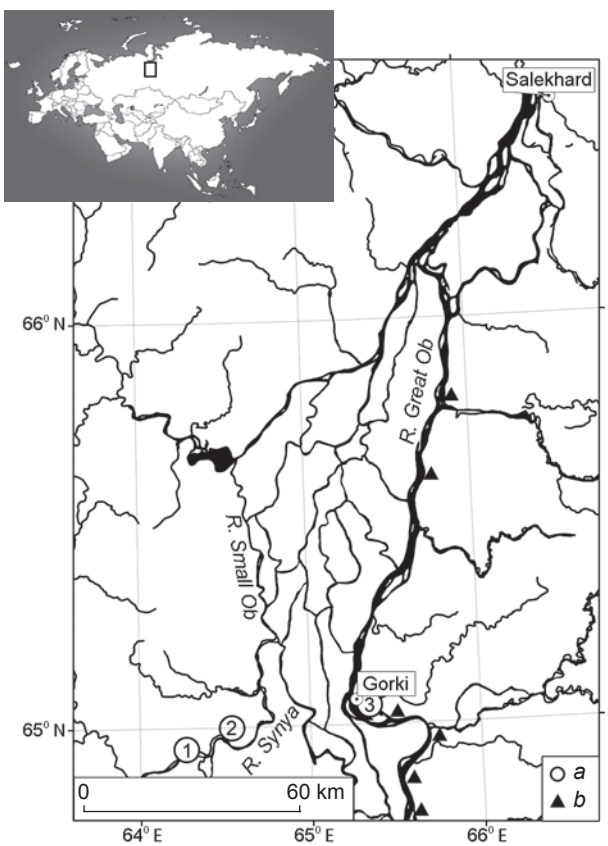

Fig. 1. Study region.
a – sites with *in situ* occurrence of archaeological materials (1 – Yam-Gort-4, 2 – Un-Soim, 3 – Kushevat); *b* – site of surface occurrences of artifacts and faunal remains.

Kushevat

General information. The site is located at the eastern outskirts of the abandoned village of Kushevat, 5 km eastwards of the village of Gorki, on the right bank of

the Kushevat channel of the Great Ob (Fig. 1). It is situated on the right side of the valley of a nameless stream flowing into the Kushevat channel, together with another stream forming a *kurya*—short and wide mouth filled with water during the spring-summer flood and almost drying up in the autumn-winter period (Fig. 2, *1*). Initially, trenches were prepared on the left bank of the *kurya* in 2019 (Zolnikov, Anoikin, Filatov et al., 2021). In 2020, a bone from a Pleistocene bison and a small flake of light brown flint were found on the right bank shoal. Subsequently, the works continued at this site, and in 2020–2021, two excavation areas and 14 trenches with a total area of 72 m^2 were established at the site (Fig. 3). The excavations reached the alluvial deposits of the Ob at a maximum depth of 3.7 m. Abundant faunal material and isolated archaeological finds were recorded in the layer of the ravine-gully solifluction-brook deposits underlying the subaerial cover.

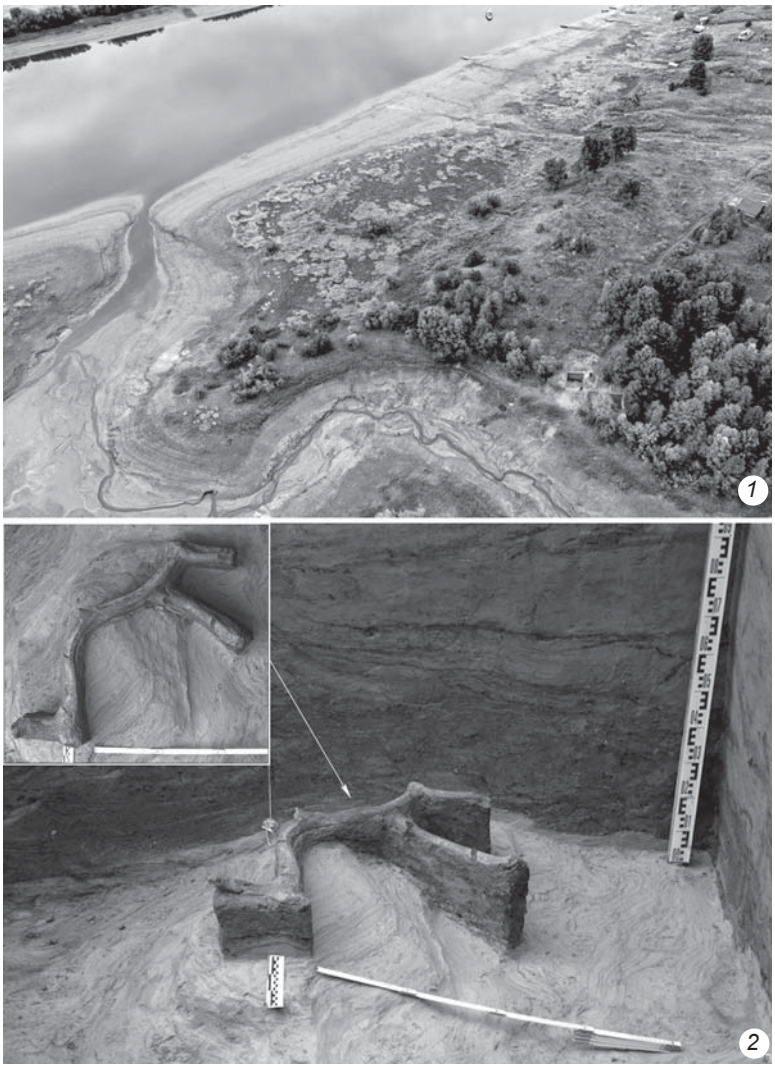

Fig. 2. The top view on the site of Kushevat (*1*); the conditions of occurrence of the reindeer antler with cut marks in excavation area 2 (*2*).

Stratigraphy. The generalized column of the deposits represents a consolidated stratigraphic sequence in excavation trenches 1 and 2, located at a distance of 5 m from each other. The profiles show numerous leanings, insets, envelopings, and facies replacements. The number of layers varies in different excavation areas; nevertheless, the layers can be combined into four stratigraphically consistent units, which have been traced in all the sections (Fig. 4).

Unit I—covering subaerial sediments. The uppermost stratum is modern forest soil 0.1–0.3 m thick. It is underlain by pale-brown silt, with sandy (up to silty sand) inclusions, and areas with thin and fine layering parallel to the slope. The origin of the unit is a subaerial cover with the thermokarst-puddle, eolian, diluvial, and solifluction processes. The bedding is enveloping. The thickness varies from 0.2 to 0.7 m, 0.3–0.4 m on average.

Unit II is mudflow (veloflux, i.e. fast soliflux). The deposits are gray silt with a brownish tint, with rare "smeared" sandy strips. Up to five or six layers were identified in the studied profiles; these layers vary significantly in thickness from about 2 m to wedging out. In the bottom part of the layers, irregularities in the lower border were recorded with vertical amplitude of up to 1 m, which are textures of capture of the underlying sediments and their involvement in the liquid-mud flow. The common origin of the sediment unit is a series of fast solifluction flows. Similar drift deposits are typical of the subarctic regions and are narrow long fans of liquefied mud hundreds of meters long (Astakhov, 2020: 47; Lavrushin et al., 2015: 20). The unit fills the paleo-hollow of the ancient gully. The thickness is from 0.4 to 2.7 m.

Unit III—ravine-gully deposits. They include two main facies: 1) sands of creek alluvium with trough-like and plane-parallel oblique bedding; 2) solifluction

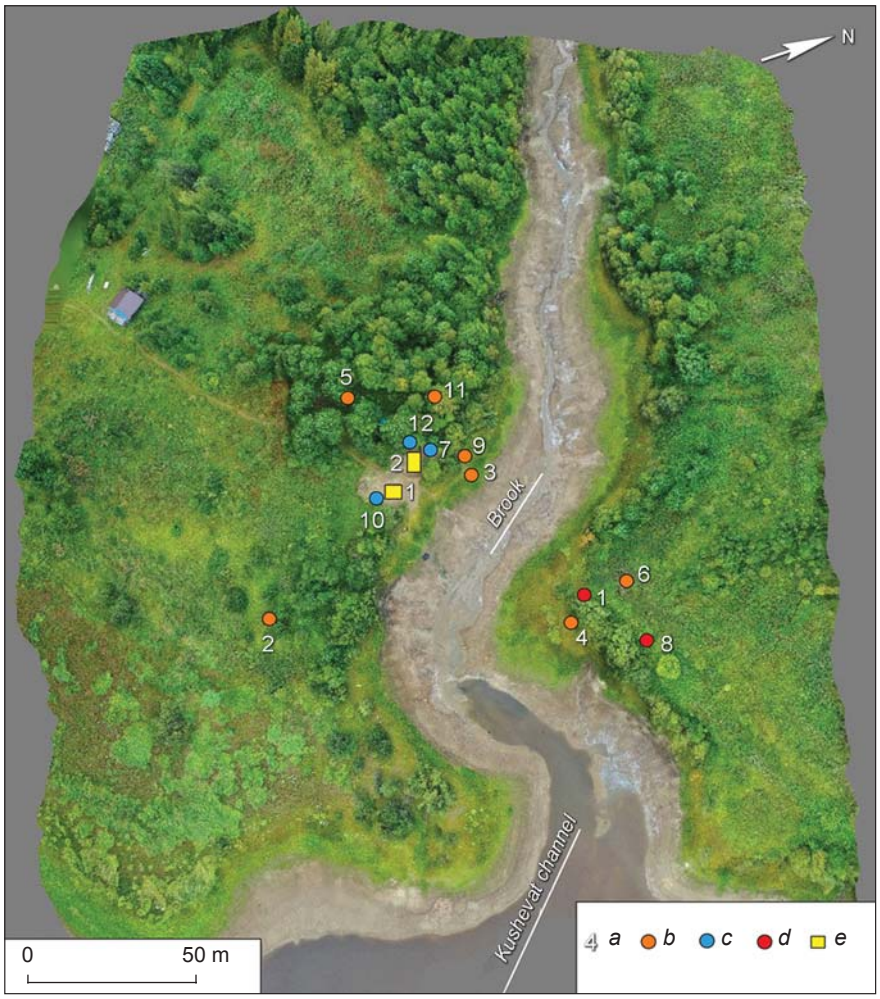

Fig. 3. Ortho-photo-map of Kushevat, with excavation areas indicated.
a – numbers of probe trenches and excavation areas; *b*, *c* – trenches of 2020 with faunal remains (*b*) and without them (*c*); *d* – trenches of 2021 without faunal remains; *e* – excavation areas of 2021.

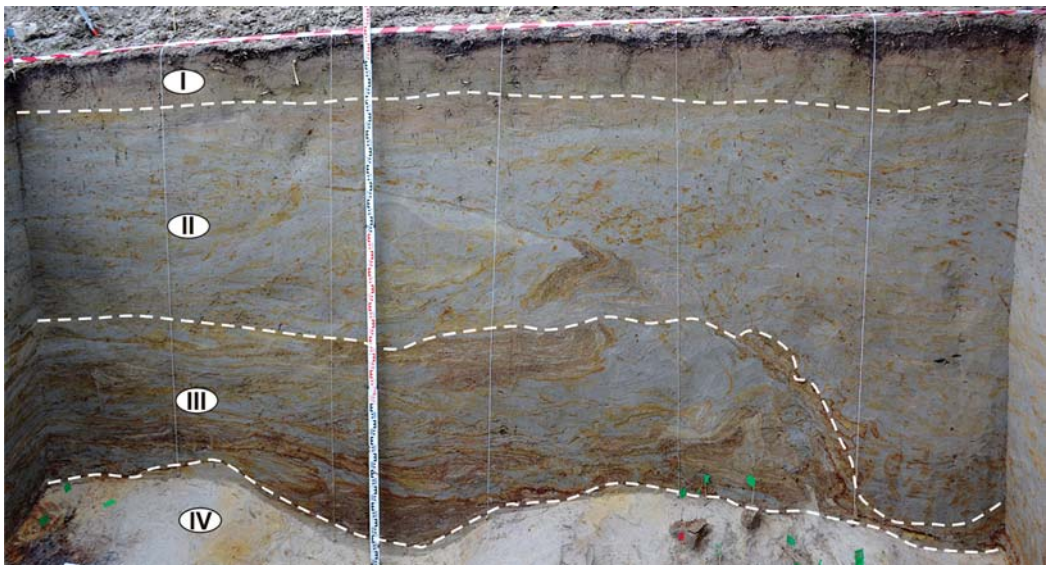

Fig. 4. Northern wall of excavation area 2, with the main sediment units indicated.

silts, which are mud deposits, slowly moving in a fluid state and deposited in paragenesis with cross-bedded sands dragged by ravine alluvium. In contrast to the layers of unit II, each of which corresponds to an independent drifting event, the layers of unit III cannot be unambiguously subdivided into layers of different ages. This is due to the fact that ravine deposits are composed of fluvial and mud-drifting interlayers, troughs, and oblique series that replace and cut one facies by another. The total thickness of the unit is from 2.2 m to complete wedging out. Faunal and archaeological materials were recovered from the near-bottom part.

Unit IV—the Great Ob alluvium. Well-washed light gray fine- to medium-grained sands deposited in parallel subhorizontal and oblique fine laminations, with ascending current ripple. The deposits stem from a typical alluvium of the Ob. The bottom has not been reached, but judging by the sands of this unit, which are exposed on the near-channel shoals of the Great Ob in this area, the thickness of this unit exceeds 3–5 m. The deposits represent alluvial stage II of the floodplain terrace of the Great Ob.

Chronology. The age of the deposits and the time of accumulation of the bone-bearing horizon were determined on the basis of optically stimulated luminescence (OSL), radiocarbon AMS analyses, performed in various laboratories both in Russia and abroad. Four samples for OSL-dating were collected from different lithological units in trench 7 (Fig. 5). Sample preparation was carried out in the OSL-dating laboratory of the Moscow State University and Institute of Geography RAS; and sample measurement in the Aarhus University. The uppermost part of unit IV (depth 230 cm) was dated to 57.9 ± 4.1 ka BP (lab. code 206186), which suggests the age of the top of alluvium II of the floodplain terrace of the Ob as ~60 ka. Date 39.8 ± ± 2.4 ka BP (206187) for unit III (depth 185 cm), which includes a bone-bearing horizon, reflects the time of accumulation of ravine-gully alluvium in the estuarine section of the *kurya*. The date of 31.1 ± ± 2.3 ka BP (206188) was obtained for the near-bottom part of unit II overlying the abovementioned deposits (depth 175 cm), and 22.6 ± 1.2 ka BP (206189) for the middle portion (depth 130 cm) thereof. These ages indicate the start of accumulation and further development of the process forming the subaerial cover of terrace II. Notably, the series of ages forms a continuous sequence without inversions, and fairly accurately reflects the main stages of accumulation

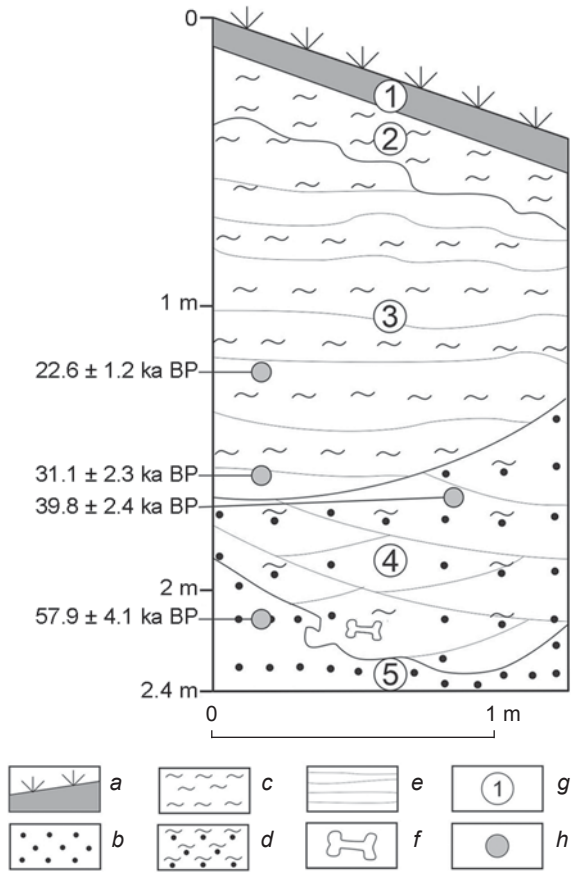

Fig. 5. Stratigraphic column of the northern wall of trench 7 (2020).`
a – modern soil; *b* – sand; *c* – aleurite; *d* – silty sand; *e* – bedding; *f* – paleofaunal remains; *g* – numbers of layers; *h* – places of sampling for OSL-dating.

of Ob terrace II in the site area. This series is in good agreement with the data of ^{14}C AMS-analysis of the faunal remains from the bone-bearing horizon in unit III. A total of four dates were generated in the laboratories for AMS-dating at Aarhus University (AAR) and the AMS Golden Valley (GV). The ages were calibrated in OxCal, v. 4.4.4., using the IntCal20 calibration curve (Muscheler et al., 2020), with a reliability rate of 95.4 %. For reindeer antlers with traces of anthropogenic impact, two close dates were obtained: 40.1 ± 0.7 (GV-3112) and 38.1 ± 0.9 (AAR-33845) ka BP. A slightly younger age was received for another fragment of a deer antler and a fragment of a mammoth's tubular bone: 29.7 ± 0.4 (AAR-33846) and 32.1 ± 0.6 (AAR-33847) ka BP, respectively. Consequently, the age of accumulation of animal remains in lithological unit III is 40–30 ka BP.

Faunal remains. The bone-bearing horizon lies at the bottom of unit III, at a depth varying from 1.5

to 3.5 m depending on the area. Its mean thickness is 0.20–0.25 m. Analysis of the stratigraphic sequence shows that the bone-bearing layer extends in a narrow (up to 10 m wide) band along the right side of the Kushevat *kurya*, and its total area does not exceed 1000 m^2.

In total, 130 bone remains were recovered, including 53 specimens identifiable to a species (identifications made by S.K. Vasiliev). More than a half of the bones belong to the reindeer (*Rangifer tarandus*); these are bones of the limbs, cervical spine, and fragments of the skull, including antler. Mammoth remains (*Mammuthus primigenius*) form the second largest group (11 spec.): cervical vertebrae, metatarsal bones, and tusk fragments. The ribs of woolly rhinoceros (*Coelodonta antiquitatis*) and bison (*Bison bison*) were recorded in small numbers. Solitary bones of musk ox (*Ovibos moschatus*), horse (*Equus sp*.), wolf (*Canis lupus*), and hare (*Lepus tanaiticus*) were also found. It should be noted that the predominance of reindeer bones in faunal collection distinguishes Kushevat from the sites of the West Siberian Plain, belonging to the late stages of the Upper Paleolithic, such as Lugovskoye, Komudvany, Shestakovo, etc., where mammoth remains dominate, accounting for up to 95 % of the collection (Derevianko et al., 2003: 120–127; Zenin et al., 2006; Makarov et al., 2022).

Anthracological analysis data. In the bone-bearing horizon, along with the faunal remains, more than ten pieces of charcoal were found, with sizes and states of preservation allowing anthracological analysis to be conducted. We selected 11 samples, ranging in size from 2 × 4 to 3 × 14 mm. Macroscopic signs of transverse, tangential, and radial sections of charcoal were studied in reflected light using the Axio Imager D2 microscope and Stemi 508 binocular with an AxioCam HRc 5 camera (Carl Zeiss). Species identification was carried out by comparing the diagnostic structures with the keys of the atlas "Anatomy of Russian Woods" (Benkova, Schweingruber, 2004).

The analysis has shown that six samples belong to deciduous species (*Dicotyledones* sp.), more detailed definition is not available; four samples belong to common pine (*Pinus sylvestris* L.); and one sample to silver birch (*Betula pendula* Roth). All the types of woody plants correspond to the forest-forming species of the northern taiga. These data indicate that the anthracological analysis did not show any fundamental differences between the environmental conditions that existed during the accumulation of the bone-bearing horizon at the site and the modern ones.

Archaeological materials. In the bone-bearing horizon, in excavation area 2A, a small fragment of spall of gray silicified shale rock (Fig. 6, *1*) and a small, heavily exhausted core retaining the straight striking-platform bearing lengthwise scars of elongated rectangular removals (Fig. 6, *2*) were found. The artifacts were made on small pebbles of silicified sedimentary rock of dark gray color. Notably, the artifact-bearing sediments contained almost no detrital material. Rock fragments were noted only in thin lenses of grus, which included very small weakly rounded fragments of slates, granites, and quartz.

Traceological analysis data. Use-wear analysis of the faunal remains revealed the signs of anthropogenic impact on two reindeer antlers. The specimen from trench 12 shows a series of deep linear marks, suggesting deliberate cutting of an antler on one of its parts (Zolnikov, Anoikin, Filatov et al., 2021).

In 2021, in excavation area 2, another piece of antler was found, a larger one, broken into several fragments (see Fig. 2, *2*). These show clear, well-preserved, and rather deep cut marks, predominantly V-shaped in side view (Fig. 7). In most cases, the groove in the central part is deeper than on the periphery, the marks are not long and are localized in the areas of the antler's fragmentation, suggesting their interpretation as traces of chopping with a sharp tool. Traces similar in morphology and localization were recorded on deer antlers from several Upper Paleolithic sites in Eastern Europe and Siberia (Volkov, Vasiliev, 2017: Fig. 2, *a*, *d*; Mazza et al., 2022: Fig. 18). Noteworthy are the missing lateral processes and splitting of the antler into large fragments; this may be due to the deliberate preparation of blanks of a certain size (Tapia et al., 2018: Fig. 4). These observations, together with the straight edges of the broken parts and the availability of vivid cut-marks on the margins, indicate the purposeful splitting of antlers by man.

Discussion

The materials from the site of Kushevat and the results of absolute dating, derived through various methods in several laboratories, suggest that it was the location of pioneer human settlement in the Lower Ob

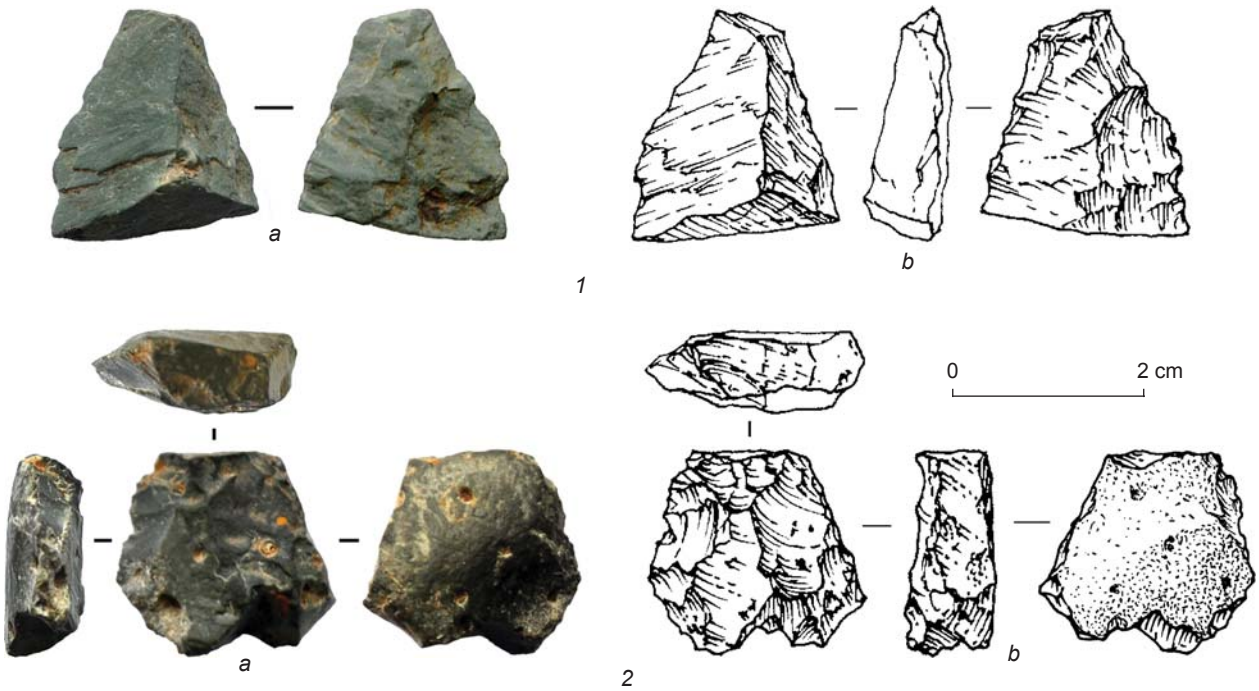

Fig. 6. Flake (*1*) and core (*2*) from Kushevat.
a – photo; *b* – drawing.

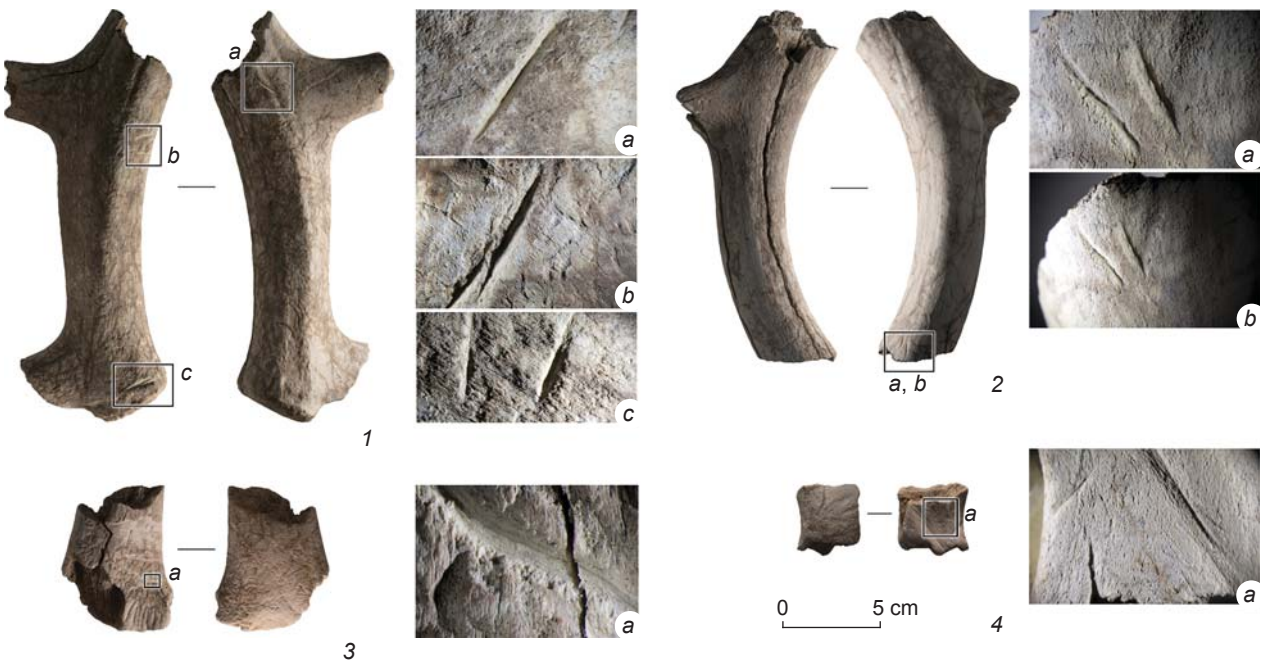

Fig. 7. Fragments of reindeer antler from excavation area 2 and macrophoto of chop marks on them.
Magnification: *1*, *a*, *b*, *c* – ×16, ×12.5 and ×12.5, respectively; *2*, *a*, *b* – ×16 and ×8, respectively; *3*, *a* – ×32; *4*, *a* – ×8.

region. However, the discovered artifacts are scarce and do not provide a good insight into the material culture of the first settlers, even in general terms. The following inferences can be proposed on the basis of the paleogeographical situation at the site, which is reconstructed from analyses of numerous geological sections. The bone-bearing horizon, presenting evidence of human habitation, is associated with

ravine-gully deposits of a paleoravine covered by a thin subaerial layer. The camp of prehistoric humans was obviously located not in the ravine, but on the second terrace above the floodplain. At the same time, it could not have been situated at a great distance from the excavated area, since the bone-bearing horizon contained rather large charcoal fragments that would have been destroyed during long-term transportation. Such localization of the main habitat close to the area of concentration of faunal remains (where archaeological materials could be occasionally imported), but at a higher hypsometric level, is not unusual and is well-illustrated by recent discoveries at the site of Volchya Griva (Leshchinskiy, Zenin, Bukharova, 2021).

Many Paleolithic sites of Western Siberia are associated with accumulations of megafauna remains, which were not directly connected with human activities. Here, in the conditions of shortage of high-quality lithic raw materials, bones were often the only alternative. Furthermore, available ages for the Upper Pleistocene faunal remains from the Lower Ob and the analysis of their species composition suggest that during the second half of the Terminal Late Pleistocene (MIS 3) the fauna actually remained unchanged here (Zolnikov, Anoikin, Rendu et al., 2021).

Notably, the climatic conditions during the first half of the Upper Paleolithic (55–25 ka BP) were quite favorable for humans in the subpolar zone (Pervonachalnoye zaseleniye…, 2014: 428). The sizes of bison and mammoth populations in the Siberian Arctic in the range available for radiocarbon dating show that the period of ~45–35 ka BP presented the optimal conditions for habitation (Nikolsky, Pitulko, 2015). During this period, corresponding to MIS 3, the Ural Range was not an insurmountable barrier to the migrations of early humans (Zolnikov et al., 2020); it seems quite feasible to consider the inhabitants of the northeastern margin of the East European Plain as potential participants of the initial peopling of the Trans-Urals. According to available data, the first human penetration into the basin of the Lower Pechora occurred ~40 ka BP (Pavlov, 2015). Accordingly, the geological and geomorphological features of the sites of this time in the Northern Cis-Urals can be considered parallel to the paleogeographic conditions of human habitation in the Lower Ob region in the Pleistocene.

According to available data (Pervonachalnoye zaseleniye…, 2014: 143), the sites of the initial Upper Paleolithic in the Cis-Urals are located at the mouth areas of large ravines; this feature is also typical of the chronologically close sites in the central regions of the East European Plain. Meanwhile, the younger Paleolithic sites are located mainly in the central parts of river bends. Usually, in the estuarine areas of ancient ravines, there are *kuryas*—bays deeply cutting into the bank of a large modern river. In this regard, Mamontovaya Kurya is of particular interest, being the northernmost and the oldest site of the initial Upper Paleolithic in the Cis-Urals, located on the left bank of the Usa River (a tributary of the Pechora). According to a series of ^{14}C- and OSL-dates, its age is estimated in the range of 35–40 thousand years (Ibid.). In total, 123 bone remains, mainly those of mammoth, horse, reindeer, and wolf, were found at the site. The archaeological collection included a side-scraper, a biconvex biface, and a mammoth tusk with traces of anthropogenic impact (Svendsen, Pavlov, 2003). All the finds were deposited in sand and gravel sediments up to 1.4 m thick, localized in an ancient wide and short ravine and overlain by a six-meter thick alluvium of the "big river" (Pervonachalnoye zaseleniye…, 2014: 105). Apparently, the Paleolithic site itself was located on a watershed plain near the ravine. Notably, similar paleo-incisions of various depths and widths are characteristic of the Lower Ob region (Zolnikov, Anoikin, Rendu et al., 2021). Some of them are associated with modern short valleys of tributaries of large rivers and dry ravines, at the mouths of which megafaunal remains and single artifacts have accumulated. Comparisons of the materials of Mamontovaya Kurya and Kushevat show that these sites are similar in almost all parameters.

A similar geological and geomorphological situation is observed at the Byzovaya site. This site is also located at the mouth of a large ravine, cutting through the steep bank of the Pechora. About 300 artifacts of the Upper and Middle Paleolithic appearance and over 4000 animal bones (mammoth bone share is 98 %) were found here. These occurred in sandy-gravel-pebble deposits, which lined the bottom of the ancient ravine with a two-meter layer (Pavlov, 2015) and were covered by subaerial sediments of several generations, with a total thickness of up to 10 m. Culture-bearing deposits were formed by several washes, which is evidenced by the spread of 24 radiocarbon dates on bone in the range of ~34–28 ka BP (Ibid.).

Unlike Mamontovaya Kurya and Byzovaya, which are striking examples of Paleolithic sites at mammoth "cemeteries", Zaozerye is actually a site of ancient hunters with three accumulations of cultural remains associated with hearths, apparently marking living zones. The site is located on the left bank of the Chusovaya River (a tributary of the Kama), on a promontory bounded by large ravines. The proposed area of the site is >2.5 thousand m^2 (Pavlov, 2009). The cultural layer, up to 45 cm thick, lies under a loess cover 2.5–3.5 m thick and is associated with the middle part of the Bryansk paleosol. It contained about 1500 faunal remains, of which >80 % are identifiable as horse remains. The archaeological materials (~1800 artifacts) include a large collection of Upper Paleolithic tools (bifaces, scrapers, burins, and others) and bone artifacts, as well as flakes and single subprismatic cores. The radiocarbon analysis suggests the age of the cultural layer as 33–35 ka, the OSL dating provided the age of ~40 ka (Ibid.).

The upper cultural horizon of the Garchi I site, located on a plain area bounded by broad incisions, on the right bank of the Kama, has been attributed to the Early Upper Paleolithic (Pavlov, 2011). The proposed area of the site exceeds 2000 m^2. The cultural layer, ~20 cm thick, occurs at a depth of 2 m and is associated with paleosol. Its age, according to the available AMS- and OSL-dates, is ~33 thousand years. Almost all identifiable remains of fauna belong to horse and reindeer. The archaeological collection contains ca 9000 artifacts (including surface finds) attributed to the Upper Paleolithic Kostenki-Streletskaya culture. The site is believed to be a repeatedly used hunting camp, with a full production cycle of tool manufacturing (Ibid.).

In sum, the sites of the initial Upper Paleolithic in the north of the Pechora Plain are located mainly at *kuryas*, i.e. at the mouths of wide ravines flooded in spring, where streams and small rivers (tributaries of large rivers of the Cis-Urals) flow. The available materials testify that these ravines were "cemeteries" of large gregarious mammals, and were visited by early humans for butchering animal carcasses and collecting bone raw materials; the living zones proper were located on the nearby level grounds.

Such accumulations of megafaunal remains localized in broad short paleoravines on the Russian Plain are attributed to the episodes of extreme mudflow sedimentation, during which the mud flew with the greatest speed in the mouth parts of the gullies (Lavrushin et al., 2015: 15). Thus, these landforms could have served both as natural shelters from bad weather for large mammals, and as natural traps during prolonged downpours. Animals could die not only because of mudflows, but also as a result of outpourings of high-density flows of quicksand from lateral parts of the loess-soil cover, forming the gentle banks of ancient ravines. In the north of the region, during the climate warmings in the Subarctic, a significant role was played by the focal process of slope denudation of the "baydzharakh type", producing steep slopes of the southern exposure, composed of ice-saturated rocks. During melting of underground ice and frozen rocks, powerful flows of liquefied silty mass emerged, which attracted (lithophagy) animals, but also killed them.

Conclusions

The analysis of the available geoarchaeological data for the Northern Cis-Urals has shown that the Upper Paleolithic sites in this region are associated mainly with large accumulations of paleofaunal remains, located at the mouth parts of ancient ravines/gullies, which in the modern relief are presented by the succeeding *kuryas*. The relevant archaeological sites usually consist of two areas with different locations, economic purposes, and material finds. Areas of the first type include residential and utility zones, located on the level grounds of the second terraces directly adjacent to the *kuryas*. These zones can occupy large areas and show significantly thick cultural deposits, retain traces of dwelling structures and hearths, and reveal rich archaeological material reflecting several stages of stone and organic material processing. Those of the second type are zones located in the mouths of modern stream and river valleys, where at the bottoms of the ancient gullies we find the accumulations of remains of large gregarious mammals that died in shelter-traps. The bones may bear traces of human impact, and be accompanied by scarce artifacts associated with butchering of animal carcasses and procuring horn, tusk and other organic materials. Zaozerye and Garchi I sites are examples of the areas of the first type, while Mamontovaya Kurya, Byzovaya, and Kushevat sites represent second type. Both types have been identified at the Lugovskoye location, where on the high bank of the ravine rich archaeological material was found, and below there was a flooded ground

with an accumulation of paleofaunal remains, containing solitary artifacts and traces of hunting/butchering (fragments of a side-bladed point in a mammoth vertebra) (Zenin et al., 2006; Makarov et al., 2021). Detection of possible dwelling areas associated with a bone accumulation site is often hampered by the geomorphological situation (for example, at Mamontova Kurya or Kushevat), since the thickness of deposits overlying the cultural layers at the site depends on the local geological and geomorphological conditions, as well as on the ratio between the processes of aeolian-diluvial accumulation and denudation. It can range from one to over ten meters.

The results of recent works at Kushevat have shown the undoubted peopling of the Lower Ob region prior to 30 ka BP, and suggested that it was a pioneer settlement in Northwestern Siberia. The general geomorphological situation at the site and its comparison with the data from other sites in the Northern Cis-Urals suggest that within the ancient ravine, along with solitary artifacts, a settlement complex with abundant archaeological materials can be found, which is buried in the second terrace of the Ob and covered by thick (up to 10 m) unit of subaerial sediments.

Acknowledgements

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The Concept of Civilization in Modern Studies of the Neolithic in China and Japan

This paper presents a brief overview of studies exploring the origin of civilizations in modern archaeology of China and Japan and mostly concerning the Neolithic period. The analysis of publications shows that in Chinese and Japanese archaeology, original scholarly traditions have been developed, with their own methodological foundations and terminology. We outline the key ideas relating to the origin of civilization, elaborated by researches in China (Su Bingqi, Yan Wenming, Li Boqian, Xu Hong, Gao Jiangtao) and Japan (Harunari Hideji, Watanabe Hiroshi, Sasaki Fujio, Yasuda Yoshinori). We show that most Chinese scholars consider the formation of state a sine qua non of transition to the civilization stage. However, the problem of identifying criteria of civilization and state formation using archaeological data has not been resolved to date. Examples of archaeological markers of civilization proposed by Chinese specialists are listed. In the works by Japanese researchers, no connection between the emergence of the state and civilization has been revealed. Most Chinese archaeologists date the emergence of civilization and of the first state formations to the Late Neolithic (Dawenkou, Hongshan, Liangzhu, Longshan, etc.), ca 3500–2000 BC. There are alternative hypotheses—the Early Bronze Age (Erlitou culture) and the Late Bronze Age (the Spring and Autumn period). In Japanese archaeology, there are two main positions regarding the time when civilization had formed—the Jōmon period (Neolithic) and the subsequent Yayoi period (Bronze Age). Scholarly and external (including political) factors that have influenced modern concepts of the origin of civilization require special historiographic research.

Keywords: *China, Japan, civilization, Neolithic, archaeological criteria of civilization.*

Introduction

The notion of civilization is one of the key concepts in the Humanities and Social Sciences. The meaning of this term may widely vary in different fields and scholarly schools, which hampers the mutual understanding of scholars specializing in various areas, as well as interdisciplinary research. V.G. Child (1950) made the greatest contribution to adapting this concept to archaeological methodology and identifying criteria for the emergence of civilization, using archaeological evidence. Subsequently, the criteria he formulated have been revised and refined many times (Kradin, 2006). In Russian scholarship, this issue was primarily discussed by V.M. Masson (1989). However, the tasks of selecting indicators of

the transition to civilization, their correlation with each other, and adaptation to specific archaeological realities are still relevant; they attract the attention of scholars in different countries of the world. Chinese and Japanese studies discussing the origin and development of civilizations employ their own distinctive terminology, which may complicate the analysis of publications. In this case, not only the knowledge of the subject matter is required, but also familiarity with theoretical approaches followed by the specialists from these countries.

Searching for the roots of Chinese civilization has been one of the main issues since the beginnings of archaeology as a modern scholarly field in China. Back in the 1920s, during the movement of "criticism of ancient history", Professor Li Xuanbo from Peking University stated that "the path of archaeological research" was "the only way to solve the problems of ancient history" (cited after (Li Boqian, 2016: 5)). The most important landmarks were the discovery of the Late Yin capital in the Xiaotun village in Anyang in 1928, the discovery of the Erligang culture, which was earlier than Xiaotun, excavation of the Shang settlement in Zhengzhou in 1950, as well as the discovery of the Erlitou site and culture in Yanshi in 1959. These and subsequent achievements of archaeologists have made it possible to confirm the information of historical sources about the ancient Chinese state of Shang-Yin and raise new questions concerning the authenticity of the Xia State, as well as the time and region of the emergence of Chinese civilization, etc. Chinese archaeologists still focus on these problems. At the turn of the 20th and 21st centuries, the major multidisciplinary projects "Chronology of Xia–Shang–Zhou" (1996–2000) and "Comprehensive Study on the Origins and Early Development of Chinese Civilization" (2004–2015) were carried out in China. In addition to field research, Chinese archaeologists elaborated the theoretical foundation of the issue, attempting to establish signs of transition to the stage of civilization that could be identified using archaeological evidence. History of research into the origins of civilization (usually using the example of China) in the archaeology of the People's Republic of China has already become the subject of several overviews summarizing and analyzing the results in this area (Lin Yun, 2016; Chang Huaiying, 2016; Bao Yifan, 2020; Wang Zhenzhong, 2020).

Throughout the 19th–20th centuries, Japanese scholars have deepened and expanded our knowledge about the past in the Japanese Archipelago. One of the most important achievements was the identification of the *Jōmon* period (*jōmon jidai* 縄文時代) and *Yayoi* period (*yayoi jidai* 弥生時代)*.

The concept of the "*Jōmon* civilization", or "*Jōmon* utopia", gained popularity in Japanese society in the late 1980s–mid 1990s. This shift in the attitude towards the ancient history of Japan changed on the basis of economic and social upheavals, and there emerged the idea about the *Jōmon* period as a time of flourishing, marked by increased wealth accumulation and social stratification. This concept was largerly based on the discovery of the Sannai-Maruyama site in Aomori Prefecture in 1994 (Yamada Yasuhiro, 2020: 32–33). New finds, which had not been previously discovered at the *Jōmon* sites, and the high level of skills among the inhabitants of the settlement caused a sensation in Japanese society. Publications on that site emphasized the uniqueness of Japanese heritage as compared to Chinese civilization (Seki Yūji, 2020). In the late 20th–early 21st century, the theory of the existence of civilization in the *Jōmon* period has been spreading in the Japanese scholarly community. According to this theory, the *Jōmon* society of hunters and gatherers was comparable to classical civilizations of Egypt, India, Mesopotamia, and China in terms of its level of material culture (Umehara Takeshi, Yasuda Yoshinori, 1995; Yasuda Yoshinori, 1997; Sasaki Fujio, 1999). However, the majority of scholars remain skeptical about this idea, and point out the weakness of its factual basis and supporting evidence, such as the absence of developed agriculture, towns, and literacy in the *Jōmon* period. Instead, they associate the emergence of early civilization on the Japanese islands with a wave of migration from the mainland and with the *Yayoi* culture (Fujio Shin'ichiro, 2002: 5–8; Yamada Yasuhiro, 2015: 63–64).

This article does not claim to cover in full all of the evidence. Its purpose is to make a brief overview of current research on the problem of the emergence of early civilizations in East Asia in the archaeology of China and Japan. For that purpose, it will discuss the relevant terminology used in Chinese and Japanese scholarly literature, and present the main concepts elaborated by Chinese and Japanese scholars in their research on the archaeology of the Neolithic.

*The Japanese term *jidai* 時代 has several meanings—'age, period, century'. In our work, the term "period" is used to designate the entire time of the *Jōmon* (subdivided into initial, middle, etc.), and *Yayoi* periods. The term "culture" (*bunka* 文化) as applied to the Jōmon period designates the material culture and worldview in specific subperiods.

Terminology and theoretical principles used in the studies on the origins of civilizations in China and Japan

The term *wenming* 文明, which in the modern Chinese language denotes the concept of "civilization", first appeared with the meaning of 'bright, shining'* in the "Wenyan zhuan" commentary, ascribed to Confucius (551–479 BC), to the classical Chinese philosophical treatise "Yi Jing" ("Book of Changes", 10th–4th centuries BC) (Morohashi Tetsuji, 1967: 596). The term was used when assessing the level of social development by the Chinese writer Li Yu (1611–1680) in the Early Qing period. In its modern meaning, the term *wenming* came into Chinese from the Japanese in the early 20th century (Popova, 2020: 5–6).

The work of F. Engels "The Origin of the Family, Private Property and the State" (1884) is the most important methodological basis for Chinese scholars of the Humanities until this day. Following Engels, most Chinese scholars understand "civilization" as a certain stage in the development of human society. In accordance with the thesis that "the state is a product of society at a specific stage of development" (Engels, 2019: 271), shared by most Chinese experts, the main indicator of the transition to the stage of civilization is the emergence of a state (Su Bingqi, 1988: 1; Lin Yun, 2016: 5; Xu Hong, 2016: 13; Gao Jiangtao, 2019: 21). Some scholars completely connect these concepts (Yi Jianping, 2014: 144). An exception is the point of view of Ye Wenxian, who believes that the transition to civilization does not necessarily entail the emergence of a state (2016).

The idea of an inextricable link between states and civilization fosters theoretical research of Chinese archaeologists on the emergence of early states. In recent years, in addition to the works of K. Marx and F. Engels, the concept of chiefdoms by E. Service and M. Sahlins (Evolution…, 1960; Service, 1975) and the theory of early states proposed by H.J.M. Claessen and P. Skalnik (The Early State, 1978) have become the sources for methodological developments in this research field. Therefore, the most important problems of theoretical archaeology in China are adapting these theories and translating the borrowed terminology. Currently, the apparatus of concepts and terms for studies on the origins of civilization and state has not been unified. One source is the body of terms available in traditional Chinese historiography, such as *guguo* 古国 'ancient state', *fangguo* 方国 'principality, domain', *bangguo* 邦国 'principality, domain, possession, city-state', etc. These terms allow for various interpretations, and boundaries between them are blurred. This makes communication difficult even within the Chinese academic community, not to mention dialogue with foreign colleagues. Another component is terminology that comes from works written in English. A single standard for translating and interpreting these terms has not yet been developed. In order to avoid confusion in Chinese publications, these terms are provided not only in translation, but also in the original, for example: English "chiefdom", Chinese *qiubang* 酋邦; English "early state", Chinese *zaoqi guojia* 早期国家; English "proto-history", Chinese *yuanshi* 原史 (see (Xu Hong, 2016; Chang Huaiying, 2016; Gao Jiangtao, 2019)).

Another theoretical basis for studying the issues of civilization in the archaeology of China is the concept of the "urban revolution" by Child (1950). Almost at the same time, one of the founders of the Institute of Archaeology of the Chinese Academy of Social Sciences and its long-time director Xia Nai (1910–1985), as well as the famous American archaeologist of Chinese origin Zhang Guangzhi (1931–2001), both of whom were influenced by the ideas of Child, presented their definitions and criteria of civilization. It is currently believed that it was precisely Xia Nai who was the first scholar in the People's Republic of China to connect the concept of "civilization" with archaeology, and emphasize the importance of archaeological information for determining the origins of Chinese civilization. He introduced these points in a series of lectures on the Japanese television channel NHK, which were recorded in 1983 (Gao Jiangtao, 2005: 46). Later, he reworked these lectures into a monograph "The Origins of Chinese Civilization" (Xia Nai, 1985). Xia Nai defined civilization as a stage in social development when the tribal system disintegrates and state organization with class differences emerges. In addition to this prerequisite for the transition to civilization, he identified three more criteria revealed by archaeological evidence: towns as centers of political, economic, cultural, and religious activities; literacy; and metal production (Xia Nai, 1985: 81). Xia Nai suggested that civilization emerged in China no later than the Late *Erlitou* stage, but accumulation of quantitative indicators for a qualitative transition occurred in the previous period from the Late Neolithic to the Early Bronze Age (Ibid.: 82–100). In 1984, Prof. Zhang Guangzhi from Harvard University

*Or 'adorned and brightened' in the translation by J. Legg (see: Wen Yan, Qian, in *Chinese Text Project*, URL: https://ctext.org/book-of-changes/wen-yan (accessed 08.01.2021)).

was invited to present a course of lectures at Peking University. Later, he published the lectures in the book "Six Lectures on Archaeology" (1986) (Sun Qingwei, 2021: 65). The first lecture discussed the importance of studying the history and archaeology of Ancient China for world history. During this lecture, Zhang Guangzhi proposed his version of the list of signs of civilization: literacy, towns, metal production, state structures, religious buildings, and monumental art (1986: 14). According to Zhang Guangzhi, mechanisms of transition to civilization were by no means universal. He suggested two models: 1) the Western, "breakthrough" model, distinguished by acute social, economic, and cultural transformations; 2) the worldwide (non-Western), "sequential" model, characterized by prolonged preservation of cultural elements, including the time of transition from barbarism to civilization. China represents the second civilizational model (Ibid.: 17–24). The ideas of Xia Nai and Zhang Guangzhi formed the basis for further research into the emergence and development of civilization in China, using archaeological evidence.

In the Japanese language, the notion of "civilization" appeared in the Meiji period (1868–1912), together with ongoing active Westernization, accompanied by the adoption of Western ideas about society and history, which resulted in new terms and variants of their use. The term "civilization" *bunmei* 文明 was first used by Fukuzawa Yukichi in his work "Conditions in the West" (1866–1870), and later in his treatise "An Outline of a Theory of Civilization" (1875). The scholar opposed the concepts of "civilization" and "savagery" by comparing the level of social, political, cultural, and spiritual development of the leading capitalist states and of Japan, which lagged behind. In his understanding, Japan occupied an intermediate position between "civilized" (England, France, USA) and "savage" (African countries, Australia) countries (Kawajiri Fumihiko, 2010: 136). In conjunction with *bunmei*, the term *kaika* 開化 'civilization' was used at that time. The phrase *bunmei-kaika* 文明開化 became also widely employed. However, along with the original meaning, it was used for referring to a specific historical phenomenon of the Early Meiji period, and was also a synonym for the term "modernization" (Ibid.: 137). In the early 20th century, the term "culture" *bunka* 文化, as well as the borrowed term *karuchā*: カルチャー (transcribed English 'culture'), emerged.

The words *jinbun* 人文 'civilization, culture', *kyōka* 教化 'culture, civilization, enlightenment, education', *kaimei* 開明 'civilization, enlightenment' and the term *shibirizēshon* シビリゼーション (civilization) borrowed from English are used in the modern Japanese scholarly language along with *bunmei* and *kaika* in the meaning of "civilization" (Ruigo dai jiten, 2002: 1046–1047). These are more common in social, political, and cultural studies.

The term "civilization" is not widely used in the context of contemporary Japanese archaeology. It is absent from available archaeological dictionaries, and is present only in the Japanese-English-German dictionary of archaeological terms as *bunmei* (Melichar, 1964: 7); whereas the term "culture" (*bunka*) is commonly used, especially when describing the *Jōmon* period (Wa-Ei taishō…, 2001: 87, 129, 252; Shin Nihon…, 2005: 407–408).

In Japanese scholarly literature, the term "civilization" traditionally describes early proto-state entities, which emerged in the Late *Yayoi* period and flourished in the *Kofun* period. However, in recent decades, the idea of the existence of civilization in the *Jōmon* period has become more widespread, based on the concept of the "stratified *Jōmon* society" (Umehara Takeshi, Yasuda Yoshinori, 1995; Yasuda Yoshinori, 1997; Sasaki Fujio, 1999).

Researching the sites and collections of the *Jōmon* period began in the late 1870s by so-called hired foreigners—Western scholar-naturalists (E.S. Morse, P. von Siebolt, J. Milne, W. Gowland, N. Munro) (Yamada Yasuhiro, 2015: 17–24; Ikawa-Smith, 1982: 299–301). In addition to the methodology of archaeological and anthropological research, they introduced to Japanese scholarship terminology based at that time on a "system of three ages". Subsequently, using new evidence on pottery assemblages, the Stone Age was divided into two periods: cultures of the *Jōmon* type (*Jōmon-shiki bunka jidai* 縄文式文化時代) and cultures of the *Yayoi* type (*Yayoi-shiki bunka jidai* 彌生式文化時代) (Yamanouchi Sugao, 1932; Morimoto Rokuji, 1935). After the Second World War, the idea about the uniqueness of the *Jōmon* period began to emerge; at its early stage, this idea was under the marked influence of European scholarly concepts. In the early 1960s, the "*Jōmon* period" *Jōmon jidai* 縄文時代 and the "*Yayoi* period" *Yayoi jidai* 弥生時代 were recognized as unique stages in the ancient history of the Japanese Archipelago, equivalent to the concepts of the "Neolithic" and "Bronze Age". Ten years later, these terms became widespread: from popular and educational literature to scholarly monographs.

The turning point in identifying the role of the *Jōmon* period in the development of the ethnic and cultural identity of Japan were the 1950s–1970s, when

the idea of a "new Japan" with "new history" and "new ages for Japan" emerged in the scholarly community. In the 1970s, a clear sequence of the ancient history of the Archipelago was established: the Paleolithic, *Jōmon*, *Yayoi*, *Kofun*, and historical period (Yamada Yasuhiro, 2015: 60–68). This was accompanied by the development of concepts about the uniqueness of Japanese civilization throughout the period of its existence, in comparison to continental civilizations, primarily China.

Concepts of transition to civilization in the contemporary archaeology of China and Japan (evidence of Neolithic cultures)

Chinese scholars have proposed two main variants concerning the time of transition to civilization: 1) the Late Neolithic—cultures of *Dawenkou*, *Hongshan*, *Songze*, *Liangzhu*, and the *Longshan* cultural community; 2) the Early Bronze Age—the so-called Xia period (23rd–16th centuries BC). However, the famous Chinese historian He Ziquan believed that societies of the Shang (16th–11th centuries BC) and Western Zhou (11th–8th centuries BC) periods were at the stage of chiefdom, while state and civilization emerged only during the Spring and Autumn period (722–481 BC) (Wang Zhenzhong, 2020: 121–122). Currently, the more commonly accepted version is that of the Neolithic origin of civilization in China.

In the late 1980s, Su Bingqi (1909–1997), a member of the Institute of Archaeology of the Chinese Academy of Social Sciences and Professor of Peking University, presented his view of the emergence of Chinese civilization as a process including three stages: ancient culture *gu wenhua* 古文化, ancient cities *gucheng* 古城, and ancient state *guguo* 古国 (1988). Later, he proposed the concept of emergence and development of the state, which also implied three stages: ancient state *guguo* 古国, principality *fangguo* 方国, and empire *diguo* 帝国. Moreover, the third stage in the emergence of civilization (ancient state) corresponded to the first two stages in the development of state (ancient state and principality). Su Bingqi also distinguished three models of state formation: the primary type *yuansheng xing* 原生型, secondary type *cisheng xing* 次生型, and reproducing type *xusheng xing* 续生型 (1997: 108–139). Su Bingqi proposed this theoretical framework after studying archaeological cultures of the Neolithic (Xinglongwa, Zhaobaogou, Hongshan, Fuhe), Bronze Age (Lower Xiajiadian culture and Upper Xianjiadian culture), and Early Iron Age (the culture of the state of Yan) in Southern Manchuria. The starting point was the discovery of sites of the Neolithic Hongshan culture (4600–2900 BC) in Southeastern Manchuria, primarily the Niuheliang group of sites, which included a temple, altars, and burial mounds. According to Su Bingqi, large burial and ritual complexes, as well as advanced art (terracotta sculpture, jade artifacts), testified to the emergence of supra-communal social structures and the transition to civilization. Initially, Su Bingqi believed that the Hongshan culture was at the stage of "ancient culture" and did not show signs of "ancient state". Later, he revised his opinion, attributed that culture to the stage of "ancient state", and suggested that its chronological framework corresponded to the reign of the mythical ruler Huang-di, whose state center was located in the Yanshan Mountains in North China. The culture of the lower layer of Xiajiadian (2000–1300 BC) in the northeastern region and the Liangzhu culture (3300–1700 BC) in the lower reaches of the Yangtze River corresponded to the stage of "principality". The first empire in the history of China was Qin (221–206 BC) (Ibid.: 86–106, 111–129).

Since the formation of state in Manchuria took place earlier than on the Central Plain, Su Bingqi attributed it to the primary type. He believed that the idea of state was borrowed by the population of the Huanghe River Basin from the cultures of the northeast. On the Central Plain, the largest site of the "ancient state" stage was the fortified settlement of Taosi (ca 2500–2000 BC) in Shanxi Province; the stage of "principalities" was represented by the states of Xia, Shang, and Zhou. Individual Chinese principalities also had their own history of statehood. The most representative of these principalities was Qin, which experienced all the stages: "ancient state" under Xiang-gong (833–766 BC), "principality" under Mu-gong (683–621 BC), and empire under Qin Shihuang. According to Su Bingqi, Qin was an example of a secondary type of state; the reproducing type was represented by the states founded by nomads on the territory of China after collapse of the Han Empire (Ibid.: 129–139).

Despite the lack of clear criteria for transition to civilization and formation of a state, the vagueness of formulations and an abundance of metaphors, which make it difficult to understand and use the theory of Su Bingqi, it had a huge effect on Chinese archaeology. Currently, the ideas of Su Bingqi have been elaborated by the Professor of Peking University Yan Wenming, by the Researcher at the Institute of Archaeology of the Chinese Academy of Social Sciences, head of excavations at the Erlitou site Xu Hong, and by one of the supervisors of the "Xia–

Shang–Zhou Chronological Project", the Professor of Peking University Li Boqian.

In 1995–1997, Yan Wenming offered his own approach to solving the issue. He believed that Huangdi reigned in the 3rd millennium BC; in archaeology, his kingdom is represented by the evidence of the Longshan cultural community in the basin of the Huanghe River. Concerning its level of political organization, the Longshan society was at the stage of chiefdoms. However, Yan Wenming considered this borrowed term not very suitable for describing Chinese history and preferred to use the terms "prehistoric state" *yuanshi guojia* 原始国家 or "ancient state" *guguo* 古国. The fortified settlements of Erlitou, Sanxingdui, and some other sites were "kingdoms" *wangguo* 王国, which in Su Bingqi's terminology roughly corresponds to the stage of "principalities" *fangguo* 方国. Later, Yan Wenming dated the transition to "ancient states" to an earlier time, the mid 4th millennium BC, when representatives of various Neolithic cultures in five regions of present-day China—*Yangshao* on the Central Plain, *Dawenkou* on the lower reaches of the Huanghe River; *Daxi*, *Qujialing*, and *Shijiahe* on the middle reaches of the Yangtze River; *Songze* and *Liangzhu* on the lower reaches of the Yangtze River, and *Hongshan* and *Xiaoheyan* in the Yanshan Mountains—moved from tribal organization to a state (Yan Wenming, 1997). Thus, the entire period of 3500–2000 BC can be considered "the age of ancient states" *guguo shidai* 古国时代. The ideas of Yan Wenming, Xia Nai, and Su Bingqi found their reflection in the authoritative comprehensive book "The History of Chinese Civilization" (2006), prepared by a team of authors from Peking University and translated into many languages (including Russian). Yan Wenming was Editor-in-Chief of the first volume, which provides information on the Neolithic roots and early stage in the development of Chinese civilization (Istoriya…, 2020: 82–136).

Unlike most of his predecessors and contemporaries, Xu Hong avoided the concept of "Chinese civilization" while discussing the archaeology of the Neolithic, and raised the question as to the origins of civilization on the mainland of East Asia. According to his point of view, starting from the late period of the *Yangshao* cultural community and up to the *Longshan* period inclusively (3500–1800 BC), population groups in different areas of the Huanghe and Yangtze River Basins entered a period of deep social restructuring; many tribes and ancient states *guguo* 古国 competed with each other. This period corresponds to "the age of ancient states" *guguo shidai* 古国时代, or the "age of city-states" *bangguo shidai* 邦国时代, or the age of chiefdoms. Society became more complex with population growth; class differentiation was accompanied by cultural contacts and conflicts between various local population groups. All these processes were reflected in the material culture, the traces of which survived as archaeological objects. The most striking examples are the sites of the *Liangzhu* culture and fortified settlements of Taosi and Shimao (Shaanxi Province). Specific indicators of the transition to civilization are: 1) systems of settlements grouped around one large central settlement; 2) ditches and walls surrounding settlements; 3) large structures created using the *hangtu* method of earth compaction; 4) buildings of the palace type; 5) large altars; 6) large burial complexes. Differences in quantity and quality of the grave goods testify to significant social stratification. Gradually, various communities formed an extensive communication network; however, within this network they retained their independence and self-sufficiency. Starting around 1800 BC, towns and large settlements of the *Longshan* cultural community on the Central Plain ceased to exist. They became replaced by the *Erlitou* culture, which absorbed traditions of the previous period. The area of this culture included the entire territory on the middle reaches of the Huanghe River, while some of its elements penetrated remote areas up to present-day Hong Kong. According to Xu Hong, this fact, as well as the emergence of the capital city of Erlitou, testified to the first territorial state in the middle reaches of the Huanghe River and transition from multiple "civilizations of city-states" *bangguo wenming* 邦国文明 to a single "dynastic civilization" *wangchao wenming* 王朝文明. The emergence of the *Erlitou* culture marks the beginning of the Bronze Age in China and constitutes a watershed between the pre-dynastic and dynastic periods of Chinese history (Xu Hong, 2016: 15–16).

As with Su Bingqi, Li Boqian offered a tripartite model for the development of state: "ancient state" *guguo* 古国, "kingdom" *wangguo* 王国, and "empire" *diguo* 帝国. The period of "ancient states" lasted from about 3500 to 2500 BC. In addition to the Niuheliang complex, Li Boqian included the Lingjiatan site in Anhui Province and the Xipo site in Henan Province in the group of "ancient states". Upon comparing the assemblage of jade items from these three sites, Li Boqian came to the conclusion that there were three paths of transition to civilization. The first path was based on theocracy, as was the case with Niuheliang, where zoomorphic images and ornaments dominated. The second path was based on a combination of

military, political, and religious power, as was the case with Lingjiatan, where cultic items and ritual weaponry were present. The third path was based on political and military power, as was the case with Xipo, where only *yue* jade axes were found. Li Boqian's "ancient state" is synonymous with the term "chiefdom". The initial stage of "kingdoms" is represented by the Liangzhu site of the *Liangzhu* culture and by Taosi site of the *Longshan* culture on the Central Plain. After analyzing these complexes, the following signs of transition to civilization and formation of a mature state were formulated:

1) stratification of settlements and emergence of particularly large ones;

2) construction of defensive structures around the settlements;

3) appearance of large ritual complexes;

4) stratification of burials, emergence of organized cemeteries;

5) organization of specialized areas for artisans' workshops in the settlements, appearance of storage facilities;

6) presence of specific weaponry and/or ritual objects which could serve as symbols of power;

7) appearance of literacy and signs of its exclusive use in large settlements;

8) presence of foreign cultural borrowings in large settlements;

9) signs of relations of control and subordination between settlements of different levels;

10) spread of cultural influence over a certain territory (Li Boqian, 2016: 6–7).

Gao Jiangtao from the Institute of Archaeology of the Chinese Academy of Social Sciences did a comprehensive analysis of archaeological evidence, including location and spatial organization of settlements, size and function of buildings, structure and size of burials, composition of grave goods, etc. Under the possible influence of Li Boqian's views, Gao Jiangtao proposed the concept that there were three models of transition to civilization and emergence of state in the Late Neolithic of China: the Taosi, *Hongshan*, and *Liangzhu* models. The common prerequisite for civilization and statehood was the emergence of economic and social inequality, which primarily found its material expression in the differences in size and structure of burials, and composition of grave goods. The Taosi model was distinguished by sophisticated social stratification, with possible presence of a noble class. The basis of statehood there was the power of the ruler-*wang*; a system of rituals played an important role in political life. In terms of the form of government, Taosi was a city-state. The most important difference in the *Liangzhu* model was that the state was based on religious rather than secular power. This is confirmed by an insignificant number of symbols of political and/or military power (high status weaponry) among the grave goods as opposed to abundant jade artifacts used in religious rituals. The *Hongshan* model was in many ways similar to the *Liangzhu* model. The role of religion in the life of society was extremely important; religious power occupied a central place in the state system, but secular power of the ruler-*wang* also existed at the same time. State entities during the Late Neolithic might have also emerged in the lower reaches of the Huanghe River and middle reaches of the Yangtze River. However, settlement sites in these regions have not been studied fully enough to draw conclusions about the social and political structure of the population (Gao Jiangtao, 2019: 23–28).

In Japanese archaeology, the theory of civilizational development of ancient societies has been traditionally applied to the *Yayoi* (middle and late stages, 6th century BC to 3rd century AD) and *Kofun* (3rd–7th centuries AD) periods (An Illustrated Companion…, 2020: 84). The term "civilization" began to be used for describing the *Jōmon* period starting in the late 20th century, which, however, has not found support among the majority of specialists. The most important theoretical area, which we will discuss in more detail, is the study of the material culture of this period for detecting sophisticated social structures.

Large-scale construction on the entire archipelago triggered activization of archaeological works, starting in the mid 1960s (Habu, Okamura, 2017: 13–15), which resulted in discovering new sites and in new directions for research into the *Jōmon* period. Active studies of archaeological sites of the *Yayoi* culture in the 1940s–1960s led to the concept of the "stagnant period of *Jōmon*" which, according to some scholars, was pushed away by a new culture experiencing a strong continental influence (Tsuboi Kiyotari, 1962). The idea of the "rich *Yayoi* period" was confirmed by the discovery of new sites, primarily the settlement of Toro in Shizuoka Prefecture, which was discovered in 1943. At that site, in 1947, the first comprehensive interdisciplinary research in Japan was carried out. The excavations of 1947, 1952, 1965, and 1999–2003 resulted in discovering twelve dwelling pits, two pile structures, a ritual building (also of the pile type), remains of a well, irrigation canals, and rice fields at the settlement. Archaeological evidence included items made of wood, bone (including oracle bones), iron,

and stone, as well as pottery, glass beads, etc. This settlement existed during the 1st–5th centuries AD (Late *Yayoi–Kofun* periods) (Okamura Wataru, 2014). Publication of evidence from the Toro site among the "Japanese people exhausted by war" resulted in the idea of the *Yayoi* period as a time of "peaceful villages of farmers surrounded by rice fields", confirming the reality of the mythical "Central Land of the Reed Plain" *Toyoashihara no Nakatsukuni* 豊葦原中国. This discovery played an important role in spreading the knowledge about the origins of the Japanese culture, and anchored images of the *Jōmon* and *Yayoi* periods in the public consciousness (Yamada Yasuhiro, 2015: 119, 133–134).

In the 1980s, research on the *Jōmon* period was based on social theory appearing primarily in the writings of Hayashi Kensaku and Harunari Hideji. After analyzing the spatial structure of burial complexes and orientation of bodies of the deceased, Hayashi Kensaku (1977) suggested a dual system of social organization. Harunari Hideji (1973) studied specific aspects of intergroup marital ties and the kinship system in the *Jōmon* period, based on the practice of ritual tooth extraction (the *basshi* ritual). Most research at that time followed the idea of a "poor and equal society of hunter-gatherers", which appeared in the 1960s. The features of burials, such as differences in the position and orientation of the dead, different types of tooth extraction, presence or absence of grave goods, etc., were interpreted not as signs of a hierarchical society, but as embodiment of a horizontal division according to the principle of "us versus them" (Yamada Yasuhiro, 2020: 29).

Possible existence of hierarchical relations in the Japanese Neolithic, as opposed to the idea of a "poor equal society", was discussed in the second half of the 1980s. Sasaki Fujio was the first scholar who spoke about inequality in the *Jōmon* period, but his suggestion was not accepted. Sasaki Fujio (1973: 40–42) did not use the term "hierarchy", but proposed a vertical form of social differences after analyzing the data from settlement complexes.

The emergence of the theory of a "stratified society of the *Jōmon* period" was associated with discovery of new archaeological complexes, such as the Torihama shell mound (Fukui Prefecture, initial–early period, ca 12,000–5500 BP). Abundant organic remains (tools of bone and wood, lacquerware, well-preserved wicker baskets, canoes, textile fragments, nuts, seeds), as well as pottery, stone tools, ritual items, ornaments, etc. were found at the site. This discovery resulted in the idea of the Neolithic *Jōmon* society as a society of "wealthy hunter-gatherers" with an advanced spiritual and material culture (Yamada Yasuhiro, 2020: 29). The discovery of large ritual and settlement complexes with abundant and well-preserved organic material evidence dating from the Initial to Final *Jōmon* period in different parts of Japan provoked a powerful response in academic circles and the elaboration of new theories.

In the late 1980s to early 1990s, the ideas of a "segmented society" and slave-owing relations in the *Jōmon* period appeared. After comparing data on the indigenous peoples of the northwestern coast of North America with evidence from the burial complexes of the Kamegaoka culture (final period, 2700–2300 BP), Kobayashi Tatsuo suggested the existence of slaves at that time (Yamada Yasuhiro, 2015: 171–172). This was most convincingly argued for in the work of Watanabe Hitoshi "*Jōmon* Stratified Society" (1990), where it was studied in comparison with ethnographic evidence of hunter-gatherers of the North Pacific (the indigenous peoples of Northern America and Siberia, and the Ainu). According to Watanabe Hitoshi, the structural basis of the *Jōmon* society was a hierarchical system separating the rich and poor; there was also a differentiation of subsistence strategies among the male population (salmon and marlin fishing, bear hunting, etc.). When describing social relations, Watanabe Hitoshi used concepts and terms that had not been previously applied to discussion of the *Jōmon* period, such as aristocracy, rich and poor, hierarchy, power, prestige, etc. (Yamada Yasuhiro, 2020: 29–31).

The height of the theory on the "stratified society of the *Jōmon* period" was the concept of "*Jōmon* civilization" or "*Jōmon* utopia" (Yamada Yasuhiro, 2015: 98–100). The settlement of Sannai Maruyama (Aomori Prefecture, early–middle period, ca 5900–4400 cal BP)—the largest *Jōmon* site, with hundreds of semi-dugouts and pile structures, large burial ground, utility areas, etc.—plays a central role in this concept. A unique "ritual structure" was discovered in 1994: the remains of a three-tiered building on supporting posts. Archaeological collections were enriched with wicker and lacquered items, stone and bone implements, pottery, ornaments of shells and jade, as well as floral and faunal evidence (Habu, 2004: 108–134). The study of the complex has changed the perception of the period and has outlined the direction of new research. Based on the interpretation of remains of the tiered structure as a cultic place, the concepts of "stratified social inequality in the *Jōmon*", the "town of *Jōmon*", "Tohoku Kingdom" (or "Northern Kingdom of *Jōmon*"), "forest Neolithic culture", "wooden civilization", and "temple" theory were put

forward (Sasaki Fujio, 1999; Yamada Yasuhiro, 2015: 63–65; 2020). This site was advertised as "the great discovery, rewriting the history of Japan". High-flown language was used in popular and academic literature ("hierarchy", "slavery", "city", etc.). For example, Koyama Shūzō insisted that a "hierarchical society divided into an aristocratic class, common people, and slaves" was present in the settlement of Sannai Maruyama (Yamada Yasuhiro, 2020: 31), which caused much criticism and contributed to a negative attitude towards the theory of the "stratified society of the *Jōmon*" among many scholars. Despite all this, this theory continued to gain ground in the 2000s. Many researchers tend to see traces or vestiges of a transegalitarian society in the *Kamegaoka* culture. Nakamura Oki, Sasaki Fujio, Taniguchi Yasuhiro, Takahashi Ryuzaburo and others worked in this area (Ibid.: 32–33). Signs of social inequality were identified based on the contents of burials (differences in the composition of grave goods (Nakamura Oki, 1999: 50–51) or choice of burial place (Sasaki Fujio, 2002)).

Thus, until the 1960s, it was customary to refer to the *Jōmon* people as "poor, sedentary hunter-gatherers", but after the emergence of new analytical methods and the involvement of experts from related fields, a new perspective has appeared. Today, we understand that the *Jōmon* people were actually highly developed hunter-gatherer-fishermen, with sophisticated social stratification (Sasaki Fujio, 1973: 40–45). This people possessed a technologically diverse toolkit, high level of pottery production (Yamada Yasuhiro, 2015: 68–70), specific funeral and ritual practices, and a fertility cult (Sasaki Fujio, 2002), as well as an integrated approach to adaptive strategies (Yasuda Yoshinori, 1997: 10–12).

There are two points of view on the origins of civilization in contemporary Japanese archaeology. The first is based on the theory of a sophisticated hierarchical society emerging in the Middle to Final *Jōmon* period, when favorable climatic conditions and a variety of adaptive strategies (gathering, hunting, early forms of agriculture) made it possible to achieve a high level of development in the material and spiritual culture. This was most clearly manifested in construction of large settlement complexes and sophisticated structures from earth embankments, stone, and wood. Followers of the other view do not deny the high level of development in the material culture of the *Jōmon* period, but believe in the existence of several regional cultures, which evolved at that time on the basis of a hunting and gathering economy, while an agrarian economy appeared on the territory of Japan only with the influx of the carriers of the *Yayoi* culture.

Conclusions

The analysis of works on the origins of civilization, written by Chinese and Japanese archaeologists, has revealed ongoing discussions in scholarly communities of both countries on the time and nature of transition to the stage of civilization. There is still no unified approach to identifying criteria for this qualitative leap in the development of societies. The most common hypotheses suggest the emergence of civilization in the Neolithic (the *Longshan* period in China, *Jōmon* period in Japan) or Bronze Age (in particular, the *Erlitou* culture in China and the *Yayoi* culture in Japan). Currently, the majority of scholars in China tend to share the idea that powerful cultural centers where statehood began to take shape in different regions on the territory of present-day China, and transition to civilization occurred in the Late to Final Neolithic (ca 3500–2000 BC). A consensus has not yet been reached in Japanese archaeology. Two more aspects of the Chinese scholarly tradition are the belief in interdependence of processes behind the emergence of civilization and state, which stems from reliance on the works of F. Engels, and desire to compare (not always critically) archaeological evidence with information derived from traditional historiography. Japanese scholars who study the archaeology of the Neolithic–Bronze Age are deprived of the opportunity (and need) to rely on chronicles, and are less hampered by ideological restraints; their main focus is on social structures of ancient societies.

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The *Pisany Kamen* Rock Art Site on the Angara (Marking the Tercentenary of Its Discovery by D.G. Messerschmidt)

The petroglyphs at Pisany Kamen on the right bank of the Angara, near Klimino, Kezhemsky District, Krasnoyarsk Territory, first described by D.G. Messerschmidt in 1725, have been examined by many specialists. Most previous studies, however, were superficial, and the information they provided was unreliable and contradictory. To specify the site's location and to study the petroglyphs in more detail, using more advanced methods, the archaeological team from Krasnoyarsk Pedagogical University visited Pisany Kamen in 1999–2000. A topographic survey was carried out, and the petroglyphs were photographed and copied. Both previously known and new petroglyphs were recorded, showing animals, anthropomorphic figures in masks, and a separate mask. Results were compared with those recorded by Messerschmidt. The estimated dates of the site fall within a broad interval from the Early Bronze Age to the Late Iron Age (2nd millennium BC to 1st millennium AD). The petroglyphs are relevant to various aspects of the ideology and material culture of the ancient population of the region. Their further study will hopefully disclose the semantics of many images and assess their cultural and chronological attribution, relevant to the history of several modern groups of Siberia.

Keywords: *Messerschmidt, petroglyphs, Angara, horsemen, Iron Age.*

Introduction

The petroglyphs of the Angara are notable for their diversity: images on rocky cliffs, coastal boulders and fallen stone blocks, separate slabs, and mini-sculptures. The Asian northernmost stone anthropomorphic sculpture is unique. The technique of execution is also varied: pecking, engraving, polishing, and trace-drawing with liquid or dry pigments of various colors. There are cases of combining different techniques when the pecked contour was rubbed and then painted over. Notably, despite the great number of other rock art sites in the region, this was the only one that attracted D.G. Messerschmidt's attention about 300 years ago, and became a launching point for subsequent studies of the Angara petroglyphs. These were drawings on the Pisany Kamen rock near the village of Klimovo. In the summer of 1725, Messerschmidt (1675–1735) undertook a boat trip along the Angara River from Irkutsk to Yeniseisk, and it was the final event of his long-term research journey in Siberia. During the trip, he was adding to his natural science collections; however, he was also interested in "antiquities", and on July 8, 1725, he made a stop near the Pisany Kamen, "to examine the ancient images painted on the rock" (Putevoy zhurnal…, 2021: 378). Messerschmidt made sketches and descriptions of the petroglyphs, and determined the geographic coordinates of Pisany Kamen (Zaika, 2022). Judging by these sketches, he recorded images of two horsemen (Fig. 1) drawn with red ocher on a rocky surface, as follows from the description. After Messerschmidt, the site was visited by I.G. Gmelin, who did not find

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Fig. 1. Drawings of the images at Pisany Kamen, made by D.G. Messerschmidt (Putevoi zhurnal…, 2021: 378).

anything else (Zaika, 2022: 30) except the same images of "two riders on horses, roughly painted with red paint" (Okladnikov, 1966: 7). Later, this rock art site was mentioned by G.F. Miller. He traveled through the site in 1738 and, unlike previous explorers, noticed only one image of a rider (Miller, 1999: 528–529).

Subsequent studies of the Angara petroglyphs took place almost 150 years later. In 1882, with the support of the East Siberian Department of the Russian Geographical Society, N.I. Vitkovsky carried out an archaeological survey along the Angara, almost from its source to its mouth. At Pisany Kamen, he recorded the previously unknown images of a horse and a deer, made with red ocher (Vitkovsky, 1889: 11). Notably, for more than 100 subsequent years, the Pisany Kamen images did not attract any attention from other researchers. One can only note the report made by geologist V.S. Karpyshev in the late 1950s (Zaika, 2022: 30). He carried out geological works at the rock, recorded an elk image on its surface, and briefly described it (Okladnikov, 1966: 104).

Judging by the information from the above-mentioned researchers, the rock with the images was located "13 versts downstream the mouth of the Chadobets River, and 17 versts upstream the mouth of the Mura River" (Miller, 1999: 528), "between the villages of Klimovaya and Goltyavino" (Vitkovsky, 1889: 11), "between the Mura rapids and the mouth of the Kova River" (Okladnikov, 1966: 104). Only one coastal cliff known as Pisany Kamen is situated on the right bank in this section of the Angara, between the Obrodny stream and Ogaleva River, in the vicinity of the village of Khrebtovy, 7 km downstream of the village of Klimino (Karta…, 1984: 2), which description doesn't contradict the Messerschmidt's reports: "…on the right bank of the Tunguska (Angara River), about 2–2/3 old versts downstream the village of Klimovaya" (Putevoi zhurnal…, 2021: 378). For almost 200 years, all rock art studies in the region were focused exclusively on this site. Apparently, this was due, on the one hand, to its geographical name, Pisany Kamen ('rock with images'), and on the other hand, to the lack of the relevant research in that period. In 1999–2000, a team from the Astafiev Krasnoyarsk State Pedagogical University carried out archaeological studies of the site in order to establish its location accurately and to clarify the ambiguous information about the images (riders, horse and deer, elk) (Makulov et al., 1999; Zaika, 2000). The general task included a more detailed and qualified study of the petroglyphs and a determination of the current state of the site's preservation. The works were aimed at establishment of the site's boundaries, a topographic survey of the locality, photographic recording and copying of the images, and their description.

Description of the site

The Pisany Kamen rock art site is located on the right bank of the Angara River, downstream of the village of Klimino, Kezhemsky District, and 700 m northeast of the village of Khrebtovy, Boguchansky District of the Krasnoyarsk Territory (Fig. 2). This is a coastal cliff of whitish-gray limestones. It has sheer walls and a rather flat top, partly covered with taiga vegetation. The rock images are observed over a length of 50 m along the riverbed, on four steep cliff-faces (Fig. 3, 4); these were made with red ocher and black pigment. The images show animals, riders, anthropomorphic characters in the form of masks and masked figures. There are also barely identifiable images and fragments thereof.

Panel 1 (0.6 × 0.6 m), facing southeast (az. 70°), is located 7 m above the water's edge, in the northern part of the site. It shows a static contour image of a deer, rendered in a roughly realistic manner (Fig. 5, *1*). The deer's torso is shown in the form of an inverted isosceles trapezoid crossed in the front part by a vertical line; a hump is conveyed by a small protrusion. The neck is almost not distinguished; the realistically shown head is turned down, it is crowned with a vertical rod of horns with two lateral processes and a short line of ears. Straight limbs, widely spaced to the sides, are indicated by single short lines. The figure faces right. The ocher color is crimson.

Panel 2 (0.6 × 0.7 m) is located 17 m south of panel 1, at a height of 8 m from the water's edge. It is vertical, facing southeast (az. 55°). In the center, a silhouette image of a rider is painted with light red ocher (Fig. 5, *2*). The body is straight, wide, and short; one arm is extended

forward, towards the head of the horse; the other arm and the legs are not shown. The rider's head of hypertrophic size is rendered in the form of a rounded spot with a pointed top. The horse's body has a dorsal deflection in the middle and a slightly paunchy belly; the neck is straight, raised up and stretched forward; the front and hind "valenki-shaped" limbs are straight, put slightly forward; the wide angular tail is raised up. The head is shown quite realistically, the fork of long ears is highlighted. The image of the rider partially (the "foot" of the front leg and the head of the horse) overlaps the rounded contour of the mask located to the right. The mask was drawn with black sooty dye. The eyes and mouth of the mask are rendered with three circles. It is crowned with two straight "antennas". Between them, there is an angular line and oblique strokes of ocher, which was apparently used to represent the figure of the rider.

Panel 3, 1.2 m high and 1.3 m wide, is located 20 m south of panel 2, at the same level. It is vertical and slightly concave, facing southeast (az. 60°). The drawings are made with red ocher, which color varies in a wide range: from scarlet to maroon (Fig. 6), suggesting that the images were made not simultaneously.

A silhouetted image of a rider, oriented to the right, is located in the middle part of the panel, in the area of a relatively fresh exfoliation of the rock's crust. To the left, there is a large anthropomorphic image with a mask, rendered in a linear style; the image is shown with its head down (see Fig. 5, *3*). The head part (facial mask) looks like a horizontal oval with short "outgrowths" at the sides (braids, ears?). It is crowned with a T-shaped pommel. To the left of the anthropomorphic image, a heart-shaped face

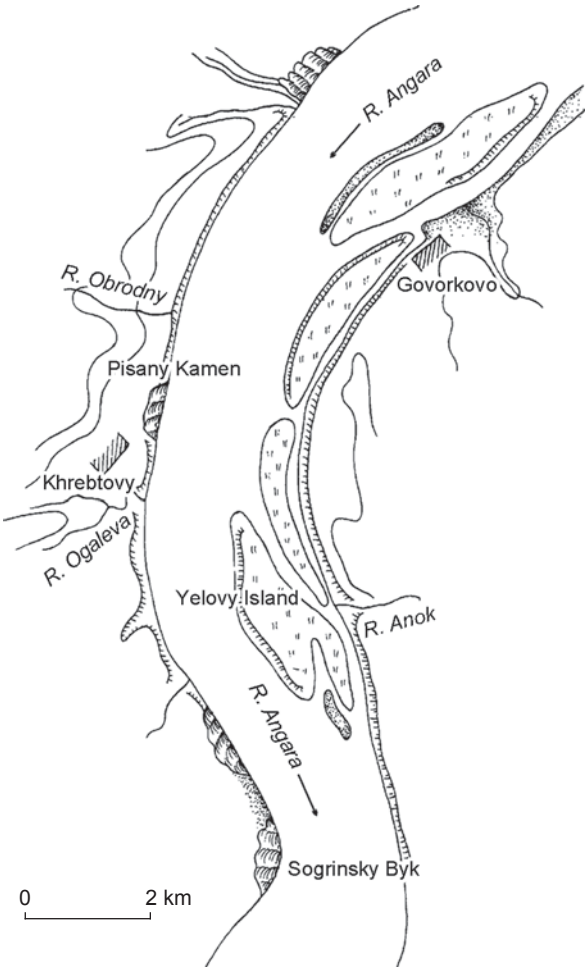

Fig. 2. Layout plan of the Pisany Kamen location.

Fig. 3. General southern view on the cliff with images.

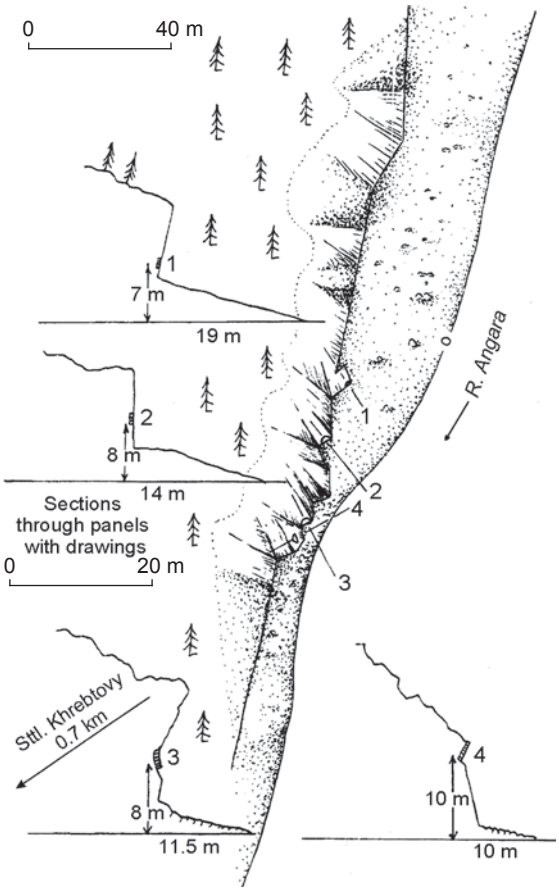

Fig. 4. Topographic map of the rock art site.

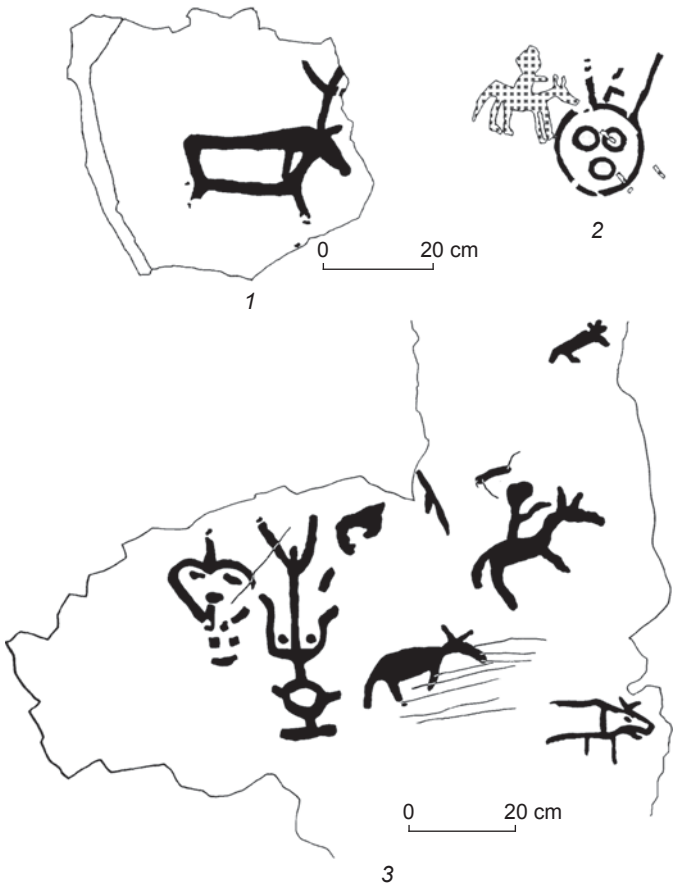

Fig. 5. Copies of the images from panel 1 (*1*), 2 (*2*), and 3 (*3*).

Fig. 6. General view on panel 3 from the southeast.

is shown. Below and to the left of the rider, a silhouetted image of an ungulate animal (elk?) is shown. Stylistically, it looks similar to the horse, but with a larger torso and short neck and limbs. To the right of the animal, there is an incomplete, roughly realistic contour image of an elk, with a vertical division of the body, executed with red ocher, which changes maroon tones to pink under calcite streaks. Above the rider's silhouette, there is probably a predator depicted; judging by the small size of its figure, it belongs to the Mustelidae family. A little to the side, 0.5 m to the right of the upper edge of the main composition, a realistic silhouette of the elk's head turned to the right was identified (section 3a).

Panel 4 (2.5 × 3.0 m) is located 5 m southwest of panel 3, 10 m above the water's edge. Unlike other petroglyphs, it faces northeast (az. 340°). The panel is relatively flat, but covered with cracks. It contains visible fragments of zoomorphic images, possibly ungulates. The rock frieze is hardly accessible; therefore, thorough examination of the images was not possible without special climbing equipment. Only the images in the lower right part of the panel, bearing the linear image of an animal in an inclined position, have been examined. The animal image shows proportionate torso and limbs; the neck and head are stretched forward and rendered with one straight line. The bifurcated ears are shown; the tail is not depicted. The animal species is hardly identifiable owing to the schematic style of the image. Below, a slanting ocher line is noted.

The site is in a critical condition. Rock panels are intensively destroyed both by natural processes (cracking and exfoliation) and anthropogenic impact (visitors' inscriptions, lime burning in rock niches).

Discussion

Messerschmidt supplemented his description with an illustration showing two similar images of horsemen, located one above the other on adjacent panels, subdivided by a diagonal rock crack (see Fig. 1). The recent examination of the rocks did not reveal such a combination of horseman figures at this rock art site. Only solitary horseman images are represented in the compositions. Also, no signs of loss of fragments of these panels or adjacent stone blocks, which might contain another rider image, have been noted. Apparently, the researcher combined in his illustration the most striking images from different places on the rock, because later, G.F. Miller recorded only one rider image on one of the panels (1999: 528–529). Notably, until the early 20th century, the practice of "natural sketches" was widespread. Using this practice, researchers often combined images from various panels in a single graphic illustration at their own discretion (Belokobylsky, 1986: Fig. 12–15, 32–36).

Horseman images are present only in two parts of the rock art site (panels 2 and 3). They are located relatively close to each other (20 m between them), 8 m above the water's edge. The panels face southeast, which does not contradict Messerschmidt's illustration, as also the orientation of the riders (to the right) and the silhouette execution of the images (Zaika, 2022: 31). The horses are rendered in a relatively static pose, the tails and uplifted neck with ears are depicted; the bodies of the riders are straight, with only one hand extended forward to the neck of the horse shown; the rounded heads of the riders are depicted. As was mentioned above, the differences with modern data are insignificant, and observed only in particulars: the legs of the riders are not shown; the pairs of limbs of the horse on panel 2 are rendered with single lines. It seems that the researcher added "missing" details in his subjective desire to give the images a more naturalistic look. In any case, "it is necessary to note the high professionalism of D.G. Messerschmidt both as a scientist and as an artist, as he noticed the main features of rock images correctly" (Ibid.). These images and the nearby figures are not connected by a single idea; in one case (panel 2), this is evidenced by a sharp color contrast between the images and various stratigraphic levels of their position on the rocky surface; in the other case (panel 3), by various degrees of patination of the underlying rocky surface (the rider image was made on the area of a relatively fresh exfoliation of the rock's surface).

The neighboring masked anthropomorphic image and the masks on panels 2 and 3 are typical of the Bronze Age figurative traditions of the Lower Angara (Zaika, 2012). The simple mask-face with a rounded black contour on panel 2 corresponds to the Early Bronze Age (Zaika, 2013: 155, pl. 129). Such masks are characteristic of the Tas-Khazaa figurative tradition of the Early Bronze Okunev culture of the Middle Yenisei. Two straight "antennas" are also typical of the faces of this type. These has been noted on the anthropomorphic image on the floor slab in burial 1 of the Tas-Khazaa cemetery (Lipsky, Vadetskaya, 2006: Pl. XVI) and on a number of rock images (Sher, 1980: Fig. 63, 116, *9*, *10*). These similarities in the style and iconography of the images may be the result of intercultural contacts observable not only in petroglyphs, but also in other archaeological evidence from this period (Zaika, 2006a: 331).

The anthropomorphic figure depicted in an upside down position on panel 3 was likely made in the later period of the Bronze Age. Judging by the recent discoveries in the region, the head part of the image shows iconographic features close to the bronze mask found at Ust-Kata-2. During excavations of layer 1, a bronze plate in the form of a mask was found in a redeposited context. The suboval plate shows a T-shaped pommel, side eyelets, and a "neck"-handle at the base (Boguchanskaya

arkheologicheskaya expeditsiya…, 2015: Fig. 415); the Pisany Kamen image shows similar iconographic features. The find was tentatively attributed to the Xiongnu-Sarmatian Period (Amzarakov, 2013: 205); although A.P. Okladnikov did not exclude the possibility that such cast items originated in the Scythian period, and rock images in the Late Bronze Age (1st millennium BC) (1978: 163, 183; 2003: 519–527). Anyway, it must be born in mind that the idea of a particular mythical image in a spiritual culture appears much earlier than its embodiment in the portable art. Consequently, this character was likely made on a rock in the Middle or Late Bronze Age. Spots on both sides of the chest mark the female principle of the image, the phallic process the male one. The upturned position of the figure can illustrate the symbolic death of this mythical "bisexual" spirit-deity.

The neighboring heart-shaped mask represents the image that had been popular in the rock art of the region since the Neolithic and was more common for the Bronze Age (Zaika, 2006b). Fragments of a narrow subrectangular contour under the "chin" can be interpreted as a conventional image of the torso or the neck-handle of the mask. In the latter case, this image is semantically close to the mythical character considered above and, accordingly, was made at approximately the same time. The incomplete contour image of an elk in the lower right part of the panel corresponds rather to the Middle Bronze Age (Klyuchnikov, Zaika, 2002). A more realistic contour image of a deer on panel 1 corresponds to the Early Bronze Age (Ibid.). Thus, the images of horsemen should be attributed to a younger period, the Iron Age (late 1st millennium BC to early 1st millennium AD).

Despite the different color shades of the horsemen images and the discrepancies in their iconography, these drawings are relatively contemporaneous. These were made by different authors, but in common figurative traditions. The horsemen show accentuated heads of exaggerated size, only one arm, stretched forward; the legs are not indicated. The horses are depicted in a "sudden stop" posture; they have straight limbs, thin necks, elongated narrowed heads, a pair of ears each, and long lowered tails. The semantics of various combinations of horsemen images with older anthropomorphic mask- and face-images is noteworthy, and the disproportionately large heads of the horsemen suggest certain connections with the masks. In any case, these assumptions require special studies.

In general, the subjects of the petroglyphs under consideration testify to the existence of certain forms of cattle breeding (for example, horse breeding) in the economy of the drawings' author's contemporaries. The recognizability of the image of the horse suggests a good knowledge of nature by the ancient artist, the roughly realistic manner of its depiction speaks of well-established artistic traditions. The "sudden stop" posture of the animals was typical of the Scythian-Siberian animal style; this may indicate a penetration of the tribes practicing the Tagar and Tashtyk cattle-breeding cultures from Southern Siberia into the taiga regions of the Angara (Makulov et al., 1999: 424). However, the Angara horsemen images do not show the legs of the riders, in contrast to the drawings of the southern neighbors. This manner of depicting riders is typical not only of the petroglyphs of the Angara region, but also of many rock images of the taiga zone of Eastern Siberia, which indicates the originality of the local figurative traditions.

The penetration of nomads into the northern taiga regions could not be accidental. This was apparently caused by various environmental, economic, and socio-political factors. To date, a representative set of horsemen images has been recorded at the lower Angara rock art sites (Klyuchnikov, Zaika, 2006). Half-length side-view images of horsemen similar to the characters at Pisany Kamen have been attributed to the Iron Age. Front-view images of riders have been associated with a later period. Full-length images of horsemen standing on the backs of horses, deer, or other real and imaginary animals dominated in late medieval rock art. Moreover, unlike the petroglyphs of Southern Siberia, where the rider's image was often added to the earlier images of animals, the Angara rock art shows the opposite situation: the riding animal's image was added to the bottom of an older anthropomorphic character. Thus, the image of the horseman and the associated ideas, which were borrowed and adopted in the spiritual culture of the taiga population of the lower Angara at the turn of the eras, did not lose their relevance and experienced a number of adjustments in the subsequent periods.

Notably, the powerful cultural impulse of the southern steppe cattle-breeding communities was reflected not only in the rock art, but also in other archaeological materials. In the altars and funerary sites, a series of metal items—both southern "imported" bronze artifacts and local iron replicas—was found. Most of them demonstrate the artistic traditions characteristic of the Scythian-Siberian animal style. Griffin images predominate; images of deer, feline predators, wolves, and camels are much less common (Zaika, 1999; Lomanov, Zaika, 2005; Drozdov, Grevtsov, Zaika, 2011). Moreover, at the level of Early Iron Age–Middle Ages layer, in a ritual depression at the Kamenka cult complex, an accumulation of horse cranial remains and limb-bones was found (SOAN-4362: 2295 ± 45 BP) (Zaika, Ovodov, Orlova, 2013). At the neighboring rock art site of Zergulei, realistic images of horses have been recorded (Klyuchnikov, Zaika, 2006). All this may indicate the emergence of not only local variants of horse breeding in the region in the Early Iron Age, but also cults associated with the veneration of horse; these practices were developed in the subsequent periods up to ethnographic modernity. For

instance, the cult of the horse existed among the Lower Angara Evenki even prior to the arrival of the Russians; according to V.A. Tugolukov, the cult was borrowed by them from the previous Yenisei-speaking population (Assans and Kotts) (1985: 64). Notably, according to I.A. Chekaninsky, in the early 20th century, peasants of "Tungus origin", who lived on the Lower Angara and its left-bank tributaries, traditionally kept wooden and iron images of horses in their barns and sheds. Moreover, in the recent past, Tungus people "shamanized using a horse" (1914: 71).

Conclusions

The Pisany Kamen images are the first archaeological site of rock art of the ancient population of the Angara, which became known to scientists thanks to the research by D.G. Messerschmidt. As the historiographic review of the regional studies showed, "this was not only the first discovery of rock art, but also the first step in the archaeological study of the Angara region, made by a famous scientist almost 300 years ago. Apparently, this did not vanish without a trace, but provoked further research into the ancient past of the Angara, which has not lost its relevance even today" (Zaika, 2022: 31).

The recent studies at the site have revealed both previously recorded and new images (animals, anthropomorphic figures in masks, and a separate mask). At present, estimated dates of the images at Pisany Kamen fall within a broad interval from the Early Bronze Age to the Late Iron Age (2nd millennium BC to 1st millennium AD). They testify to various aspects of the spiritual and material culture of the ancient population of the region.

The horsemen images recorded by Messerschmidt have been attributed to the Early Iron Age; these mark the interaction of southern pastoralists with the local taiga population during that period. Penetration of some elements of the economic activities of the steppe people (for example, horse breeding) into the taiga environment made certain adjustments to the material culture of the Angara people, and also led to changes in the worldview of the taiga tribes. The veneration of horse was reflected both in the materials of sacrificial complexes and in the rock art of the region, without losing its relevance until the ethnographically modern period.

Further studies of petroglyphs and other archaeological sites of the Angara region will provide a new insight into the topical issues of reconstructing various aspects of the life of ancient and traditional communities, determining the features of ethnocultural interactions in a wide chronological framework, and understanding various aspects of the ethnogenesis of the modern peoples of Siberia.

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A Chalcolithic Burial in the Mountain-Forest Zone of the Trans-Urals

We describe an unusual burial at a stratified Chalcolithic site Shaitanskoye 4-6 on the coast of the eponymous lake in the Sverdlovsk Region. An individual, aged 18–35 was buried in an oval flat-grave pit, 1.6 × 0.56 × 0.2 m in size. We give a detailed description of sixty funerary items, made of stone: three unusually large knives manufactured on thin chert plates (the nearest outcrops are found in Northern Kazakhstan and Southern Urals); a projectile head, 19 arrowheads, 18 flint bladelets from a side-bladed tool, a polished axe-adze, a composite tool on a blade, two plates with use-wear traces, and 15 beads. Notably, some of the artifacts are made of "southern" rocks. The results of the isotope analysis indicate considerable mobility and close ties between populations of the forest and steppe Trans-Urals in the 4th and 3d millennia BC. The Chalcolithic site, which, apart from the burial, includes habitation deposits with numerous artifacts such as ceramics of various types, lithics including a large series of arrowheads and several flint figurines, can be viewed as a complex archaeological object where, among other activities, rites were performed securing group consolidation.

Keywords: *Urals, Chalcolithic, burial, arrowheads, knives, flint figurines, isotopes.*

Introduction

The study of burial sites can provide great evidence of cardinal changes in the worldview and lifestyle of the ancient population of the mountain-forest Trans-Urals. The earliest burials belong to the 4th–3rd millennium BC. At present, a little more than ten reliable burials are known in this territory; therefore, each new site requires in-depth scientific study.

This study is focused on the burial discovered during excavations of the stratified settlement of Shaitanskoye 4-6 on the northeastern shore of the eponymous lake in the Kirovgradsky District of the Sverdlovsk Region (Fig. 1), just 8–10 km southeast of the famous Shigir peat-bog. The site was found in 1989 by S.N. Pogorelov; it was additionally examined by the archaeologists of the Nizhny Tagil Social and Pedagogical Academy in 1996 and 2003; and in 2020 the stationary study began under the guidance of I.A. Spiridonova and O.N. Korochkova. The very first excavations showed that the burial is of high informational value. The cultural layer, with a thickness of 0.5–0.8 m, is saturated with stone items and ceramics (over 21 thousand finds), belonging to various archaeological periods—from the Neolithic to the Early Middle Ages. The majority of the finds date to the Chalcolithic and the Late Bronze Age (Cherkaskul culture). The Chalcolithic assemblage includes ceramics of the Shuvakish, Lipchinskaya, and Ayat types. One isolated burial located within the site deserves special attention: among the finds, there are numerous debris in the form of primary spalls, flakes, and chips, as well as the evidence of raw material preparation, and fragments of ceramics; such composition of the cultural layer suggests a settlement-type site. No remains of any other Chalcolithic evidence, with the exception of a few calcination spots, have been identified. Notably, within the excavation area of only 128 m^2, more than

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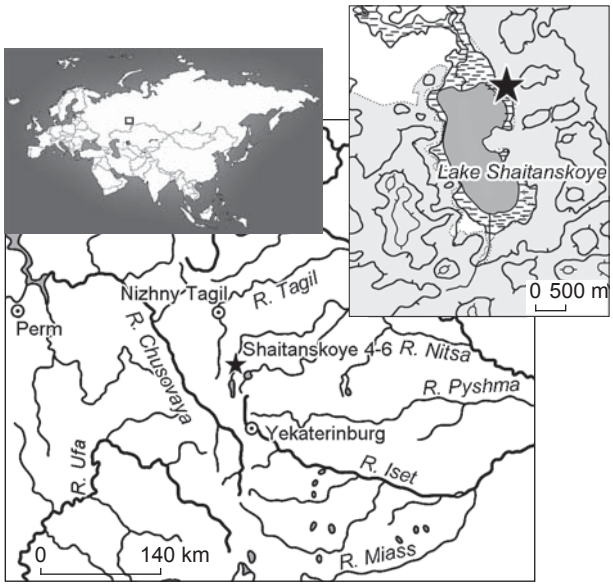

Fig. 1. The archaeological site of Shaitanskoye 4-6.

raw bone, like any other organic material, decomposes very quickly in the sod-podzolic soils of the Trans-Urals mountain-forest zone, especially in those formed on acidic intrusive rocks (granites, granodiorites). Judging by the location of the remains and the grave goods, the deceased was most likely buried with his head to the southeast. The closed jaws suggest that the decomposition of soft tissues occurred in a limited space. Most likely, the grave was covered with soil or piled with pieces of turf shortly after the burial.

Taking into account the degree of wear of the individual elements of the occlusal surface of the teeth, Svyatova suggested that they belonged to an adult individual aged 18–35 years. Dental racial diagnostic traits indicate the presence of components of western and eastern origin. The dental system is in a satisfactory condition; the absence of carious lesions and lines of enamel hypoplasia suggests that the deceased did not experience prolonged physiological stress (starvation/illness) in childhood.

170 arrowheads (102 of which were intact) and four flint figurines were found. Such an abundance of arrowheads is atypical of settlement assemblages. This feature and the presence of a burial here testify to the complex nature of the site, where funerary rites took place.

Description of the burial and the grave goods

The burial was arranged in an oval-shaped pit, with dimensions along the lower contour of 1.6 × 0.56 m, oriented along the NW-SE line, deepened into the mainland by 7–8 cm (from the ancient surface, about 25 cm) (Fig. 2). The anthropological remains found in the SE part of the grave-pit—fragments of teeth lying in anatomical order—were extracted in a monolith and subsequently cleaned in the laboratory by the anthropologist E.O. Svyatova.

The burial apparently corresponds to the rite of inhumation, since there are no traces of high-temperature exposure to the tooth-enamel, and no lenses of burnt soil, charcoal, or calcined bones. It should be noted that

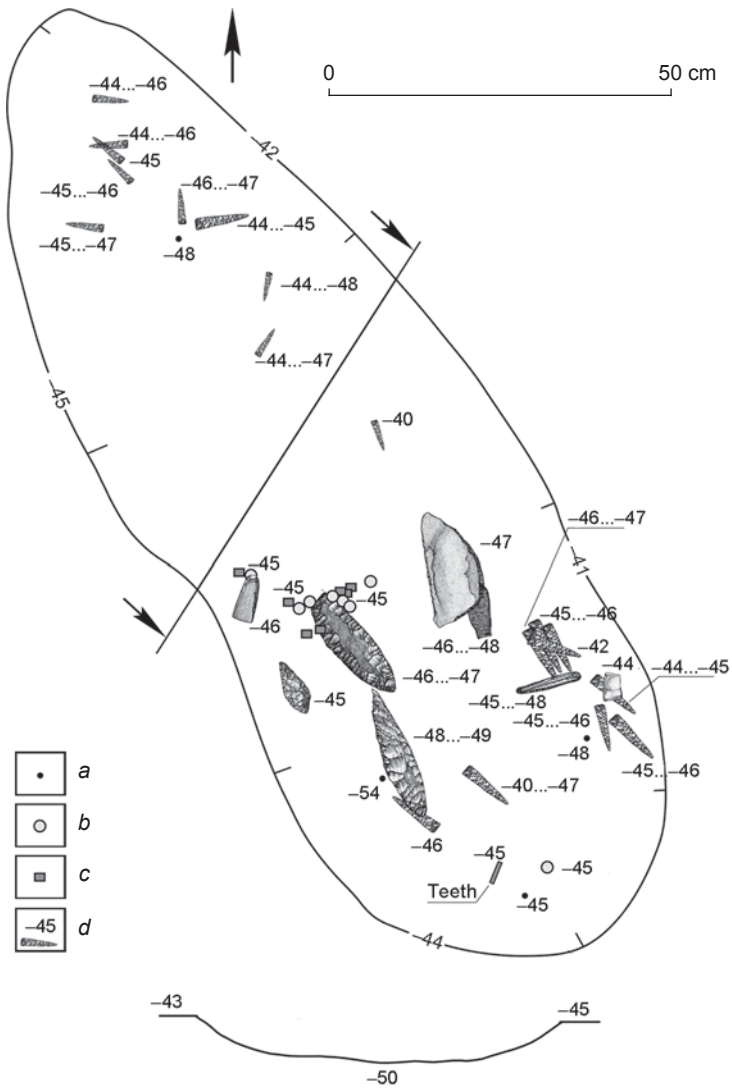

Fig. 2. Plan and section of the burial. The settlement of Shaitanskoye 4-6.
a – mark of the bottom of the grave-pit; *b* – bead; *c* – insert; *d* – artifact, depth of occurrence.

The grave goods included 60 stone items: 3 massive knives, 19 arrowheads, 1 projectile head, 18 inserts, 1 adze, 1 composite tool, 15 beads, and 2 plates with use-wear traces. In the pit's filling, there were also two small flakes and two flint chips, which probably got there by accident from a destroyed cultural layer. Most likely, there were some items made of organic material in the grave, but these were not preserved, like the bones of the skeleton and the bone side-bladed tool with grooves for inserts.

In the center of the grave, massive knives, a polished axe-adze, a projectile head (Fig. 2), flint inserts of a composite tool (some of the bladelets formed a line, the rest were in disorder), and 14 beads were found. One more bead was located in the area of the alleged skull. Arrowheads were dispersed throughout the pit: two in the center, ten in the northwestern part, seven near the southeastern wall. Near the last-named, a multifunctional tool on a large blade and a fragment of a fine-grained grinding plate were found.

These finds form a very curious and extraordinary closed assemblage: some of them find numerous parallels in the lithic tools from the sites of the mountain-forest Trans-Urals, the others stand out sharply in their morphological features and the raw materials. The absence of ceramics in the burial makes it difficult to determine its chronological and cultural affiliations. However, there are sufficient grounds for attribution of the studied object to the Chalcolithic.

Among the grave goods, noteworthy is a set of three bifacial items made of light brown laminar flint plates, which is absolutely atypical of the region. According to the conclusion of geologists*, the raw material was obviously of non-local origin and was most likely sourced at the outcrops of chert in the Southern Urals and in Northern and Central Kazakhstan.

Knife No. 1 (Fig. 3, *10*; 4, *3*) is a flame-shaped tool, the largest one in this series. Dimensions: length 205 mm, width in the middle part 76.6 mm, thickness 11.7 mm. One side of the item is almost completely covered with flat large-faceted retouch; only small "spots" of yellow pebble cortex with weakly expressed longitudinal grooves have been preserved, which would have appeared during preliminary grinding with a fine-grained abrasive tool. On the opposite side, the tool under study had been processed differently: along the contour, marginal sharpening retouch had been applied, and the recess inside had been polished. The final finishing of the blade edges had been partially completed.

Knife No. 2 (see Fig. 4, *1*; 5, *27*) is a willow-leaf tool with a maximum width in the middle part. Its length is more than 170.7 mm (one end is broken off), width 57.0 mm, thickness 12.5 mm. On one side, the surface is entirely covered with accurate flat retouch; on the other side, with large marginal retouch; an extended area of pebble cortex with barely noticeable traces of grinding has been preserved.

Knife No. 3 (see Fig. 4, *2*; 6, *20*) is a segment-shaped tool. Its length is 160.7 mm, width 80.3 mm, thickness 6.5 mm. One of its surfaces had been processed with a large-faceted marginal retouch; the pebble cortex is partially preserved, polished with a fine-grained abrasive tool. The blade was furnished on the curve with a large-faceted bifacial sharpening retouch. The opposite edge of the knife was chipped and slightly blunted by a large-faceted vertical retouch.

According to L.L. Kosinskaya, who studied the described knives using the binocular microscope, knifes No. 2 and 3 were not subjected to long-term use. The presence of separate areas with traces of chipping on the blades' edges suggests short-term (one-time?) use. On knife No. 1, no traces of use were found.

The closest parallels to the described items are found in the materials of the Botai culture of Northern Kazakhstan (Zaibert, 2011: 230, fig. 2). Kazakh colleagues identified them as spears or daggers for slaughtering animals. We classified our finds as knives. Items that are very similar to knives No. 1 and No. 2 considered in this paper, but made from different raw materials and interpreted as daggers, are known from the Late Neolithic and Chalcolithic sites of the Barnaul-Biysk region of the Ob (Ust-Isha, Shipunovskoye locality) (Kiryushin, Kungurova, Kadikov, 2000: Fig. 20, 21; Kiryushin, 2002: Fig. 31, 32). The segment-shaped tool finds parallels in the sites of the Khvalynsk culture in the steppe Cis-Urals (Morgunova, 2011: Fig. 64).

The polished adze (Fig. 6, *1*) is a trapezoid-shaped artifact, flattened-oval in cross section, with a slightly beveled, convex blade-edge. The edges are fuzzy, rounded in places, the butt is chipped. The tool is made of fine-grained light green rock, close to serpentinite. Its length is 73.5 mm, the blade's width 33.0 mm, the butt 20 × 15 mm.

Axes and adzes are typical attributes of the lithic toolkits at both sites of the local cultures of the 4th–3rd millennium BC, and the contemporaneous sites in the forest-steppe/steppe zone of the Trans-Urals and Kazakhstan.

The composite tool on a large blade with a trapezoidal cross-section (Fig. 6, *21*). Its length is 102.5 mm, thickness 5–6 mm, maximum width 17 mm. From the

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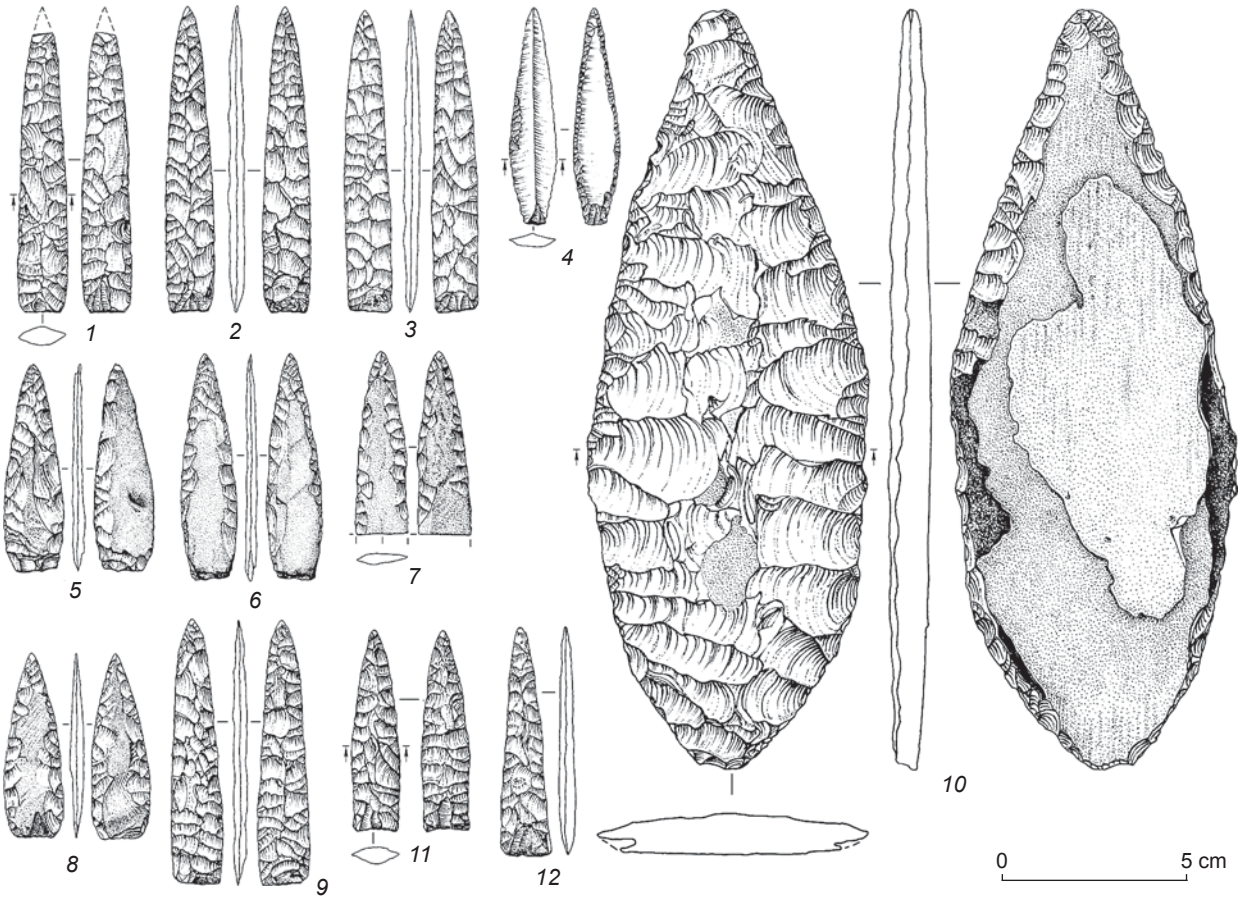

Fig. 3. Lithic tools from the burial. The settlement of Shaitanskoye 4-6.
1–9, *11*, *12* – arrowheads; *10* – knife.

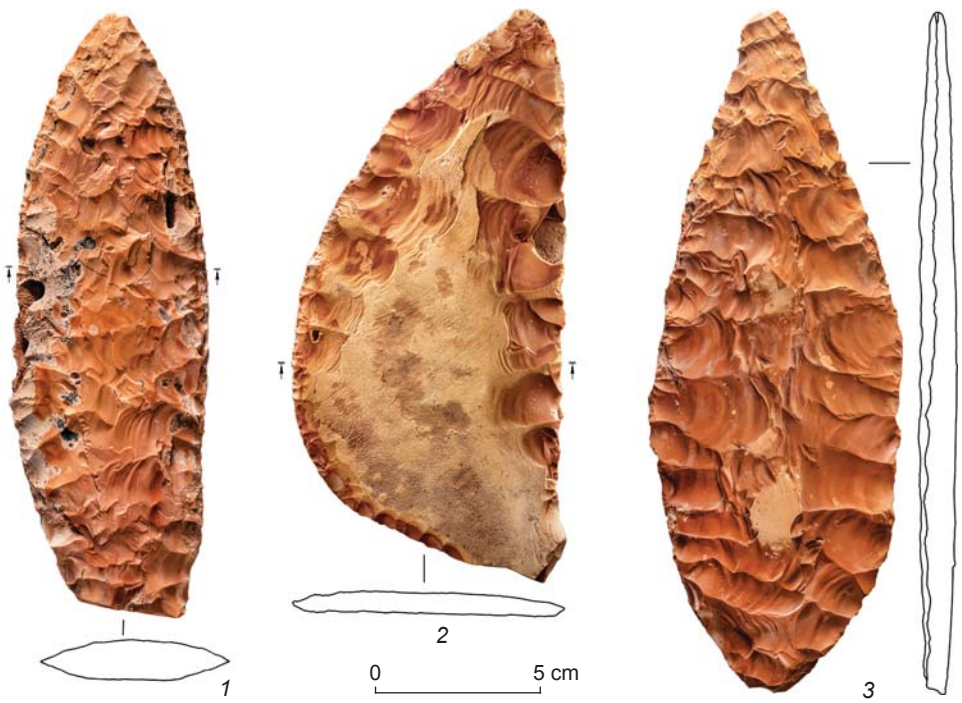

Fig. 4. Stone knives from the burial. The settlement of Shaitanskoye 4-6.

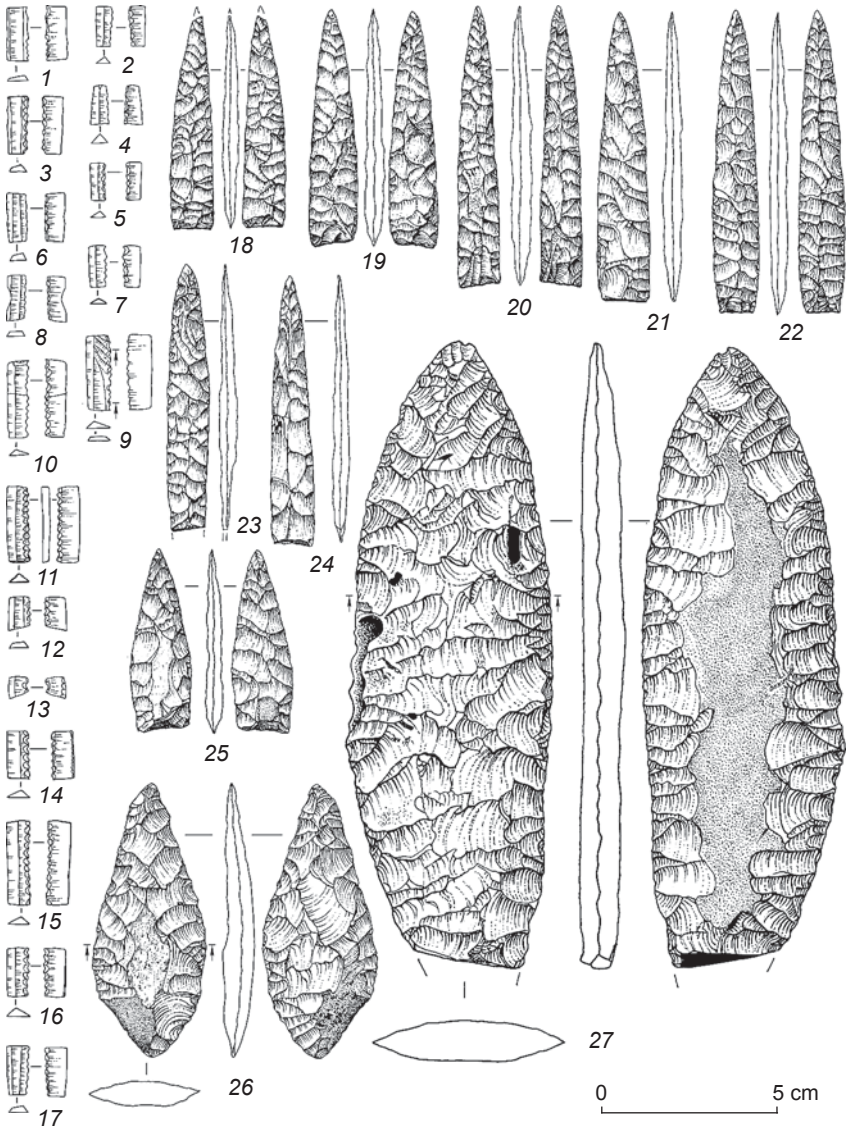

Fig. 5. Lithic tools from the burial. The settlement of Shaitanskoye 4-6.
1–17 – inserts; *18–25* – arrowheads; *26* – projectile head; *27* – knife.

back it is fashioned with marginal retouch along the entire contour. The tool is made of dark gray (with light veins) fine-grained highly-siliceous rock. Judging by the size and the angle of retouch, the tool was intended for scraping operations on various materials, and was also used as a knife.

The arrowheads—19 specimens (see Fig. 3, *1–9*, *11*, *12*; 5, *18–25*); three of them are slightly damaged, the rest are intact. At first glance, most of the items were made by one artisan. The most numerous (14 spec.) are arrowheads made of carbonaceous chert, willow-leaf-shaped, with straight or slightly beveled bases, elongated (54.3–85.3 mm long, with a width of 11.8–15.0 mm and a thickness of 3.7–6.0 mm), carefully processed with continuous bifacial retouch (for example, see Fig. 3, *1–3*). Four more items (see Fig. 3, *5–8*), made on thin (3–4 mm) chert plates, 50–61 mm long and 14.5–17.0 mm wide, have a slightly narrowing straight bases and are trimmed on both sides with marginal retouch.

The assemblage shows an arrowhead made on a blade of light gray flint, subtriangular in cross section, lanceolate, 58.5 × × 12.7 × 4 mm in size, with the ventral marginal and continuous fine retouch (see Fig. 3, *4*). From the dorsal side, there is a partially trimmed haft element and a small area of one surface. This specimen, found in the NW part of the grave, surrounded by nine other arrowheads, may belong to a quiver set.

Arrowheads from the burial under study make up a set that is interesting for its "standardization", but it is by no means the most numerous nor original. Similar finds are known from the lithic assemblages of many Chalcolithic sites of the Middle and Southern Urals and adjacent regions. Such arrowheads were found in the cultural layer of the Shaitanskoye 4-6 site (Fig. 7, *2*, *6*).

The projectile head (see Fig. 5, *26*) is a leaf-shaped artifact, intact, 77.5 mm long, 32.2 mm wide in the middle part, and up to 9 mm thick, processed on both sides with large-faceted flat retouch; the subtriangular haft element is partially trimmed, with one of its wide surfaces retaining small areas of pebble cortex. The material is carbonaceous chert. This is quite a typical find for the Chalcolithic sites of the Trans-Urals.

The inserts—18 specimens (see Fig. 5, *1–17*), made of medial parts of flint blades, triangular or trapezoidal in cross-section, with straight profile. Their length is from 6–9 to 22–24 mm, with a width of 4.5–6.5 mm and a thickness of 1.5–2.2 mm. These were parts of some composite tool. Three pairs of plates are matched to each other, the total length of the inserts arranged in a single line exceeds 25 cm. The items are carefully retouched on one lateral surface from two sides or only ventrally; the retouch is fine marginal. One can only guess how the composite tool might have looked, and what its purpose was.

The plates with use-wear traces. Item No. 1 is a thin plate of fine-grained gray chert with dark green

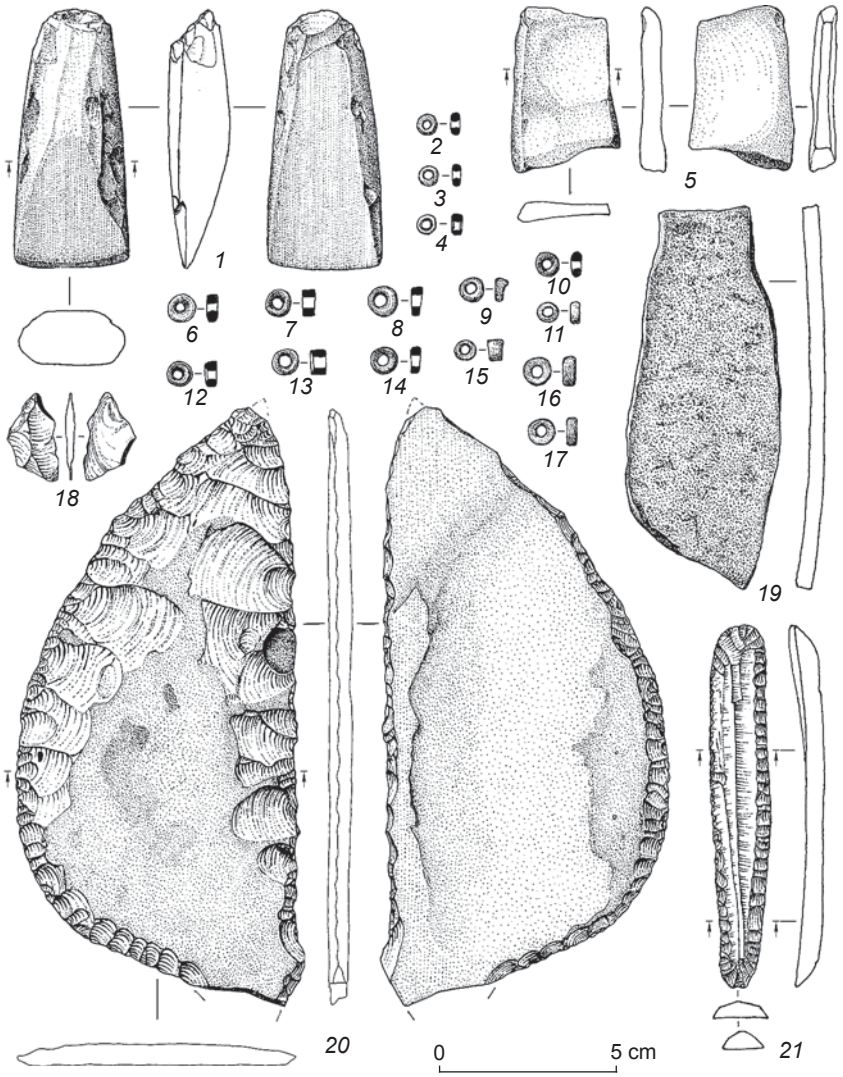

Fig. 6. Lithic tools from the burial. The settlement of Shaitanskoye 4-6.
1 – adze; *2–4*, *6–17* – beads; *5*, *19* – plates; *18* – flake (from cultural layer); *20* – knife; *21* – tool on blade.

inclusions (see Fig. 6, *19*). There are weak traces of modification on one narrow lateral surface only. Item's length is 107.7 mm, width 43.0 mm, thickness 4.7 mm. Item No. 2 is an orange quartz-silicite chert plate with brown veins (see Fig. 6, *5*). The side edges are broken off. Traces of longitudinal and circular movements are visible on both flat surfaces. The product was probably used for fine grinding of some items. Its length is 47 mm, width 31 mm, thickness 2.6–8.0 mm. Such artifacts are typical of the toolkits of Chalcolithic sites in the Middle Trans-Urals, including burials (Chairkina, 2011: Fig. 20).

Beads—15 specimens (see Fig. 6, *2–4*, *6–17*), made in the form of short (2.5–4.9 mm) cylinders, 6.0–8.5 mm in diameter, with holes 2.7–3.6 mm in diameter, made by double-sided drilling. The material is chlorite, a mineral widely distributed in the Urals. Stone bead necklaces/beads occur very rarely in burials, especially in the cultural layers of Chalcolithic sites and settlements. Such ornaments were usually made from bone and shells; but if any were in the burial under consideration, they would not have been preserved, owing to the features of the soil.

Interpretation of materials

As mentioned above, we tend to consider the investigated burial as an ancient Trans-Ural site of the Chalcolithic. In the absence of absolute dates (the results of radiocarbon dating of samples have not yet been obtained), convincing stratigraphic observations, pottery, lithic artifacts with diagnostic features, and, finally, without a detailed understanding of the group of sites of various types and ages, confined to one section of the coast (Shaitanskoye 4-6 occupies an area of about 11,200 m^2, of which only 128 m^2 have been excavated), our opinion is based on parallels and indirect data.

The unconditional connection of the burial with one of the habitation periods of this location is evidenced by the lithic artifacts found in the cultural layer, which do not differ much from the items found in the burial. Among them, noteworthy is a series of arrowheads made of carbonaceous chert (intact (21 spec.) and broken (7 spec.) (see Fig. 7, *2*, *6*)), retouched flint inserts (7 spec.) (see Fig. 7, *4*, *5*), polished chopping tools, and chert grinding plates, including some with traces of circular movements (see Fig. 7, *7*). Of particular interest are extraordinary finds—flint figurines: three are almost intact, and one is represented by a fragment (see Fig. 7, *1*, *3*). These were found in different parts of the excavation and have no equivalents among the grave goods; but what is remarkable about them is the raw material. Two sculptures are made on thin plates of a light brown siliceous sublayer, covered with brown-whitish pebble cortex (see Fig. 7, *3*). The same "non-local" material was used to manufacture the massive knives placed in the grave (Korochkova, Spiridonov, 2021: 197).

Notably, among the lithic artifacts from this site (more than 12,000 spec.), even among fragments and flakes,

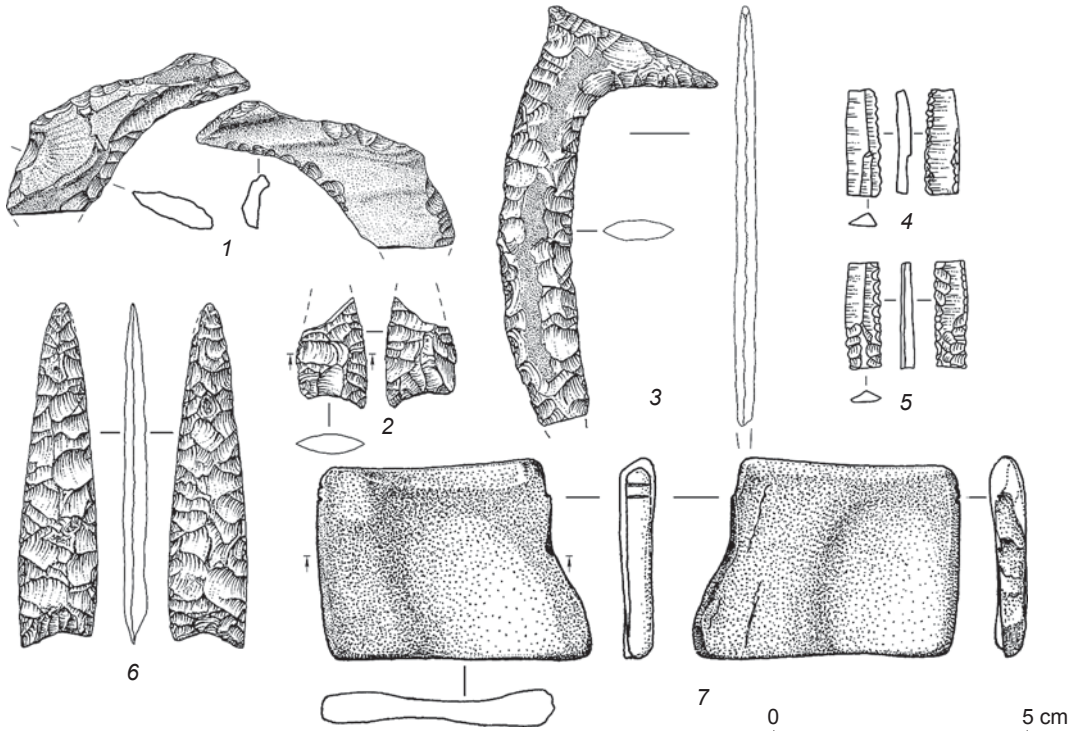

Fig. 7. Lithic tools from the cultural layer of the Shaitanskoye 4-6 settlement.

there are no other items made from this raw material. The possibility of contemporaneousness of large-sized knives and stone figurines, unfortunately, does little to determine the chronological attribution of the burial, since, first, the Ural sculptures are dated in a wide range—from the Mesolithic to the Bronze Age, although most of them belong to the Chalcolithic (Serikov, 2011: 158–160); and second, at Shaitanskoye 4-6, no reliable connection between flint figurines and any of the cultural-chronological complexes identified by ceramics has been established. These can be either Neolithic or Chalcolithic complex, other options (Bronze Age, Early Iron Age, Early Middle Ages) are ruled out.

There were no ceramics in the grave, but the absence of vessels among the grave goods is typical of the burial practice of the Middle Trans-Urals population of the Chalcolithic period (Shorin, 1999: 45; Chairkina, 2011: 95, 119). No such feature is known in the Neolithic, because no burials from this period have been found in the region. The correlation of the Shaitanskoye 4-6 burial with a certain cultural and chronological horizon could be possible with the help (albeit not decisive) of pottery fragments, but these were not there either.

Fragments of vessels of various Neolithic types make up a very small group in the collection—approx. 2 %. The Chalcolithic assemblage is dominated by the Ayat ceramics (more than 51 % of the total); the representativeness of other samples is estimated as small (Shuvakish type) and negligible (Lipchinskaya type). Fragments of Neolithic and Chalcolithic pottery are relatively evenly distributed over the exposed area and do not form noticeable local accumulations. Taking into account the fact that the data regarding the quantity and spatial distribution of various pottery in the excavation area do not give the possibility of establishing the exact time and attribution of the studied complex, we believe it is feasible to confine ourselves to its epochal attribution.

Individual burials in shallow pits on the territory of settlements are typical of the funerary rites of the Chalcolithic population not only of the mountain-forest Trans-Urals (Shorin, 1999: 41–56; Chairkina, 2011: 95–103), but also of many other regions. Chalcolithic burials with rich and diverse grave goods in the Urals are rare, but not so rare as to speak of their exclusivity. For example, not far from Lake Shaitanskoye, at the site of Skvortsovskaya Gora V, in burial 1, ca 400 intact and broken items made of stone and bone were found (Chairkina, 2011: 52–93). The absence of vessels in the graves is a feature of the Trans-Ural Chalcolithic. The traceologists who examined the finds from the Shaitanskoye burial and the samples of flint sculptures from the layer admit the possibility of using metal fabricator-retouchers in the manufacture of some items (Korochkova, Spiridonov, 2021: 197). As is known, the first metal products in the Trans-Urals appeared precisely in the Chalcolithic. Parallels of lithic artifacts in the materials of the Botai and Khvalynsk cultures support the relative dating of the burial to the Chalcolithic.

Describing the funerary practice of the Chalcolithic population of the Trans-Urals and adjacent territories, researchers note the use of ocher and the important role of fire in the rites (Shorin, 1999: 49; Chairkina, 2011: 95). In the Shaitanskoye burial, these features were not recorded. Neither did it contain stone teardrop-shaped pendants, polished arrowheads with longitudinal grooves on the blades, shouldered arrowheads nor "fish-shaped" arrowheads, quite common for Chalcolithic sites. On the contrary, this burial contained artifacts that did not have direct correspondences in the assemblages from other Chalcolithic burials—large knives and a set of microblade-inserts of a composite tool. In general, in the Urals, side-bladed bone tools (arrowheads, daggers, knives) are numerous (Talitsky site, Shigir peat bog, cave at Kamen Dyrovaty, cave Lobvinskaya, etc.), but these all belong to earlier periods—the Paleolithic, Mesolithic, Neolithic.

Strictly speaking, the data presented cannot be considered unconditional evidence for the Chalcolithic age of the Shaitanskoye burial, but they suggest the assessment of this variant of its epochal attribution as more preferable. Without going into discussion about the chronology of the Trans-Ural Chalcolithic (Shorin, 1999; Chairkina, 2005, 2011; Epimakhov, Mosin, 2015; Chairkina, Kuzmin, 2018; Shorin, Shorina, 2021), we will determine its time boundaries to be in the interval of from the 4th to the first half of the 3rd millennium BC. The question of the cultural affiliation of the burial site studied on Lake Shaitanskoye remains open. Here, it is important to emphasize the position of the site under consideration within the Chalcolithic period and the vast conglomerate of cultures of the Trans-Urals and Northern Kazakhstan, united by common semiotic systems, embodied in funerary rites, symbolism, and ornamentation.

Conclusions

A single burial with rich grave goods, located on the territory of the settlement, was a substantial addition to the sparse data on the funerary rites of the Middle Trans-Urals population of the Chalcolithic. The specialists acquired access to the original site testifying to the formation of a new symbolic system in the 4th–3rd millennium BC. The small number of burials and their noticeable variability indicate the processes of formation of such a system. The absence of large necropolises, similar to those known in the forest and forest-steppe Tobol region (2nd Pereyminsky, site at Lake Bolshoye Andreevskoye, Chepkul-20, Buzan-3, Duvanskoye XVII, Verknyaya Alabuga, etc.), can probably be associated with the specifics of the Trans-Ural cultural genesis.

The Late Atlantic period was a time of serious landscape and climatic changes that caused peat formation in the lakes of the mountain-forest Trans-Urals, which led to a significant reduction in food resources and, as a result, the outflow of population groups to the neighboring regions of the Urals and the West Siberian Plain, and an exacerbation of intertribal competition for resource-rich territories. Under these conditions, various rituals, including funerary ones, held at special cult sites, in grottoes, at cave sanctuaries and settlements, apparently played an important role in maintaining intragroup consolidation. It is possible that the numerous arrowheads at Shaitanskoye 4-6 also represent the symbolic activities of the local groups.

The presence of massive knives and flint figurines among the grave goods raises the question of their origin: are these finds the result of the movement of things or people? The answer is suggested by the results of isotope analysis carried out at the "Geoanalitik" Center for Collective Use (Institute of Geology and Geochemistry, Ural Branch of the Russian Academy of Sciences). The isotope ratios of strontium $^{87}Sr/^{86}Sr$ in the tooth enamel samples from the burial (0.710093) differ markedly from the background ratios of bioavailable strontium near Lake Shaitanskoye: grass taken at a site in the immediate vicinity of the excavation area was 0.709053, and mollusk shells from the lake were 0.708562. These values suggest that the individual whose remains were found in the burial was genetically associated with an area that differed in its geochemical background and/or geological structure of the underlying rocks from the area adjacent to Lake Shaitanskoye. Preliminary data on the distribution of strontium $^{87}Sr/^{86}Sr$ isotope ratios in water bodies in the southern part of the Chelyabinsk and Orenburg regions, which are in the range of 0.70985–0.71588 (Epimakhov et al., 2021), with a certain degree of probability may indicate that the individual buried at Shaitanskoye 4-6 had his origins in the steppe region (within the Eastern Urals structural-formation megazone). This assumption needs to be verified, but it is quite consistent with other data on high rates of integration and mobility within the vast cultural entity of the Chalcolithic of the Trans-Urals, Western Siberia, and Northern Kazakhstan.

Acknowledgments

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Okunev Culture and the Dene-Caucasian Macrofamily

The article discusses the linguistic affiliation of the Okunev people. Arguments are cited favoring the idea that they spoke a Dene-Caucasian language belonging to the Yeniseian branch. This is indirectly evidenced by genetic and cultural ties between Okunev ancestors and Native Americans, by parallels to Okunev art in prehistoric China and on the northwestern coast of North America, and by Okunev type petroglyphs in northern Kashmir, where, in addition, a linguistic isolate is preserved—Burushaski, a language related to Yeniseian. Being a relict population, which remained in the place from where the Dene-Caucasian speaking tribes had migrated in various directions, Okunevans may have been ancestors of Yeniseians (another contender is the Karasuk population, whose ties with Okunevans remain to be established), as well as collateral relatives of Na-Dene, Sino-Tibetans, and other Dene-Caucasians. Alternative proposals, such as a Uralic, specifically Samoyed affiliation of the Okunev language, are less probable for several reasons. The idea that this language was Indo-Iranian, which almost necessarily follows from the hypothesis that the key role in Okunev origins was played by Yamnaya-Catacomb tribes, is quite unlikely. This idea is much more plausible with regard to Chaa-Khol people of Tuva, who display marked cranial affinities with a number of Yamnaya and Catacomb groups and with Scythians of the Pontic steppes. Okunevans proper show no such affinities.

Keywords: *Southern Siberia, Bronze Age, Okunev culture, Dene-Caucasian languages, Yeniseian languages, Burushaski.*

Introduction

The linguistic affiliation of people associated with prehistoric cultures is often believed to be an intrinsically unsolvable problem. However, the collation of linguistic, cranial, population genetic and archaeological evidence may clarify the picture in great measure. Ideas outlined in this article are not proofs; in fact, they themselves require proof. So far, they are only food for thought.

There are two principal language macrofamilies in northern Eurasia—Eurasiatic, proposed by J. Greenberg (2000, 2002); and Dene-Caucasian, reconstructed piecemeal by S.A. Starostin (1984, 2005), S.L. Nikolaev (1991), A. Vajda (2010), G.S. Starostin (2012), and J.D. Bengtson (2017). The latter includes four families—North Caucasian, Yeniseian, Sino-Tibetan, and Na-Dene, and two isolates—Basque and Burushaski.

Regarding the Nostratic macrofamily, as it was reconstructed by V.M. Illich-Svitych (1971: 45, fig. 1) and A.B. Dolgopolsky (2013: 13), it has now become clear that if Dravidian and Kartvelian are related to its "core", which consists of Indo-European, Uralic, Altaic, Chukotko-Kamchatkan, Eskimo-Aleut, and Yukaghir (they are sometimes jointly referred to as Narrow Nostratic), then the relationship is at a very deep level. Even further from this "core" is the Afrasian (Semito-

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Hamitic) macrofamily (Starostin G., Zhivlov, Kassian, 2016). "Narrow Nostratic" largely coincides with Greenberg's Eurasiatic.

The objective of this study is to review facts that may help in assessing the linguistic affiliation of the Okunev people at least at the macrofamily and hopefully at the family level, or maybe even at the level of separate branches.

Eurasiatic or Dene-Caucasian?

In the last years, I have been applying various multivariate methods to *The Global Lexicostatistical Database* (http://starling.rinet.ru/new100/trees.htm), composed by the leading members of the Moscow comparativist school—G.S. Starostin, A.S. Kassian, and M.A. Zhivlov* and to A.Y. Militarev's Afrasian database. The models I used, mixed genealogical-areal and quasi-areal, are described in my studies concerning various language families—Indo-European (Kozintsev, 2018a, b; 2019a, b), Eurasiatic (Kozintsev, 2020a, b), Afrasian (Kozintsev, 2021; Kozintsev, Militarev, 2022), and Dene-Caucasian (Kozintsev, 2023a, b).

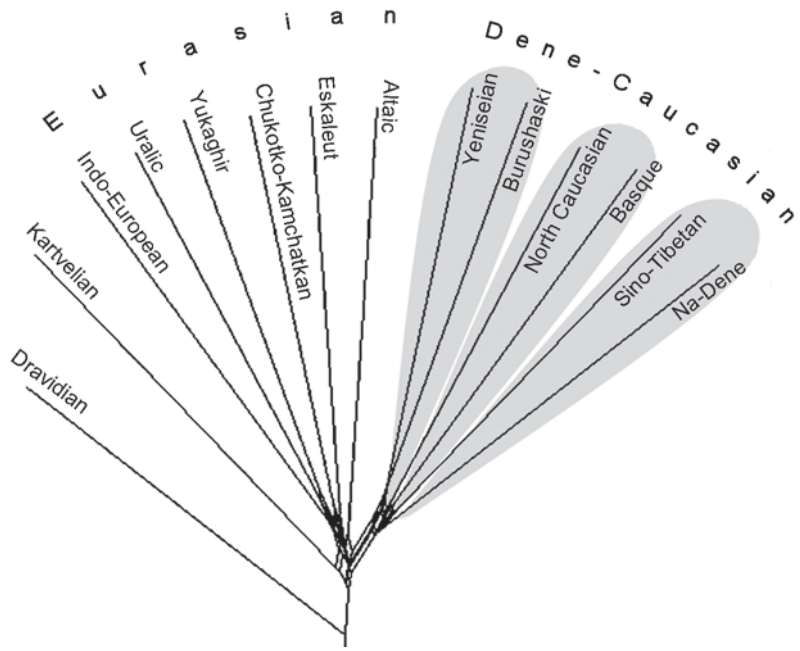
The mixed genealogical-areal model, implemented by means of the SplitsTree4 package by D. Huson and S. Bryant (https://software-ab.informatik.uni-tuebingen.de/download/splitstree4/welcome.html), resulted in a network of principal language families (see *Figure*). Generally, the network agrees with the glottochronological tree composed by G.S. Starostin (https://starlingdb.org/new100/eurasia_short.jpg). But unlike the normal genealogical tree, the network takes into account not only vertical (temporal) relationships, but also horizontal (spatial) ones. Therefore, the branches within clusters are arranged not in a random order, as in usual trees, but according to possible areal ties, which are shown as "collaterals" near the branches' bases. The network was rooted by the Dravidic family, which is the most distant from the others. The Kartvelian branch is connected with the Eurasiatic macrofamily, specifically with its Indo-European branch, by areal and possibly also by genealogical ties.

The Dene-Caucasian macrofamily falls into three pairs, established by G.S. Starostin (2009, 2016: 361) (see *Figure*). The most distinct pair, taking a central geographic position, consists of the Yeniseian languages and Burushaski. Their relationship is quite evident (Toporov, 1971; Starostin S.A., 2005), although the glottochronological estimate of their separation is mid-7th millennium BC (G.S. Starostin's unpublished data; see (Kassian, 2010: 424)). Another rather distinct pair is geographically western, and consists of Basque and North Caucasian. The relationship between the two members of the eastern pair, Sino-Tibetan and Na-Dene, is the most problematic because of their early separation and areal ties (see (Kozintsev, 2023a, b) for details). The geographically central pair, Yeniseian-Burushaski, takes an extreme position within Dene-Caucasian on the graph owing to its connection with Eurasiatic, specifically Altaic (the most isolated Eurasiatic branch). "Collaterals" possibly indicate early contacts between the common ancestor of Yeniseian and Burushaski, on the one hand, and proto-Altaic, on the other.

Because geographic considerations rule out both the Dravidian and Kartvelian affiliation of Okunev people, it remains to choose between two major macrofamilies, Eurasiatic and Dene-Caucasian. In essence, the choice could already be made on the basis of cranial and genetic ties of Okunevans with Native Americans (Kozintsev, Gromov, Moiseyev, 1999; Vasilyev et al., 2015: 323–325; Balanovsky, 2015: 312; Allentoft et al., 2015; Zacho, 2016: 38; Hollard et al., 2018; Kim et al., 2018) and parallels to Okunev art in China and America (Vasilyev et al., 2015: 469, 489–538). Admittedly, the fact that elements of the Okunev artistic style have been discovered in Bronze Age cultures of Xinjiang, such as Gumugou and Xiaohe (Molodin, Komissarov, Nesterkina, 2019) could suggest connections with Tocharians. But Tocharians, who spoke an Indo-European, i.e., Eurasiatic language, were definitely people of western descent, and it is with them that the western traits in the Bronze Age cultures of Xinjiang can be associated. No such parallels are found in Okunev art.

The results of the genome-wide analysis of the Tarim Valley people, buried at three cemeteries broadly contemporaneous to Okunev—Xiaohe (1900–1700 BC), Gumugou (2200–1900 BC), and Beifan (1800–1600 BC)—were quite unexpected. An earlier study of uniparental markers attested to either admixture, as in Xiaohe (Li et al., 2010), or to western origin, as in Gumugou (Cui et al., 2009), whereas craniometric data for the latter cemetery revealed ties with Andronovo people of the Middle Irtysh and Rudny Altai (Kozintsev, 2009). However, amazingly, a detailed study of the sample mostly from Xiaohe at the genome-wide level has demonstrated affinities with the Botai and Okunev people, as well as with their probable ancestors represented by the Malta boy (Zhang F. et al., 2021). A high content of the ANE (Ancient North Eurasian) autosomal component reveals very deep Southern Siberian roots for those people. Disagreement with previous findings may stem partly from heterogeneity (especially chronological) of the samples. On the other hand, individuals who lived in Dzungaria earlier, in the beginning of the 3rd millennium BC, were genetically related to Afanasyevans, and it is

*I am extremely grateful to them for granting me access to their unpublished matrix of pairwise lexical matches between languages.



Network of language families and isolated languages, rooted by Dravidian. "Petals" are tentative clades within the Dene-Caucasian macrofamily.

apparently those people who should be considered ancestors of Tocharians (Ibid.).

If the new genetic findings are indeed more accurate than the former, then Okunev elements in the cultures of Gumugou and Xiaohe (see above) receive a plausible explanation. Not only do they clarify the evidence concerning the southward expansion of Okunevans, but provide indirect clues as to their linguistic affiliation. Indeed, Okunev-like petroglyphs representing masks with "antennae" or "horns" of the so-called Mugur-Sargol type (after the eponymous site in Tuva) have been discovered on the Upper Indus (Jettmar, 1985; Devlet, 1997; Sokolova, 2012). Such representations are especially numerous among the petroglyphs of the Upper Yenisei, but their distribution area is much wider, spanning the territory between Armenia and the Lower Amur. Being associated with the Okunev tradition, as most specialists believe*, most of them apparently postdate the Okunev culture (Devlet, 1997). Because such petroglyphs are absent in southwestern Central Asia, whereas, as has now become clear, Okunevans or their relatives had definitely reached Xinjiang, it was proposed that the Okunev artistic tradition spread to the Upper Indus from that area (Francfort, 1991; Bruneau, Bellezza, 2013). New genetic data lend additional support to that hypothesis.

*Y.A. Sher (1980: 229–232) appears to have been the only one who doubted that. In fact, he ascribed virtually all Okunev art to Afanasyevans (Sher, 2006)—a view that can hardly be entertained today.

Which of the Dene-Caucasian branches?

There are no indications that Tocharians or any other Indo-European or Eurasiatic speakers had reached the Hindu Kush-Himalaya region before it was settled by Indo-Iranians in the course of the Andronovo expansion. Of particular interest in this respect is the affinity between two branches of the Dene-Caucasian macrofamily—Yeniseian and Burushaski (see above). Because they diverged many millennia before the emergence of the Okunev culture, which has local roots in Southern Siberia, it can be suggested that the now extinct languages of the Yeniseian-Burushaski clade had survived there for a long time, after which the speakers of one of them migrated to northern Kashmir.

How could that have happened? The best known answer is provided by G. van Driem's "Karasuk hypothesis", stating that a "macro-Yeniseian" language, ancestral to Burushaski, was introduced to northern Kashmir by some group associated with the Karasuk culture (2001: 1201–1206). Van Driem proceeded from the conclusions drawn by N.L. Chlenova (1969), who had demonstrated an overlap between the Karasuk distribution area and that of the Ket toponyms. However, while there is little doubt that Kets had migrated from the south, their roots do not reach further than the Altai-Sayan region. Contrary to van Driem, nothing indicates the expansion of the Karasuk culture to the Upper Indus. Judging by the petroglyphs, the migrants to that area were descendants of Okunevans or of some of their relatives.

Certain facts, on the other hand, suggest that the ancestors of the Burusho had migrated from the Tarim Basin (Chesnov, 1977), possibly together with the Okunev artistic style (see above)*. The possibility that Okunev-type petroglyphs of northern Kashmir are associated with the linguistic ancestors of the Burusho has already been entertained by K. Jettmar (1975: 289–294). If upheld, this would imply that Okunevans spoke a Dene-Caucasian language belonging to the Yeniseian-Burushaski clade, most likely Yeniseian. That the language of the 4th millennium BC Botai people of northern Kazakhstan was Yeniseian has been proposed by Vyach.Vs. Ivanov (2011), and V. Blažek (2017) inclines to the same opinion. Genetic affinities between Botai and Okunev populations (Yu et al., 2020) support the idea that the latter spoke Yeniseian.

However, the Burusho are genetically related to neither Okunev people nor Kets (this is yet another example of disagreement between the evidence derived from various disciplines, see (Kozintsev, 2022)). Judging by the Y-chromosome haplogroups, they are virtually indistinguishable from their Indo-Iranian neighbors (Qamar et al., 2002)**. Language, then, could have been borrowed.

Turning back to genetic roots of Okunev people and Yeniseian speakers, we should pay particular attention to the ANE autosomal component mentioned above. It was first described in an Upper Paleolithic boy who lived at Malta about 24 ka BP, and then in a male and a girl from Afontova Gora II dating to 15–17 ka BP (Raghavan et al., 2014; Fu et al., 2016). The frequency of ANE is maximal in Kets, Selkups, Chukchi, Koryak, and Native Americans. Among the ancient groups, those closest to Kets in this respect are Karasuk and Okunev people (Flegontov et al., 2016). It is from the latter that Kets could have received this component in their Altai-Sayan homeland (Ibid.). From Southern Siberia, ANE spread in two directions: westwards, to Eastern Europe and the Caucasus, and eastwards, to the New World, where it is quite frequent in American Indians (Ibid.). A possible connection between the westward spread of ANE from Siberia and the expansion of Dene-Caucasian languages was mentioned by A.A. Romanchuk (2019: 166–167, 181; 2020).

*According to Chesnov (Ibid.), the affinity between Yeniseian and Burushaski is due to contacts between the speakers of those languages in the Tarim Basin. As was later demonstrated, however, the proximity of both those branches was caused not by contacts but by common descent, and their last common ancestors had lived much earlier than elements of the Okunev culture reached Xinjiang.

**The same applies to Dravidic-speaking Brahui and Tibetan-speaking Balti, only the Hazara being different from others (Qamar et al., 2002). This, to all appearances, testifies to an insufficient sensitivity of the genetic analysis at the haplogroup level.

Discussion

All the facts cited above entitle us to believe that Okunevans played a very special role in the ethnic and linguistic history of Eurasia. Their language may have belonged to the Yeniseian family. Cranial and genetic data concerning a "collateral" relationship between the Okunev people and the Native Americans, as well as parallels between Okunev art and that of Tlingit, remind us of the linguistic hypothesis linking Yeniseian to Na-Dene (Vajda, 2010). Admittedly, according to G.S. Starostin and his colleagues, this connection is rather indistinct. But in any event, it appears quite likely that the language of Okunevans belonged to the Dene-Caucasian macrofamily. A very wide distribution of parallels to the Okunev artistic style in Siberia, the Far East, China, and America (Devlet, 1997; Vasilyev et al., 2015: 469) supports this idea.

Could the Okunev people be also collateral relatives of the Sino-Tibetan speakers, whose homeland, as the new findings suggest, was located in the middle part of the Yellow River Basin in the 6th–5th millennia BC (Sagart et al., 2019; Zhang M. et al., 2019)? And if so, couldn't this account for the incipient connection between the Yeniseian-Burushaski clade of the Dene-Caucasian macrofamily and the Altaic branch of the Eurasiatic macrofamily, as the genealogical-areal model suggests (see *Figure*)? Indeed, the trajectories of both these macrofamilies at the early stages of their existence were evidently similar. The primary homelands of them both, to all appearances, were situated in Southern Siberia or Eastern Kazakhstan (with regard to Eurasiatic, see (Kozintsev, 2020a); with regard to Dene-Caucasian, see (Kozintsev, 2023a, b)). The speakers of both proto-Altaic and proto-Sino-Tibetan, apparently, migrated from there to northern China along the same route—via Dzungaria. Eventually, both their secondary homelands, too, turned out to be close to one another in both time (7th–4th millennia BC) and space—southern Manchuria (with regard to Altaic, see (Robbeets, 2017)).

These considerations might seem at odds with the timescale, since the Dene-Caucasian macrofamily, according to the glottochronological estimate, split in the mid-11th millennium BC (Kassian, 2010: 323), so the Okunevans, who lived in the second half of the 3rd to the early 2nd millennium BC could have belonged only to one of its filial branches, probably Yeniseian, like the Karasuk language (see (Kosarev, 1973))*. But although Okunevans themselves could take part neither in the peopling of America nor in the proto-Sino-Tibetan migration to China (because they lived later), nor in the migration of the linguistic ancestors of the Burusho to the

*J. Janhunen (1998) believes that Yeniseian was spoken by the Tashtyk people.

Upper Indus (because Yeniseian and Burushaski had split long before that), the totality of archaeological, cranial, and genetic data suggests that they were a unique relict group that survived for several millennia in the place from where its ancestors and descendants spread along various routes.

Can the Eurasiatic (narrow Nostratic) attribution of the language that the Okunev people spoke be excluded? The answer is no. Theoretically, it might belong, for instance, to the Uralic family, specifically to its Samoyed branch (Vadetskaya, 1983), or to the Altaic family (see above). But what, in that case, would account for the "American" ties of Okunevans, showing up in cranial, genetic, and archaeological data? What would account for the presence of a language related to Yeniseian and of the Okunev type petroglyphs in one and the same hard-to-reach mountainous region, remote from Southern Siberia?

It was hypothesized that Okunevans were Indo-Europeans, specifically Indo-Iranians (Pyatkin, 1987; Sokolova, 2012). This conclusion would be nearly inevitable if it were possible to demonstrate that the roots of the Okunev culture are in the Eastern European steppes. So far, the attempts at demonstrating this have been unsuccessful (Kozintsev, 2022) and will hardly succeed in the future. But could we at least assume that the hypothetical immigrants—people of the earliest (Uybat) stage of the Okunev culture, whose mortuary rite showed parallels with that of the Yamnaya and Catacomb cultures of northeastern Caucasus (Polyakov, 2022: 83, 132, 154, etc.)—were Indo-Iranians? But who then were the Chaa-Khol people, who resembled Okunevans culturally while differing from them sharply in physical type, which was very similar to that of certain Yamnaya and Catacomb populations in Ukraine and of later Scythians (Kozintsev, 2007; Kozintsev, Selezneva, 2015)? A striking similarity between the Chaa-Khol people and Scythians is a weighty argument in favor of the Indo-Iranian, possibly even Iranian, affinities of the Chaa-Khol. Okunevans proper, at least those studied thus far, show no such close cranial parallels in Eastern Europe or Northern Caucasus (Kozintsev, 2020b). Possibly, studies of the Uybat crania, currently being undertaken by A.V. Gromov and his students, would correct this conclusion.

On the other hand, could the Uybat people, at least those who migrated to Southern Siberia from the Eastern European and northeastern Caucasian steppes, have spoken one of the Dene-Caucasian languages? This idea, at first sight, agrees with the view of G.S. Starostin (2016: 363–365) and A.S. Kassian (2010: 416–417, 428–432), who hold that these languages spread to eastern Central Asia from the west—from regions adjoining the Near Eastern center where the production economy had arisen. But if the source of the hypothetical migration was the northeastern Caucasus, and if they spoke a Dene-Caucasian language, then this language could belong only to the North Caucasian branch. The problem, however, is that no traces of North Caucasian languages have been found in Siberia. The Southern Siberian homeland, on the other hand, is favored not only by geographic considerations but also by the spread of the ANE component from there both to the west (to Europe and the Caucasus)* and to the east (to the New World). This reconstruction agrees with the fact that Okunevans, who lived near the presumed Dene-Caucasian homeland, show the highest content of ANE, and the same is true of their tentative descendants (Kets) and collateral relatives (Native Americans).

Conclusions

1. The totality of available biological and cultural data indicates an exclusive status of the Okunev people as an aboriginal relict group.

2. Their language likely belonged to the Yeniseian branch of the Dene-Caucasian macrofamily. The Eurasiatic (specifically, Uralic) or Indo-European attribution is less probable.

3. Even if the Okunev origin was affected by a migration from northeastern Caucasus, the language of the presumed immigrants, no matter whether it belonged to the Indo-Iranian branch of the Indo-European family or to the North Caucasian branch of the Dene-Caucasian macrofamily, must have been displaced by an indigenous language spoken in Southern Siberia.

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A New Approach to the Study of Archaeological Charcoal: The Case of Metallurgical Furnaces of the Southeastern Altai

In recent years, dendrochronological analysis in archaeology has undergone a substantial transformation, offering an opportunity to use samples of wood that were previously considered uninformative. One striking example is the analysis of charcoal excavated from archaeological sites. We have studied 448 samples of charcoal collected from metallurgical (iron smelting) furnaces in the Kurai and Chuya basins of the Russian Altai Mountains. Earlier methods of preparing such samples were slow and inefficient. Our approach guarantees fast, simple, and high-quality preparation of a large number of samples of virtually any size and shape. Its advantages include low cost of apparatus, high quality measurement of annual rings, the possibility of efficient remote measurement, no need for verification, and a wider range of measured parameters of the annual ring. Hopefully, the new approach will help to solve the critical problem relating to the construction of a tree-ring chronology in the arid zone of Southern Siberia. Such a chronology will be highly prospective for assessing the age of wood from numerous mounds in the intermountain depressions of the Altai-Sayan region, and year-by-year reconstructions of the humidity regime; and for revealing extreme droughts and other climatic phenomena in this territory.

Keywords: *Dendrochronology, archaeology, anthracology, charcoals, metallurgical furnaces, Altai Mountains.*

Introduction

The rapid development of science and technology in the 20th century has generated a wide range of new methods used in studying objects of material culture. Applications of methods from natural sciences have been so successful that they have entered the standard practices of archaeological research. One of these methods is dendrochronology, which is widely used in analyzing the finds of well-preserved wood (Myglan et al., 2020; Zharnikov et al., 2020; Büntgen, 2019). As a result, a separate field of dendrochronological research

(dendroarchaeology) has emerged both abroad and in Russia (Hollstein, 1984: 21; Karpukhin, 2016: 52). In recent years, this field has been undergoing substantial transformation from the introduction into practical research of non-invasive methods for studying wood (Domínguez-Delmás, 2020). Furthermore, original data have been digitized, marking a shift from direct measurement of annual-ring width on wood samples to simultaneous measurement of multiple parameters on digital images obtained using various types of scanners, cameras, microscopes, and other similar equipment. For example, the new approach has made it possible to establish the age of boards for Old Russian icons of the 15th–17th centuries (Matskovsky, Dolgikh, Voronin, 2016), and the "blue intensity" method of analyzing annual-ring density was used in dating wooden structures in the town of Yeniseisk (Myglan et al., 2018).

New approaches offer the opportunity to employ the evidence that previously was not considered to have had great scholarly value because of the technical impossibility of extracting all the information from it. One vivid example is charcoal. The special field of anthracology focuses on studying this type of material evidence (Scheel-Ybert et al., 2003). Charcoal is very common and has often been discovered during archaeological excavations. Yet, until now it has been considered suitable only for establishing species and radiocarbon dates (Filatova, Filatov, 2021), but unpromising in terms of dendrochronology. As a result, the capacity of charcoal—an important source of information about the past—remained underused.

This article demonstrates the effectiveness of a new method of preparing charcoal samples from archaeological sites, which removes the former limitations on using dendrochronological approaches. The results of the study clearly show that charcoal is currently one of the most underestimated and yet highly promising sources of information about the past.

Material and methods

The collection of charcoal analyzed in this study was gathered at archaeological sites in the Chuya and Kurai basins in the mountains of the Russian Altai (Fig. 1). The system of these depressions, separated by the Chagan-Uzun mountain group, extends for 120 km in the sublatitudinal direction. This area has a sharply continental cold climate with high annual and daily temperature ranges, a short frost-free period, a small amount of snow in the winter, and a general lack of precipitation. According to the Kosh-Agach meteorological station, located in the Chuya basin, the average annual temperature there is below 0°C, and in 1981–2010 it was –4.2°C. The annual amount

Fig. 1. Location of sites for sampling charcoal (*a*) and wood for the construction of tree-ring chronologies Kur and Jelo (*b*).
1 – Kuekhtonar; 2 – Yustyd; 3 – Kur for the forest-steppe zone, 4 – Jelo for the upper forest boundary.

of precipitation is 80–150 mm in the Chuya basin and 150–200 mm in the Kurai basin; about two-thirds of the precipitation occurs in the summer.

The Chuya basin is the largest in the Altai. It reaches 70 km in length and 40 km in width, narrowing to 12 km in the eastern part. Its slightly concave bottom drops from 2100 to 1730 m above sea level in the northwestern direction. The central part of the basin is located at absolute heights of 1750–1850 m and is constituted mainly of semi-deserts with salt- and drought-resistant vegetation. Poplars and willows grow in the floodplains of rivers; occasionally, there are single trees of Siberian larch. The larch's somewhat wider occurrence in the recent past is indicated by the remains of larch-stumps in the floodplain near the village of Kosh-Agach. Small larch forests sometimes appear in the Chuya depression on the slopes of the northern and northwestern exposure.

The Kurai basin, measuring 25 km in length and 20 km in width, slopes generally towards the northwest, and sits at an altitude of 1500–1600 m above sea level. While the southeastern part of the basin is flat, the surrounding ridges give way to deserted steppes. In the northwestern part of the depression, a rocky foundation forms a hilly plain predominantly covered by dry steppe. Ribbon forests and groups of Siberian larch grow in hollows of the terrain. On the southern slope, a continuous belt of spruce, Siberian pine, and larch forest stretches, with an upper boundary at around 2350 m above sea level, further to the east, to the Chuya River

valley. On the northern slope, the forest is sparse owing to greater solar exposure and aridity, has an insular distribution, and consists mainly of larch.

The arid climate and small population have contributed to the good preservation of a huge number of archaeological sites from the Late Paleolithic to the Middle Ages in the area (Derevianko, Markin, 1987; Kubarev, 1991; and others). These sites include iron-smelting furnaces, the abundance of which has made it possible to identify the Chuya-Kurai metallurgical region of the Russian Altai (Zinyakov, 1988: 31).

Collections of samples in the form of slags with high content of charcoal, and individual charcoals, were collected by A.R. Agatova and R.K. Nepop in archaeological excavations of metallurgical furnaces in the Kurai and Chuya basins, and in the valley of the Chuya River between them (Fig. 2). Initially, the samples were taken for establishing the age of the sites by radiocarbon dating, the upper chronological boundary when terraces with archaeological sites emerged, and for calculating slope-retreat rate (Agatova, Nepop, Korsakov, 2017; Agatova, Nepop, Slyusarenko, 2017; Agatova et al., 2018). However, good preservation of charcoals and large number of well-discernable tree rings even in small fragments suggested the idea of using the dendrochronological method for their dating. In the eastern part of the Chuya basin, in the valley of the Yustyt River, samples were collected over a number of years at the site of excavations carried out by N.M. Zinyakov in 1978 (1988: 38–42). Pieces of slag reaching 40–50 cm in size, with numerous inclusions of charcoals, lay either directly in the hollows, which emerged from excavated furnaces along the edge of the lower left-bank terrace, or at the foot of its slope. For this reason, attribution of charcoals collected at the Yustyd site with furnaces No. 2 (samples marked u2), 3 (u3), and 5 (u5) was rather conventional. Despite the fact that slags with fragments of charcoal lay on the daytime surface for over 35–40 years, their degree of preservation was satisfactory for dendrochronological research. At the mouth of the Kuektanar River (in the valley of the Chuya River, between the Chuya and Kurai basins), the samples were originally (in 2014) taken from pieces of slag scattered on the terrace after the excavations by N.M. Zinyakov at the Kuekhtonar-2 site in 1976 (Ibid.: 48). Later (in 2020 and 2021), the samples were taken from the spoil heap remaining from excavations by E.V. Vodyasov in 2019 (Vodyasov et al., 2020). Samples from 2020 were marked with letter "k"; samples from 2021 with letters "kk". In total, the collection included 12 pieces of slag (from 10 to 40 cm in size) and individual pieces of charcoal.

For assessing the dendrochronological capacity of the collection, small pieces of charcoal reaching 20 mm in diameter were selected in a laboratory. The transverse fractures made revealed that these pieces contained 50 or more growth rings. Since the collection contained a significant number of larger charcoals, it had great capacity for constructing an extended tree-ring chronology. However, the fundamental point related to the choice of effective method for sample preparation, which would produce high-quality images, had still remained unresolved.

The analysis of the available approaches revealed their low efficiency in terms of fast processing of the collection of charcoals (in Russia, there were no studies on constructing a tree-ring chronology from charcoals). We should briefly discuss them. The classic method involves breaking charcoal in the transverse direction. While annual rings would become visible on the broken surface, there would be no external dirt traces. However,

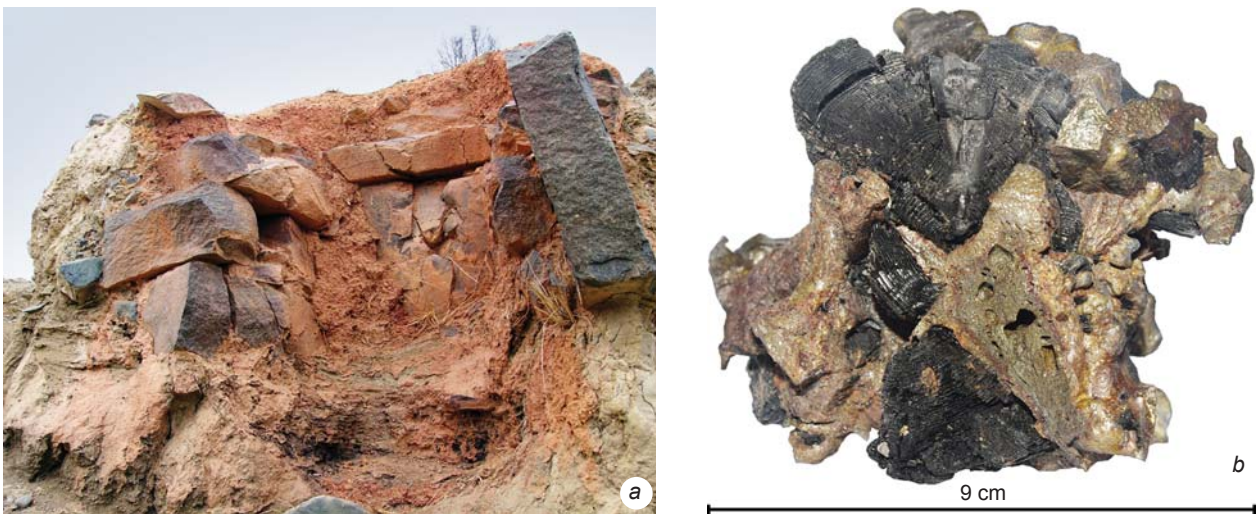

Fig. 2. External view of an iron-smelting furnace at Kuekhtonar-1 (*a*) and slag with fragments of charcoal from Kuekhtonar-2 (*b*).

in our case, breaking large charcoals (over 50 mm in diameter) was difficult, and small charcoals (up to 8 mm) often became destroyed from mechanical impact. The main disadvantages of this approach were inability to obtain consistently a flat plane along the breakage, and loss of the sample in the case of failure. Despite good end-results, the method of manual trimming of charcoal surface by a blade under microscope and contrast enhancement (with chalk powder, paste, or other finely dispersed compositions) was poorly applicable for mass processing, as it required significant labor costs and highly qualified personnel. The option of impregnating charcoals with complex compounds and subsequent trimming (polishing) allowed for an excellent quality image to be obtained. However, the high cost of equipment and consumables for sample preparation made this method unsuitable for mass processing.

In order to solve this problem, the team from the Siberian Dendrochronological Laboratory elaborated a method that facilitates fast and high-quality sample preparation of a large number of charcoals of any size and shape with minimal labor costs. Notably, the method relies on standard (conventional) grinding and microscopic equipment available in almost every natural science laboratory studying wood. This method has high accessibility (reproducibility) without any additional financial costs of purchasing specialized equipment.

The samples arrived at the laboratory both as individual charcoals and as pieces of slag with inclusions of unburned charcoal fragments (Fig. 2, *b*) that had to be extracted with the least possible loss. For achieving this, large fragments of slag with high content of charcoal were separated using a pick; in some cases, an angle grinder with a diamond disc was used. A total of 448 samples were prepared. They were processed on a disc-belt grinder (belt P600, 1000, wheel P1000). Charcoal dust, which fills the tracheids and prevents visualization of the cellular structure, is accumulated in the process of polishing the samples. An industrial vacuum cleaner was used for removing dust. It is very important to pre-dry the charcoals (to a level of no more than 7 % moisture), since with excessive moisture, the dust clogs the tracheids, sticks together, hardens when dried, and can no longer be removed.

The prepared charcoal pieces (Fig. 3) were photographed in reflected light at ×30 magnification, using a Zeiss AXIO Zoom V16 microscope equipped with a motorized object table. The photographs of the growth rings in the samples were stitched together in the ZEN (Carl Zeiss) software package, supplemented with the accompanying information on magnification, scale, etc., and then converted to the TIFF (Tagged Image File Format) format. Subsequently, the images were processed using the CooRecorder 9.3 (CR) software (Larsson, 2013), where linear parameters, such as the width of the annual ring, early and late wood, were measured manually (Fig. 3, *b*). The data were visually represented using the CDendro 9.3 software (Ibid.). All measured series were dated with a combination of graphical cross-dating (Douglass, 1919) and cross-correlation analysis using the DPL (Holmes, 1984) and TSAP V3.5 (Rinn, 1996) specialized software packages

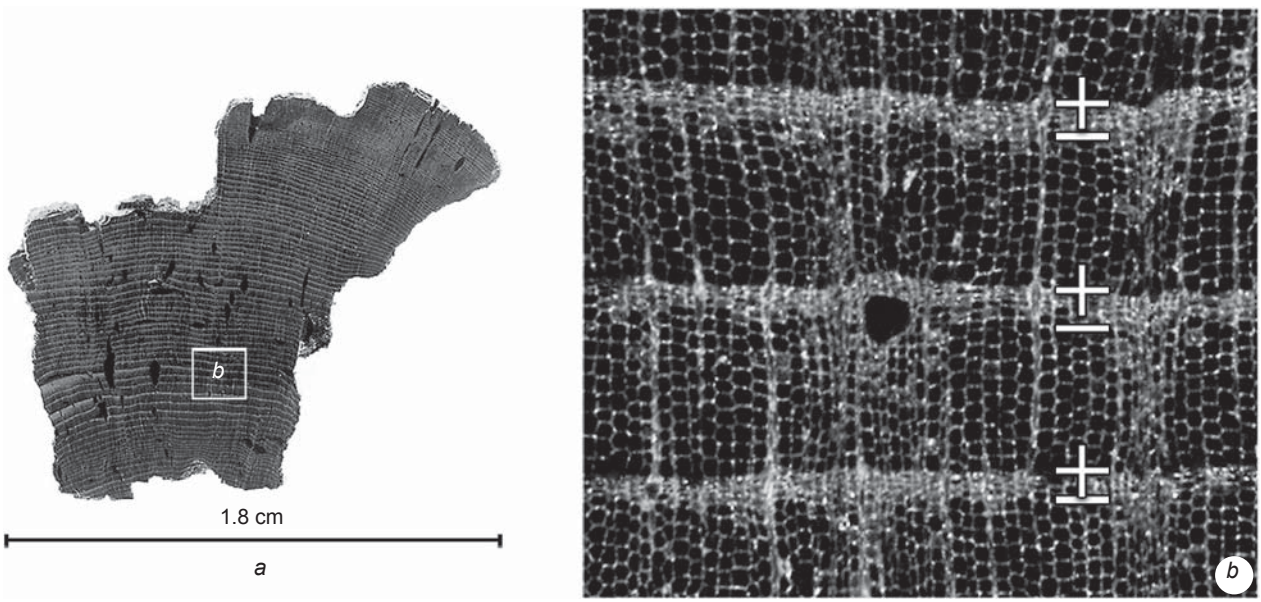

Fig. 3. Example of the sample k18 preparation.
a – general view and size of the sample containing 107 growth rings; *b* – prepared charcoal surface for measuring linear parameters of the annual ring. Crosses mark the boundaries of growth rings; horizontal dashes mark the boundary between the early and late wood.

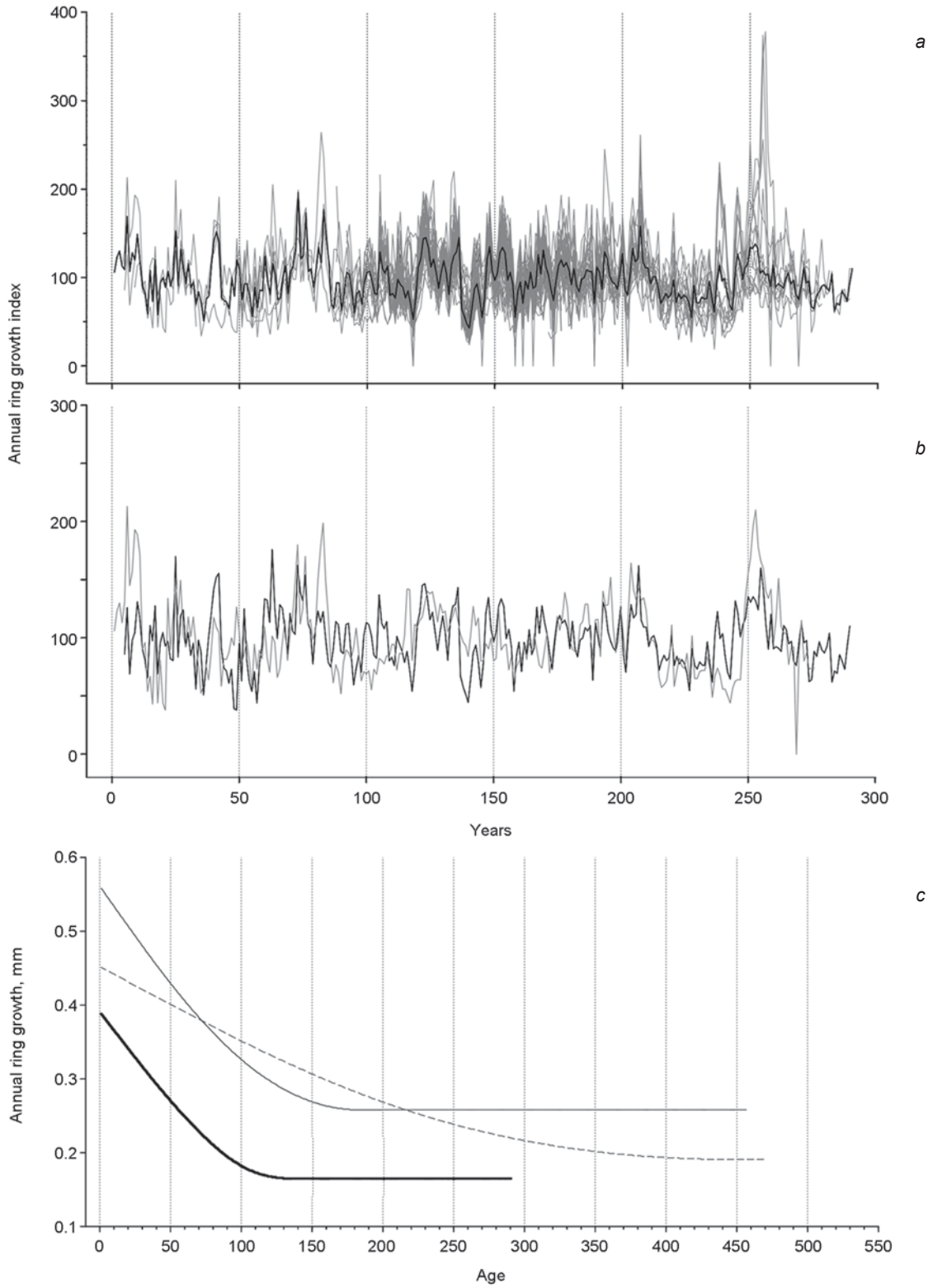

Fig. 4. Chronology 1_4.
a – individual growth series (gray line) and standardized generalized chronology built from them (black line); *b* – cross-dating of generalized growth series for charcoals from Kuekhtonar (black line) and Yustyd (gray line); *c* – comparison of age curves obtained from charcoal (black line) and trees in the Kurai basin (Kur, gray line), and from growing trees and paleowood on the upper forest boundary of the Southern Chuya Range (Jelo, dotted line).

for dendrochronological studies. During that procedure, the missing rings and measurement errors were identified, followed by accessing digital images; the presence or absence of the annual ring was checked, and measurements were adjusted. The age trend of the measured series was removed by two-thirds spline standardization (Cook, Krusic, 2008). This method was chosen owing to the presence of short periods with sharp increase in growth in individual samples (which is typical of the trees from the forest-steppe zone). The quality of the constructed chronologies was assessed using traditional indicators, such as correlation coefficients (multiple and Pearson), sensitivity, standard deviation, EPS, RBAR, etc. (Wigley, Briffa, Jones, 1984).

Results

360 out of 448 samples were suitable for measuring the linear parameters of growth rings. Tree species were identified by comparing the diagnostic features with keys from the reference book "Anatomy of Russian Woods" (Benkova, Schweingruber, 2004). It has been established that the species was *Larix sibirica* Ledeb (Siberian larch) of the *Pinaceae* (Pine) family. The samples were measured, after which ten referential samples were selected from individual growth series by such parameters as length and stability of growth (absence of short-term periods of sharp increase in the width of annual rings, presumably of non-climatic origin). At the first stage, cross-dating of the rest of the samples was done for each of these series, resulting in ten groups of cross-dated individual growth series used for constructing separate averaged chronologies. Their comparison with each other has shown that only two (No. 1 and 4) chronologies could be cross-dated and combined into a single common 1_4 chronology (Fig. 4, *a*). At the second stage, the obtained groups of samples were subjected to a standardization procedure. By averaging individual differences, the standardized chronologies better reflect the overall signal associated with changes in the external conditions of tree growth. Previously undated individual growth series were again cross-dated against standardized chronologies, which resulted in nine tree-ring chronologies based on 160 samples (see *Table*), that is approximately on 44 % of the total number of the measured samples (Fig. 5).

Parameters of tree-ring chronologies

Tree-ring chronology	Site	Height above sea level, m	Number of samples	Duration of tree-ring chronology, years		Average length of the series, years	Width of annual ring, mm		Correlation coefficient between the series	Sensitivity	Standard deviation
				Length	Range		Mean	Max			
1_4	Kuekhtonar, Yustyd		106	290	0–289	67	0.31	1.43	0.64	0.19	0.24
2	"		13	176	0–175	81	0.32	2.13	0.74	0.28	0.31
3	Yustyd	2100	9	76	0–75	37	0.33	1.08	0.55	0.26	0.28
5	"	2100	2	83	0–82	58	0.27	0.57	0.78	0.32	0.35
6	"	2100	3	108	0–107	88	0.16	0.58	0.64	0.21	0.26
7	"	2100	3	99	0–98	82	0.17	0.46	0.41	0.18	0.26
8	Kuekhtonar, Yustyd		13	115	0–114	60	0.24	0.94	0.51	0.18	0.22
9	Yustyd	2100	7	117	0–116	88	0.17	1.02	0.72	0.34	0.32
10	"	2100	4	175	0–174	95	0.20	0.69	0.45	0.18	0.22
	Total	–	160	1239	–	68	–	–	0.60	–	–
Kur	Kurai steppe	1550	30	457	1559–2015	302	0.37	4.10	0.72	0.337	0.379
Jelo	North-Chuya Ridge	2400	130	1900	112–2011	392	0.31	2.77	0.704	0.271	0.297

Note. Tree-ring chronologies 1–10 are based on charcoal from iron-smelting furnaces, Kur – on trees for forest-steppe areas, Jelo – on trees for the upper forest boundary (North-Chuya Ridge).

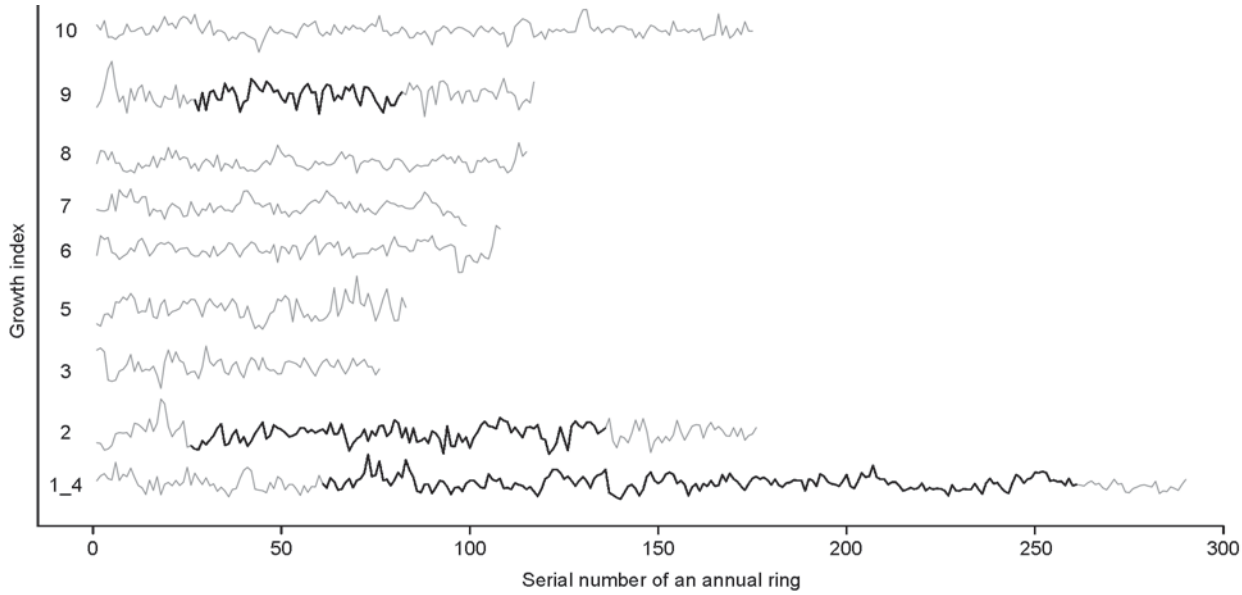

Fig. 5. Generalized standardized chronologies (gray lines) generated using charcoals from Kuekhtonar and Yustyd. Black line marks the period with EPS ≥ 0.85.

Analysis of the samples that could not be dated has revealed that usually these were series with a small number (less than 20–30) of annual rings, or long series with deviations in growth. In the future, with new evidence, it may theoretically become possible to accomplish their cross-dating.

The number of dating samples in the chronologies was uneven. The most representative was the combined tree-ring chronology 1_4 (106 samples); the least representative was chronology 5 (two samples). The length of the obtained standardized tree-ring chronologies varied from 76 to 290 annual rings; the correlation coefficient between the series ranged from 0.41 to 0.78, but these indicators do not depend directly on the saturation degree of chronologies with samples. Such a parameter as average length of series in a tree-ring chronology varied from 37 to 95 tree rings (see *Table*). The EPS parameter was significant for three chronologies, which means that growth reflected the signal of the general totality: No. 1_4 – at the interval of two hundred years, No. 2 – 110 years, and No. 9 – 55 years (Fig. 5). Since nine tree-ring chronologies could not be cross-dated with each other, it can be assumed that continued work with charcoals from the Kuekhtonar and Yustyd sites may result in constructing at least a 1200-year tree-ring chronology for the steppe and forest-steppe areas of these depressions, where a lack of precipitation is the hampering factor for the growth of woody vegetation.

An unexpected result was the fact of cross-dating of charcoals not only from one furnace, but also from the furnaces located at Kuekhtonar and Yustyd (see Fig. 4, *b*). Despite the distance of 82 km (in a straight line) between these sites, and the difference between their hypsometric marks reaching 350 m, the samples from Kuekhtonar and Yustyd (u2 and u3, u3, u2, respectively) were dated in chronologies 1_4, 2, and 8. This fact indicates the homogeneity of climatic conditions for tree growth in the Kurai and Chuya basins (resulting from the lack of precipitation as a common limiting factor). Notably, charcoal from furnaces at the Kuekhtonar and Yustyd sites revealed the minimal difference in the time between the emergence of peripheral rings. For example, it was 14 years in chronology No. 1_4 (samples u3_32 and kk48, a later date for charcoals from Kuekhtonar), 22 years in chronology No. 2 (samples k2_56 and u3_22, a later date for charcoals from Yustyd), and one year in chronology No. 8 (samples u2_27 and kk181, a later date for charcoals from Kuekhtonar). These results suggest that iron-smelting furnaces were used at about the same time.

The following pattern was observed in the distribution of samples from Kuekhtonar and Yustyd for other chronologies: No. 3 was represented by the samples from furnaces 2, 3, and 5 at Yustyd (u2, u3, and u5); No. 5 from furnace 2 at Yustyd (u2); No. 6 from furnace 5 at Yustyd (u5); No. 7, 9, and 10 were samples from the Kuekhtonar furnace.

Discussion

Our experience in dendroarchaeology clearly shows that the increased availability of professional equipment and ongoing digitization may lead to a higher quality in measurements, expanded opportunities in using sample preparation methods, and the emergence of new methods. Therefore, the dendrochronological method may be used for analyzing the evidence that had been previously considered unsuitable for processing, and it becomes possible to use charcoal to design thousand-year long tree-ring chronologies in the forest-steppe zone. The undoubted advantages of our approach include a significant reduction in the costs of equipment, increased accuracy of measuring annual rings, new opportunities for full-capacity remote work on measuring samples (you can only install the specialized CooRecorder software on a suitable PC), removing the verification problem (the quality of measurements on the image can be easily verified by independent scholars), and expanding the range of measurable parameters of the annual ring (one may simultaneously establish the width of the ring, its early and late parts, optical density, etc.). Noteworthy is that the resulting image captures the cellular structure of the sample at the moment of its optimal state (the quality of the surface obtained during sample preparation inevitably decreases with time, so in the future, there will be no need to waste time on repeated preparation).

Our approach to charcoal sample preparation has clearly shown that, unlike the common opinion, this type of evidence has a great capacity for constructing a long tree-ring chronology. Our results demonstrate a realistic opportunity to elaborate a continuous 1200-year-long tree-ring chronology. Its estimated duration is in good agreement with radiocarbon dates of charcoals from the Kuekhtonar furnaces (Vodyasov et al., 2020). The ^{14}C-dates obtained corresponded to a wide chronological range from the mid 1st millennium BC to the 1st millennium AD. In our opinion, such scatter is associated with the "old tree effect". The presence of a subcrustal ring, which directly indicates the time of three harvesting, is of key importance when dating wood. Yet, in the case of charcoal, it is extremely difficult to establish the number of the lost peripheral rings. Therefore, radiocarbon dates do not reflect the actual age of the dated objects, which are in fact younger by the time corresponding to the missing tree rings. The conventional approach to solving this issue is to select the samples of charcoals for radiocarbon dating with width of annual rings indicating the proximity of the subcrustal ring. In this case, the group of the latest close dates is taken as the year of timber harvesting (Ibid.). In our opinion, this approach should be used with great caution, since radiocarbon dating without constructing a tree-ring chronology based on the samples from the site significantly increases the likelihood of error.

To confirm this point, we analyzed the age-growth curve (reflecting a decrease in the effect of endogenous and an increase in the effect of exogenous factors as the age of the trees increases, which leads to stabilization of annual growth) and life expectancy of trees in the past and present in the area under study. For example, the growth of living trees stabilizes approximately at the age of 150 years (see Fig. 4, *c*), while the maximum recorded survival-age of trees in the Kurai steppe is over 450 years (see *Table*). The samples from the charcoal collection with the preserved central ring were used for estimating the age-curve for paleotrees. It should be mentioned that dynamics of changes in growth in the past (obtained from charcoal) correlates well with the age-curve of trees growing at the present time (see Fig. 4, *c*). However, there are also some differences. For instance, the average growth of trees in the past was somewhat smaller and its stabilization occurred at an earlier age, which indicates a more severe growing environment for paleotrees used as fuel in iron-smelting furnaces.

The experience of dendrochronological studies shows that trees live longer in a more severe environment (Büntgen et al., 2019). However, the average age established from the measured charcoal samples was 68 years, while the age of the currently growing trees exceed 300 years. If this is the case, charcoals lack a significant number of growth rings. As is shown by the above analysis, paleotrees grew in more severe (arid) environment, which means that their maximum age should be greater than that of the modern trees. For example, the maximum age of trees growing in the Ubs Nuur Basin in the neighboring Republic of Tuva, with more severe (arid) conditions, reaches 778 years (Tainik et al., 2022). On the basis of this observation, it can be assumed that features of growth stabilization in charcoals are not reliable evidence for the close proximity of the subcrustal ring. In our opinion, the only way to avoid wide scatter of radiocarbon dates is to conduct a preliminary dendrochronological analysis of the samples.

The source of wood that was used in iron-smelting furnaces at Yustyd and Kuekhtonar is of great importance. Next to the Kuekhtonar site, there is a larch forest now. A completely different situation is that at the Yustyd site, where trees do not grow today. However, there are reasons to believe that forests could have been there in the past. For example, the name of the Yustyt River can be translated as "one hundred larches" (Molchanova, 1979: 186). At present, individual larch trees grow in the floodplain upstream of the river, and small larch-groves grow 4 km south of the site with iron-smelting furnaces, on the slope of the northern exposure at an altitude reaching 2400 m above sea level. In this

case, one should take into account the process of the increasing climate aridization, which resulted in changes in the area of woody vegetation in the eastern part of the Chuya basin over the past one and a half to two millennia (Agatova et al., 2016; Churakova et al., 2022), as well as wood-harvesting by nomads for their everyday needs (Agatova, Nepop, Korsakov, 2017; Agatova, Nepop, Slyusarenko, 2017). Since the climate used to be less arid than it is now, the southern slope of the valley was likely covered with forest, which could have descended down the stream, almost reaching the furnaces. In this case, there was also no problem with charcoal wood at the Yustyd site.

In order to establish the source of wood used for metal-smelting, it was necessary to compare the parameters of chronologies obtained from charcoal (the most representative chronology 1_4, which included 99 samples from Kuekhtonar and seven samples from Yustyd, was chosen for comparison), and tree-ring chronologies generated for the steppe part of the Kurai basin (Kur) and the upper forest boundary (Jelo) (Myglan, Zharnikov, Malysheva et al., 2012). The comparison has revealed that all parameters of chronology 1_4 (the mean and maximum width of growth ring, correlation coefficient between the series, sensitivity, and standard deviation) were significantly lower than those of the Kur forest-steppe tree-ring chronology (see *Table*). This suggests a more severe growing environment for the trees used for metal production. A somewhat different situation was observed when comparing with the Jelo tree-ring chronology for the upper forest boundary. Such parameter as the average width of the annual ring had the same values; the remaining parameters of chronology 1_4 were lower (see *Table*). Thus, in terms of its characteristics, tree-ring chronology 1_4 was closer to the chronology of the upper forest boundary (Jelo) than to the chronology of the modern trees from the steppe zone of the Kurai basin. It would seem that this may indicate the harvesting of wood for iron-smelting furnaces high on the slope. However, comparison of age-curves of tree growth (dynamics of decrease in growth and growth stabilization time) has revealed that age-curves obtained for charcoal and trees growing in the Kurai steppe were similar, and radically differed from those constructed for the upper forest boundary (see Fig. 4, *c*). Tree-ring chronologies built on charcoals did not correlate with the super-long mountain chronologies of Jelo and Mongun (Ibid.; Myglan, Oidupaa, Vaganov, 2012) owing to the effect of various inhibiting factors at the upper limit of tree vegetation and in the forest-steppe zone of the Southeastern Altai, which is in good agreement with analytical data obtained for the adjacent areas in the Republics of Tyva and Buryatia, and the Trans-Baikal Region. In this case, the trees growing on the upper forest boundary could not have been the source of wood for iron-smelting furnaces.

Notably, the construction of a thousand-year tree-ring chronology for the arid zone of Southern Siberia, which is based on charcoal, is of fundamental importance. In terms of practical application, its calendar correlation will make it possible to establish accurately the time when iron-smelting furnaces operated. More broadly, further research will draw on archaeological wood (charcoal) as an important source of ecological and paleoclimatic information. In addition, tree-ring chronology of such duration will lay a solid foundation for calendar dating of wood-samples from numerous burial mounds located in the steppe regions of the Altai Republic, and will open up broad prospects for performing reconstructions of humidification in the area under study with high (annual) resolution.

Conclusions

Thus, the development of a new approach to the study of charcoal from metallurgical furnaces in the Southeastern Altai and the introduction of advanced methods for analyzing dendrochronological data open up new prospects for exploring climate change and the cultural heritage of the past. Further research will provide the opportunity of solving the fundamental problem associated with the elaboration of a long tree-ring chronology in the arid zone of Southern Siberia (today, the longest tree-ring chronology in this zone extends back only 778 years). Consequently, the creation of a tree-ring chronology based on charcoal and covering the 1st millennium AD, and its calendar reference, will make it possible to elaborate a 2000-year tree-ring chronology for the steppe belt of Southern Siberia for the first time. Such chronology would be a unique tool for solving a wide range of practical problems, including the caldendar dating of wood from numerous burial mounds located in the intermountain depressions of the Altai-Sayan region, the reconstructing of annual moisture regimes, and the identifying the frequency of extreme droughts and other natural phenomena in this region.

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A Jurchen Temple at the Southern Ussuri Fortified Site, in Primorye

The article outlines the findings of excavations of a ritual building discovered at the Southern Ussuri fortified site (Primorye Territory), identified as the capital of the Xupin county of the Jurchen Jin Dynasty. Previously it was thought that the Southern Ussuri town was founded by the Balhae people and that during its early period it was the center of the Balhae district of Shuaibin, while the Jurchens appeared there later. However, our findings suggest that the town belonged to the Jurchens from the beginning. Despite the high density of modern buildings on the territory of the medieval town, our study of what was left of the habitation deposits has allowed us to determine the architectural horizons and to associate them with specific historical periods. Based on the analysis of materials excavated from a building located on the upper architectural horizon, architectural features of a medieval building representing the Buddhist tradition were described: the colonnade, roof style, and sculptural representations of dragons, phoenixes, and Buddhist immortals. New decorative motifs on the tiles of the front and eaves of the roof were discovered, and new standards of building materials were identified. The findings suggest that the ritual structure dates to the 13th century—the second period of the Jurchen Eastern Xia State (1234–1276), preceding the Yuan Dynasty. Special architectural features revealed during the excavations of the upper architectural horizon are reliable indicators for assessing the age of other sites in Primorye.

Keywords: *Jurchens, medieval archaeology, ritual buildings, Southern Ussuri fortified site, Eastern Xia State, Far East.*

Introduction

Sites of the Jurchen culture in the Russian Far East are unique objects that have preserved authentic cultural content together with clearly-expressed local features. Following the collapse of the Eastern Xia State (1215–1233), most of the settlements of that time were destroyed, making it easier to date the upper building horizon with relative certainty. This is not the case for Jurchen sites in Northeast China, whose dates correlate to a broad chronological range spanning the Liao–Jin–Yuan periods (906–1368).

According to historical geography, Primorye was a part of the Jurchen county of Xupin. The discovered remains of the burial complex of the Jurchen leader and commander Wanyan Zhong have proven that his tribe resettled there (Larichev, 1966: 234–235; 1974; Lin Yun, 1992) in 1124 from the Yelan area (Jin shi, (s.a.)). The seal of the Yelan Meng'an, found in 1995 at the Krasny Yar fortified settlement, testifies to the presence of the toponym "Yelan" in Primorye. Some written sources also confirm this fact: "Yelan and Xupin are separated by 1000 li; in the 11th year of Dading, Emperor Shizong ordered that the Meng'an, which was ruled by relatives

(the Yelan Wanyan), be called 'Yelan Meng'an', so those living in Xupin (the Yelan Wanyan) would not forget their roots" (Artemieva, Ivliev, 2000; Jin shi, (s.a.)). Thus, "Yelan Meng'an" mentioned in the text of the seal existed under that name in the area of present-day Ussuriysk starting in 1171 (the 11th year of Dading) for over fifty years, and the Jurchens, who were a part of it, lived there for about a hundred years (Artemieva, Ivliev, 2000).

Dating of the Southern Ussuri fortified site to the 12th–early 13th century, and the traces remaining from the activities of Wanyan Zhong and his descendants in the area, make it possible to identify this site as the center of the Jin county of Xupin. However, for many years, the prevailing opinion in the literature was that the town was built by the Balhae people and that in the beginning it was the center of the Balhae region of Shuaibin, with the Jurchens settling in it later. The Chinese archaeologist Zhang Taixiang (1981) was one of the first scholars to identify the large Balhae fortified settlement of Dachengzi in the valley of the Suifen (Razdolnaya) River in Dongning County of Heilongjiang Province as being the center of that province.

Archaeological research of a ritual building

Studies of the Southerm Ussuri fortified settlement have convincingly proven that it was a Jurchen site and center of the Jin county of Xupin (Artemieva, 2008a, b, 2010). Three architectural horizons, with their corresponding layers, were stratigraphically identified at the settlement: the upper horizon consisted of brown loam, the middle horizon consisted of gray loam, and the lower horizon consisted of bright orange clay. All of them contained remains of the Jurchen archaeological culture. The first two architectural horizons can be attributed to the Jin period (12th–early 13th century), while the upper horizon belongs to the last stage of the Jurchen state of Eastern Xia (late 13th century). Dwellings with heating ducts, utility pits, and administrative buildings were found in the lower and middle horizons; a paved road, a well, residential complexes, and buildings with collonades, including a ritual structure, were in the upper horizon.

The remains of a temple were discovered in the southeastern section of the settlement during the rescue archaeological works in the city of Ussuriysk, on Lermontova str., 16. Most of the temple was destroyed by modern buildings. After removing a layer of construction debris, many places revealed a layer of clayish sandy loam with fragments of broken bricks and tiles, and the displaced basalt base of a column was found (Fig. 1, *6*). Four similar column bases are located in the park of the 40th Anniversary of the Victory across the road opposite the section under discussion (Artemieva, 2001, 2008b) and on a nearby private territory on Nechaeva str., 8. The area of excavations in 2013–2014 was 554 m^2. They covered the northeastern part of the building (about 120 m^2), from which there survived stone blocks covering the foundation (Fig. 1, *3*), stone bases, and rubblework for their foundations (Fig. 1, *1*, *2*), remains of the roof, including roof tiles with ornamented eave-edge and end tiles (Fig. 1, *4*), molded roof ridge decorations (*chiwei*), as well as sculpted images of phoenixes and dragon heads.

Judging by the location of tiles in other residential areas of the city, the building had an area of about 400 m^2; it was oriented with its corners to the four cardinal points. The foundation was covered with processed stones 20 × 35 × 15 cm, laid in a row (Fig. 1, *3*). The outer side of this covering was additionally reinforced with large flat stones, some of which were placed under stone blocks (Fig. 1, *5*).

Rubblework for four stone bases of wooden columns was found on the earthen floor (Fig. 1, *1*, *2*). Rubblework 1, measuring 180 × 300 cm and 90 cm deep, on the western side was destroyed during construction of a modern root cellar. Fragments of broken bricks, tiles, and ceramics occurred throughout the entire depth of the pit. It could be clearly seen that the brick was specially crushed to a size less than 10 cm. Debris from earlier buildings was used for rubblework, which is manifested by fragments of tiles with ornamented eave-edges. For greater density, 20 cm layers of rubblework material (broken brick, tiles, and ceramics) were alternated with 10–20 cm layers of clay. This is similar to the *hangtu* technique used in construction of Jurchen ramparts. During disassembly of the rubblework, fragments of eave-edges of lower tiles with herring bone, floral, and net-like ornamentation were found. Rubblework 2, measuring 90 × 80 cm and 20 cm deep, consisted of a layer of broken bricks, tiles, and ceramic fragments. The remaining two areas of rubblework were structurally similar to the first one. The size of rubblework 3 was 200 × 130 cm; its depth was 85 cm. Its upper part was located under a layer of clay 20 cm thick. This suggests that the rubblework was located under the floor of the building. During disassembly, fragments of the sculpted image of a dragon, three end tiles with floral ornamentation, *chiwei*, an ornamented eave-edge tile, ornamented horn, molded decoration, and dragon fang made of clay were found.

Rubblework 4 measured 160 × 160 cm and was 100 cm deep. Fragments of sculpted images of a dragon (four of the horns, two of beards, the tongue, and scales), fragments of five end tiles with floral ornamentation, six fragments of triangular eave-edge tiles also with floral ornamentation, plastering, three fragments of *chiwei*, seven fragments of lower tiles, and two roof ridge tiles were discovered during its disassembly. In the upper part

Fig. 1. Structural remains of the building.
1 – rubblework under the base of the column; *2* – profile of the rubblework; *3* – stone blocks from the covering of the building platform and collapsed remains of the tiled roof; *4* – remains of the tiled roof; *5* – stone covering of the building platform; *6* – column base.

of the rubblework, a stone base was found. It was a granite monolith measuring 80 × 60 × 15 cm. Seven more similar stones were found in different parts of the excavation area. It is not possible to establish exactly whether these were bases or were used for the outer lining of the foundation. If these stones were bases, they were moved from their original locations. The upper part of the granite monolith was shaped like a square (60 × 60 × 10 cm), with a round pedestal 55 cm in diameter and 6 cm high in the center (Fig. 1, *6*). Approximately ten bases with this design were found in the area. Most likely, they were associated with the same building. Such bases were set in palace-type or cult structures.

Remains of the tiled roof were found in the northwestern (around the covering of the stone foundation) and northeastern (behind the outer wall of the building) parts of the excavation area (Fig. 1, *3*, *4*), although roof fragments occurred over a large area in the redeposited layer. Accumulations of tiles in the form of bands ca 3 m wide were located on the outside, along the remains of the building walls. Most of the tiles were broken, but there were also places where they remained intact after

destruction of the building. The upper tiles overlapped the lower ones. Upper tiles with end tiles were also discovered in that area (Fig. 2, *6*). In the northeastern part of the excavation, in the accumulation of collapsed tiles, a large amount of plastering was found. The thickness of some plaster fragments reached 10 cm. Traces of the wooden roof structure were visible on many pieces. Judging by the orange color of the plastering, the building was burning when it collapsed. Many pieces of solidified white masonry mortar reminiscent of lime, which could have been used for attaching the upper tiles to the roof sheathing, was also discovered. The collection of tiles and molded decorations of the roof makes it possible to reconstruct its shape and identify new elements in the building design. Parallels to the images discovered on the end tiles, the ornamentation on the eave-edges of the lower tiles, as well as the molded decorations have not yet been found.

Fig. 2. Roof elements.
1 – upper tile with the end part; *2* – lower tile; *3*, *5* – end tiles; *4* – ornamented eave-edge of the lower tile; *6* – upper tile with end tile; *7* – decorations in the form of a flower rosette; *8* – iron nails.

Far-Eastern medieval tiles are traditionally divided into two types, and each of them into two subtypes.

1. Lower:

1A – large cone-shaped tubular tiles 34–36 cm long, with a span of the wide edge of 23–24 cm, span of the narrow edge of 19–20 cm, and thickness of 1.8–2.0 cm; the narrow end is usually slightly rounded; the wide end is even (Fig. 2, *2*);

1B – frontal tiles with eave-edge tiles 6–9 cm wide, extending at an angle of 90°. The outer side of the eave-edge tile was decorated with four depressed horizontal strips, on top of which alternating stamps (three or four in each section) were applied. The stamped images included a five-petaled rosette and rhomboid grid of square imprints (Fig. 2, *4*). The lower edge of the eave-edge tile has a shape of festoons decorated with stamped bands. On the upper edge, where it was attached to the flat tiles, recesses were made with a trident stamp, giving compositional completeness to the ornamental décor and at the same time making the attachment of the eave-edge tile more firm.

2. Upper:

2A – narrow tubular tiles 28–34 cm long, with a span of 18 cm, which could be with or without an end tile (Fig. 2, *1*);

2B – frontal tubular tiles with an end tile measuring 18 cm in diameter and 2 cm thick (Fig. 2, *6*), decorated with a zoomorphic image (14 cm in diameter) framed by a convex ring.

All images on the end tiles were made in the same style, but based on the shape of the mouth they can be divided into "good" (Fig. 2, *5*) and "evil" (Fig. 2, *3*). In the first group of images, the eyes are shown as flattened hemispheres in the center of depressed orbits. The nose has a subtriangular shape and an elongated nose bridge. The cheeks are accentuated on the sides right below the eyes. The mouth is oval; the teeth are represented by small bulges along the inner outline. Convex lines render the mane and beard, divided into two parts. In the second group of images, the eyes, nose, and cheeks are represented by hemispheres. The mouth has the shape of an oval raised on one side, with closely set bulges of teeth. The mane framing the upper part of the image like a crown, and beard divided into two parts, are rendered by convex lines. Zoomorphic images of the second group look aggressive and intimidating. End tiles were made separately and were fastened to the tiles with the help of an additional riveting on the inside.

For the first time at Jurchen sites of Primorye, moldings of a six-petaled rosette with a hole (0.5 cm) in the center (Fig. 2, *7*), which served as stubs for nails fastening the upper tiles to the roof rafters, were discovered. They were hemispheres 9 cm in diameter and 4 cm high. An iron nail up to 30 cm long, with a pyramidal head, was inserted through the hole into the rosette (Fig. 2, *8*).

Based on the fragments of moldings, the upper part of the roof was decorated with two massive ceramic *chiweis*, representing dragon heads. The open mouths of the sculptures held the ridge elements of the roof at both ends. This horizontal composition was supposed to give the roof a special silhouette. A large number of fragments of sculpted images of dragons have been found (scales, "curls" of sideburns, horns, beard, ears, fins, teeth, eyes).

A large (39 × 36 × 30 cm) ceramic head of a dragon (a so-called *shou tou*, 'animal head') was discovered near the northern corner of the building (Ashchepkov, 1959: 47) (Fig. 3, *3*). Such sculptures were usually set on the slopes of the roof. The image has an "aggressive" appearance: the wide-open mouth shows fangs and a raised tongue; a hook-shaped trunk supports swollen nostrils; the eyes are bulging. Eyebrows are depicted by horizontal strips above oval eye sockets. Circles imitating scales are engraved on puffed cheeks. A mane turning into a beard, the ends of which are decorated by triangular flames, is below oval ears. Many details associated with that sculpture, including a horn that must have been on the monster's forehead, were found around it. An iron band with forked end, ca 1 m long, with which the sculpture was attached to the roof rafters, was threaded through the mouth of the dragon.

Figures of animals, birds, and bodhisattvas were set on roof slopes behind the ceramic head of the dragon. As with the dragon, they had symbolic meaning, protecting the inhabitants of the building from evil powers. The ceramic body of a headless sculpture (Fig. 3, *4*), which was molded on a ceramic tube (the height of the remaining part was about 30 cm; the diameter was 9.5 cm), was discovered in the filling of a modern root cellar, along with the head (12 × 7 cm), which must have belonged to the body, without the molded part of the face (Fig. 3, *2*). Judging by the robe with a left wrap (this feature of Jurchen clothing was mentioned by M.V. Vorobiev (1983: 27, 95)), belted with a wide ribbon (a variety of the ritual belt (Sychev L.P., Sychev V.L., 1975: 36)), and long sleeves covering the hands, this must be the image of a bodhisattva. Roof slopes of Buddhist temples were decorated with similar sculptures.

A head (12 × 8 cm) of a ceramic sculpture was found in the southern part of the excavation area. It was initially identified as an image of Buddha (Fig. 3, *1*). The eyes of the sculpture are partially closed; the gaze has a faraway look; there is a peaceful smile on the lips. The upper lip slightly protrudes forward; the lower lip is divided into two parts; there is a dotted depression under it. The nose has flared nostrils as if in the process of inhalation. Ears with elongated lobes are pressed to the head, which is dressed in a tight cap with pointed top. There are three folds in its lower part; they may be traces of a crown. Facial features of the sculpture

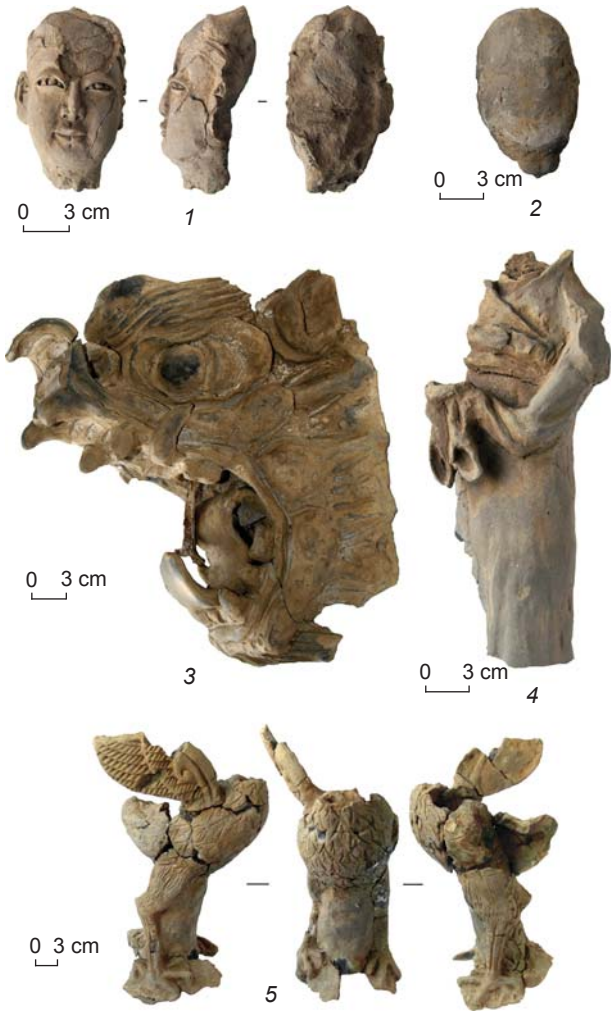

Fig. 3. Sculpted images (ceramics).
1 – head of a *kalavinka*; *2* – head of a bodhisattva; *3* – dragon *shou tou*; *4* – torso of a bodhisattva; *5* – phoenix.

correspond to the bodhisattvas of the Song and Jin dynasties. According to Chinese colleagues, this may be an image of the *kalavinka*—a fantastic immortal creature from Buddhist mythology—with human head and body of a bird with a long tail, black plumage similar to that of a sparrow, and very graceful wings.

Buddhist treatises say that *kalavinka* has a wonderful voice and can sing sutras. According to legends, this creature comes from India and lives in places with many high snowy mountains, mountain gorges, and wide plains. In China, the earliest images of *kalavinka* in stone bas-reliefs go back to the Northern Wei period (386–534). This image often occurs on the Tang frescoes of Dunhuang and on bronze mirrors. A *kalavinka* statue, with her hair tied into a knot and a red dot painted on the forehead, was discovered in the southern tower of the Upper Capital of the Liao Dynasty (modern Bairin Yuqi Banner, Chifeng City District of the Inner Mongolia Autonomous Region of China). In all images of this

creature, the upper part of the body is human, while the lower part is that of a bird; the palms are folded at chest level, which means a "gesture of worship", showing respect to a deity or respected person (Terentiev, 2004: 62).

A headless sculpture of a lunar phoenix, which in Buddhist mythology is considered the second most important symbol after the dragon, was found in the southeastern part of the excavation. The lunar phoenix is depicted with open wings; feathers are shown by parallel lines of imprinted strips (Fig. 3, *5*). The body and tail are decorated with rhombuses, with inscribed bird's foot imprints. The plumage on the thighs is rendered by long imprinted strips. The paws with five claws firmly grasp the base of a convex ceramic slab (33 × 30 × 2.5 cm). This sculpture is very expressive. Just like the statue of bodhisattva, the phoenix was molded on a tube 9.5 cm in diameter; many details were attached to iron fittings.

Based on the remains of the building, it must have had a high status and was a palace or temple. Traditional architecture of buildings of this rank was uniform, having a colonnaded structure, tiled roof, and large size. The functional purpose of the structure under discussion can be identified from molded decorations of the roof and remains of dishes intended for Buddhist rituals.

The remains of ritual utensils included two ceramic legs of a tripod 6.5 cm high and 3 cm in diameter (Fig. 4, *5*, *6*), and upper part of a bronze *kundika* vessel (Fig. 4, *2*), found at the northeastern side of the building (excavation of 2011). This water jug was used in purification and consecration rituals. It symbolized purity and spreading blessings by sprinkling the "water of life" or "nectar of immortality". During Buddhist rituals, the vessel performed the function of cleansing the sacred space (Fig. 4, *1*). It could be made of any material, and a removable hollow metal cone or sprinkler was inserted into the central hole in the upper part. Such vessels began to be made of bronze in India. Later, they spread throughout East and Southeast Asia. In Chinese Buddhism, *kundika* is an attribute of Bodhisattva Guanyin (Bir, 2013: 256). Another fragment of a similar vessel, but made of clay (Fig. 4, *3*), was discovered near the site (excavation of 2008). Further to the east (excavations of 2006 and 2014), a large number of glazed dishes were discovered, including saucers and bowls with blue and greenish *junyao* glaze (Weidong Li et al., 2018: Fig. 2, 3) (Fig. 5, *3–10*), as well as two bronze mirrors (Fig. 5, *1*, *2*), an iron sword, and ceramic cup-lamps (see Fig. 4, *4*).

Conclusions

At the Southern Ussuri fortified site, in the upper architectural horizon, the remains of a colonnaded building with tiled roof were found, which can be identified as a cult structure. The structure was built in accordance with the architectural canons of Buddhism, but without a high platform or massive plinth. The floor was made of rammed earth and lined on all sides with stone blocks in two rows. Special rubblework was created under the bases of the columns to prevent them from sinking. The rubblework was covered with a layer of clay, and stone column bases deepened into the floor of the building were set on top of them. Wooden columns had a diameter of 30–50 cm. In Jin architecture, the ratio of diameter to height was 1:8 or 1:9. In one-story buildings, the inner columns were 1.4–1.8 times higher than the outer columns, which created a steep

Fig. 4. Ritual ceramics.
1–3 – *kundika* vessel and its fragments; *4* – cup-lamp; *5*, *6* – tripod fragments.

Fig. 5. Bronze mirrors (*1*, *2*) and glazed dishes (*3–10*) found near the temple.

"flying roof" (Vorobiev, 1983: 184). The columns played both structural and compositional roles.

The design of the building successfully combined structural elements with decoration. The roof had two sloping surfaces; its ridge was crowned with two sculptures of dragon heads with wide open mouths (*chiwei*). The ridges of the side slopes were decorated with ceramic dragon heads, behind which the figures of bodhisattvas, phoenixes, and *kalavinkas* were placed. The lower tiles of the gable were decorated with ornamented eave-edges, and the upper tiles were decorated with end tiles depicting zoomorphic images. The upper frontal tiles in the middle part were attached to the rafters using long nails with pyramidal heads, which passed through six-petaled rosettes. Currently, it is difficult to calculate the exact area of the building, but judging by the distribution of tile fragments, it was about 400 m^2. Most likely, it was a cult structure, which can be dated to the period of the Eastern Xia State (1215–1233). The discovered tiles do not yet have parallels in terms of ornamentation and standards, but the sculptures that decorated the roof are stylistically similar to those discovered at other medieval sites of Primorye (Zabelina, 1960: 222–223; Shavkunov, 1966). The fact that the tiles were larger than standard may possibly serve as a chronological marker. In later periods, the standards of tiles changed to larger sizes, so the building excavated at the Southern Ussuri fortified settlement could have belonged to the second period of the Eastern Xia State (1234–1276), which was before the Yuan Dynasty. During this period, Eastern Xia became a real state entity. Being a vassal of the Mongols, it retained certain borders, kept military forces, appointed officials, and managed state affairs (Wang Shenrong, Zhao Mingci, 1990: 2–3). However, with the establishment of the Yuan Dynasty and the unification of the Mongol Empire, the Eastern Xia State lost its previous position. The administrative territories of the Liaodong Peninsula and of Primorye were transferred to the direct control of the Yuan Empire. Distinctive features of the architecture, uncovered during the study of the Buddhist temple in the upper architectural horizon at the Southern Ussuri fortified site can serve as accurate indicators in dating the evidence from other sites of the Eastern Xia State.

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Irrigation Systems of the Altai: Results and Prospects of Archaeological Studies

We present the findings of studies concerning the irrigation systems of the Altai and outline the directions of their further exploration. Irrigation canals, widely distributed in alpine valleys and intermontane depressions, are streams of the drift type. Most are found in central Altai and in the Chulyshman River valley of eastern Altai. Complex irrigation systems were recorded in the Bilgebash and Sarduma river mouths in the Chuya valley, in the Chulcha River mouth in the Chulyshman valley, and in Tötö, the Kurai basin. Pilot excavations of the main canals showed that wooden troughs had been placed on their bottoms. Radiocarbon analysis of wood from those troughs (Cheba and Oroktoi) suggests that they date to the Late Middle Ages, and a soil sample from the bottom of the canal of the Tenga irrigation system indicates early medieval age. In the 1800s and early 1900s, canals were used by the natives mainly for watering small plots of barley, but also of wheat and rye. Agriculture has been practiced in the Altai at least since the Early Iron Age, having flourished, apparently, during the Early Middle Ages. The first irrigation systems must have appeared together with the first farmers; however, taking into account the prolonged use and modifications of the main canals, assessing the time of their initial construction is difficult.

Keywords: *Irrigation, irrigation systems, Altai, canals, agriculture, suvak, dating.*

Introduction

The relatively high number of explored and studied archaeological sites in the Altai makes it possible to consider this territory as one of the key regions for understanding the processes that took place in Southern Siberia and Central Asia in antiquity and the Middle Ages. In the Altai, where the most-studied are burial sites, less attention has been paid to the objects associated with economic activities. Among others, numerous but poorly studied are irrigation systems.

The presence of irrigation practice in the Altai is associated with the environmental and climatic conditions. The Russian part of the Altai Mountains has a harsh continental climate. The terrain is typically mountainous, with clearly marked altitudinal zonation. The heights

of river valleys, intermontane depressions and plateaus rise significantly from north to south. Noteworthy is the hydrological situation favorable for the construction of irrigation systems. The river network of the Altai includes more than 20,000 mountain rivers, with their total length exceeding 62 thousand km (Marinin, Samoylova, 1987: 4, 45–46). The flow velocity is high, owing to the significant slope of the longitudinal profiles of the rivers.

Irrigation systems are numerous in river valleys and intermontane basins, as well as in some other regions of the central, southern and eastern Altai. Canals are common elements of Altai landscapes; these are mentioned in the works of researchers such as A.A. Bunge (Ledebour, Bunge, Mayer, 1993: 204), V.V. Radlov (1989: 437, 474), N.M. Yadrintsev (1883: 192, 202), and others. The study of irrigation canals in Tötö, Altai, in 1935 was carried out by S.V. Kiselev (1949: 287–289), in various regions of the Altai in 2003–2007 by T.A. Beketova (Akimova) (see (Vdovina, Trifanova, 2003; Vdovina, 2004, 2005, 2007a, b; Smirnov, Akimova, 2014)).

In 2019–2021, as part of a project to study the medieval economy of the Altai population, field works were carried out aimed at the identification of irrigation systems in the central and eastern parts of the region.

The purpose of this article is to summarize the results of the study of irrigation systems in the Altai and to determine the directions for further research.

Material and methods

Irrigation canals (Alt. *suaks*, *suvaks*) are spread over a large area of the Russian Altai (Fig. 1). Bunge reported in 1826 that the Altaians use the canals to irrigate plots with crops, most often barley (Ledebour, Bunge, Mayer, 1993: 204). According to 19th-century researchers, the canals had been built in earlier times (Yadrintsev, 1883: 192; Radlov, 1989: 437; Shvetsov, 1900: 280). In the 20th century, many canals were rebuilt by Soviet meliorators.

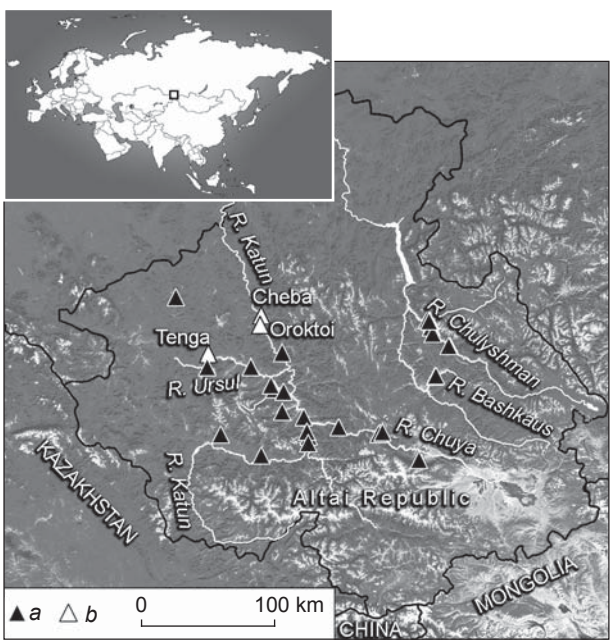

Fig. 1. Irrigation systems of the Altai (*a*); canals where cross-sections were made (*b*).

Most of the well-known Altai irrigation systems have the following arrangement (Fig. 2). Depressions were dug into the soil, through which water flowed by gravity to the areas in need of irrigation. Water intake was usually carried out from rivers of the second order, using various kinds of dam, or a natural slope. In some valleys, several levels of main canals are recorded, whose water-intake points were in different parts of the river flow. Such a system was examined by the authors on the left bank of the Kupchegen River (Fig. 3). In the topographic low areas, stone or wooden water-support conduits (aqueducts) were often built for the water's passage. When laying the canals, rock ledges were sometimes hewed (Vdovina, 2005: 174; 2007b: 63). Water storage reservoirs were also created.

Water was supplied to the irrigated fields through diversion canals. It spread over the plots with the help of diversion ditches. In the Katky area, in the lower part of the Chulyshman valley, A.S. Surazakov discovered the abandoned fields that he described as previously cultivated "cells", ca 30 × 40 m, separated by partially eroded berms (2003: 93).

A similar situation we observed on the right bank of the Chulyshman, where the Karasu-1 irrigation system is located. At the foot of the mountain slope, on a small ledge, there was a series of elongated plots, separated by partially eroded berms, along which the distribution canals passed (Fig. 4). Below these sections, there were two elongated narrow ledges resembling artificial terraces.

To capture irrigation systems, we used the photogrammetry (aerial photography) method. The acquired relief models and orthophotomaps were loaded into the QGIS program, where plans of irrigation systems were drawn. Modern methods of identification ofarchaeological sites significantly facilitate the process of studying irrigation systems.

At the sites of Cheba, Oroktoi, and Tenga, T.A. Beketova (Akimova) made cross-sections of the main canals in 2006 (Vdovina, 2007b).

Cheba. A cross-section of the main canal on the Cheba River (the right tributary of the Katun) was made at the point where the canal crossed the rocky outcrop. The rock ledge was hemmed, and the cliff behind the ledge was shaped with a stone and earth embankment. The test

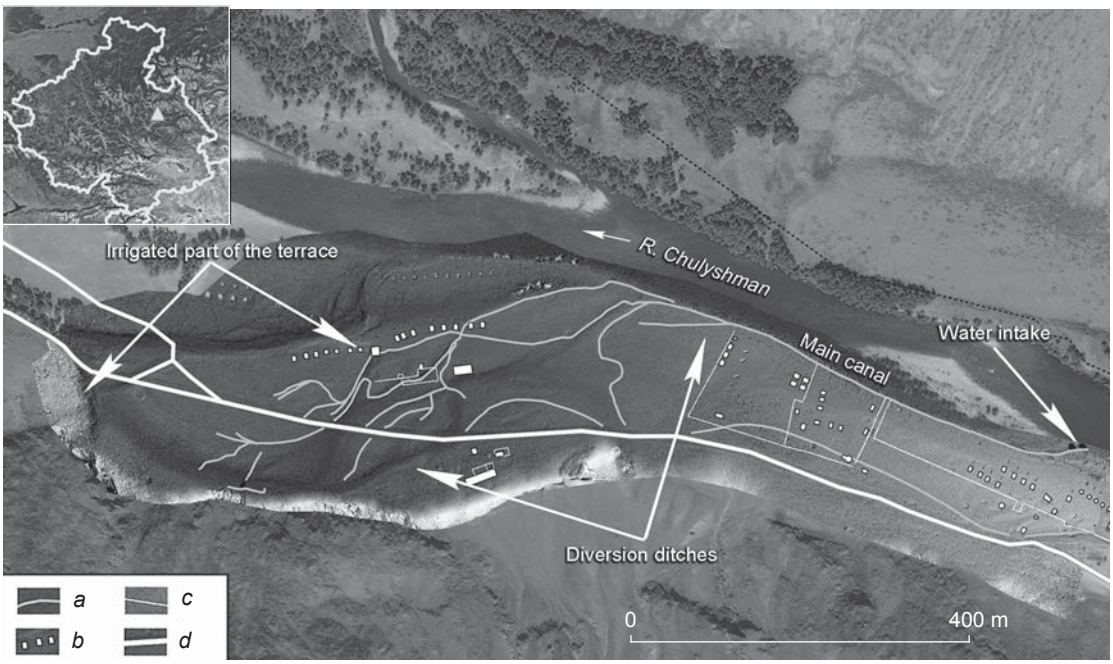

Fig. 2. Katu-Yaryk-1 irrigation system. Eastern Altai, the Chulyshman River valley.
a – irrigation canals; *b* – modern buildings; *c* – modern enclosures; *d* – road.

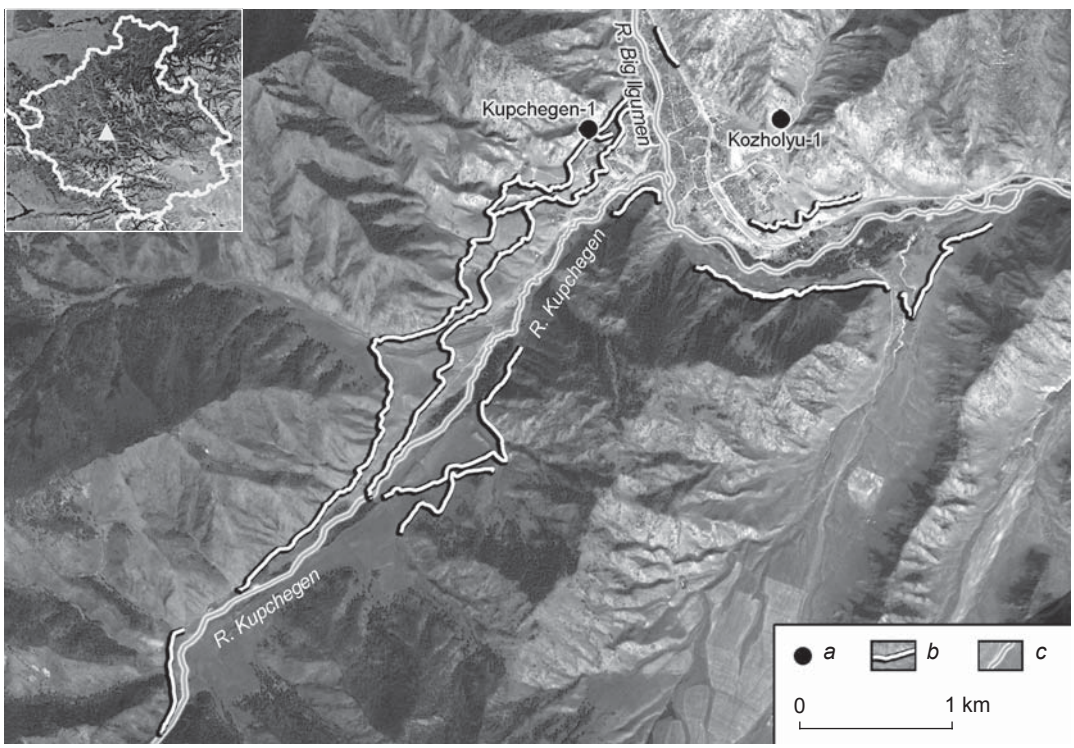

Fig. 3. Irrigation systems near the Kupchegen village. Central Altai, the Big Ilgumen River valley.
a – medieval settlements; *b* – irrigation canals; *c* – rivers.

pit was made between the rocky outcrop and the stone embankment of the canal. At the bottom of the canal, a wooden trough 45 cm wide, with sides up to 10 cm high, was found (Fig. 5; 6, *1*, *2*).

Oroktoi. At the exit of the main canal from the Orokta River valley to the left-bank terrace of the Katun, the wall of the trench crossing the canal was cleaned. The canal's depth is ca 1m from the daylight surface. At the bottom, the remains of a wooden trough were found, covered with aninterlayer of sediments of loose coarse-grained sand. Higher, at a depth of 0.2 and 0.35 m, two interlayers of sand were recorded.

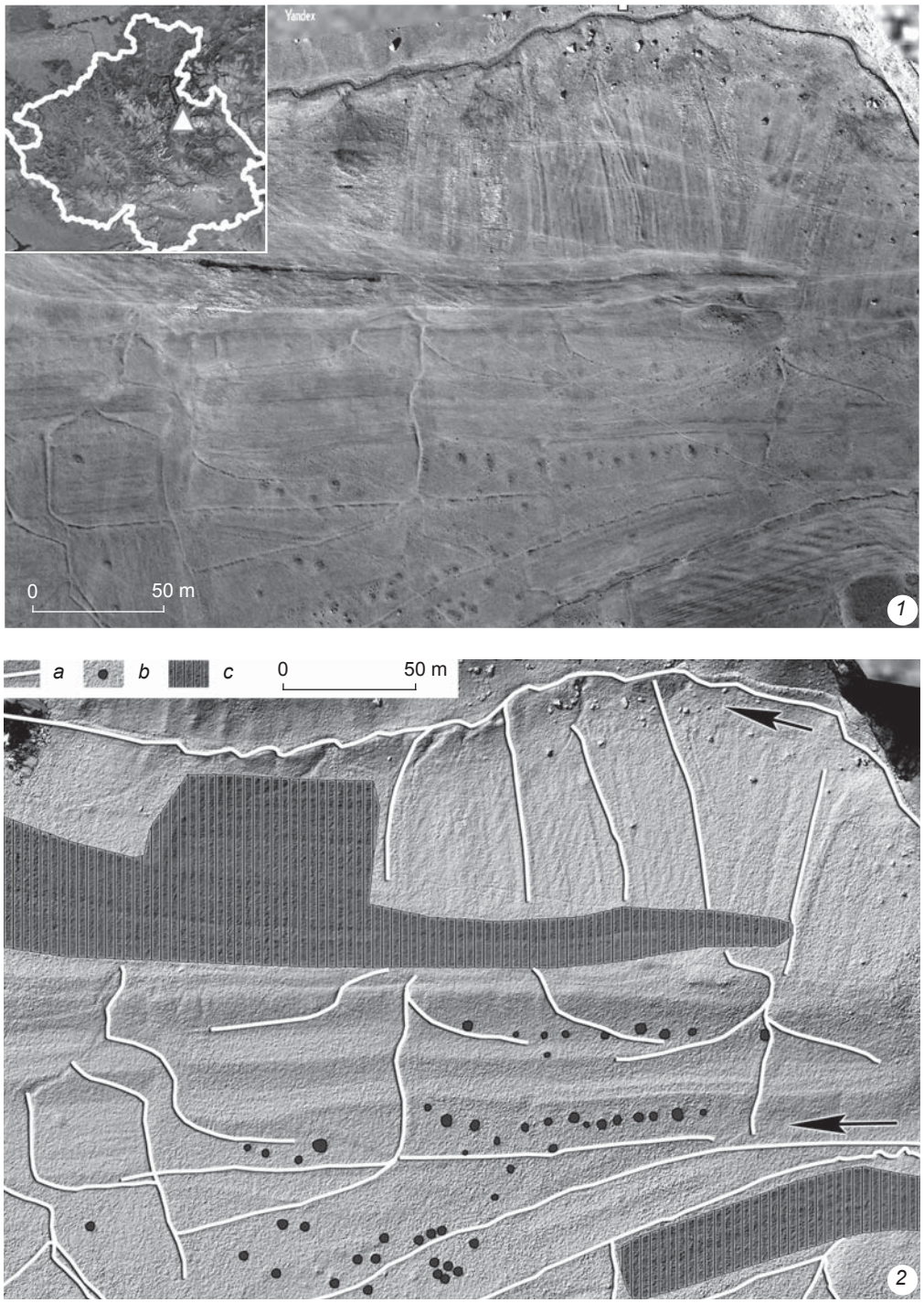

Fig. 4. Orthophotomap (*1*) and relief model (*2*, arrows indicate the direction of flow) of the section of the Karasu-1 irrigation system. Eastern Altai, the Chulyshman River valley.
a – canals; *b* – accumulations of stones; *c* – arable land of the 20th century.

Fig. 5. Wooden trough of the Cheba main canal.

Tenga (Argymaya Canal). On the left bank of the Tenga River (left tributary of the Ursul), the wall of the trench crossing the canal was cleaned. The canal's depth is ca 0.4 m. A discharge is recorded on the lower bank of the canal. At the bottom, there is aninterlayer of dense silted soil (Fig. 6, *3*).

Results

All the irrigation canals studied in the Altai belong to the systems of drift/gravity irrigation. The

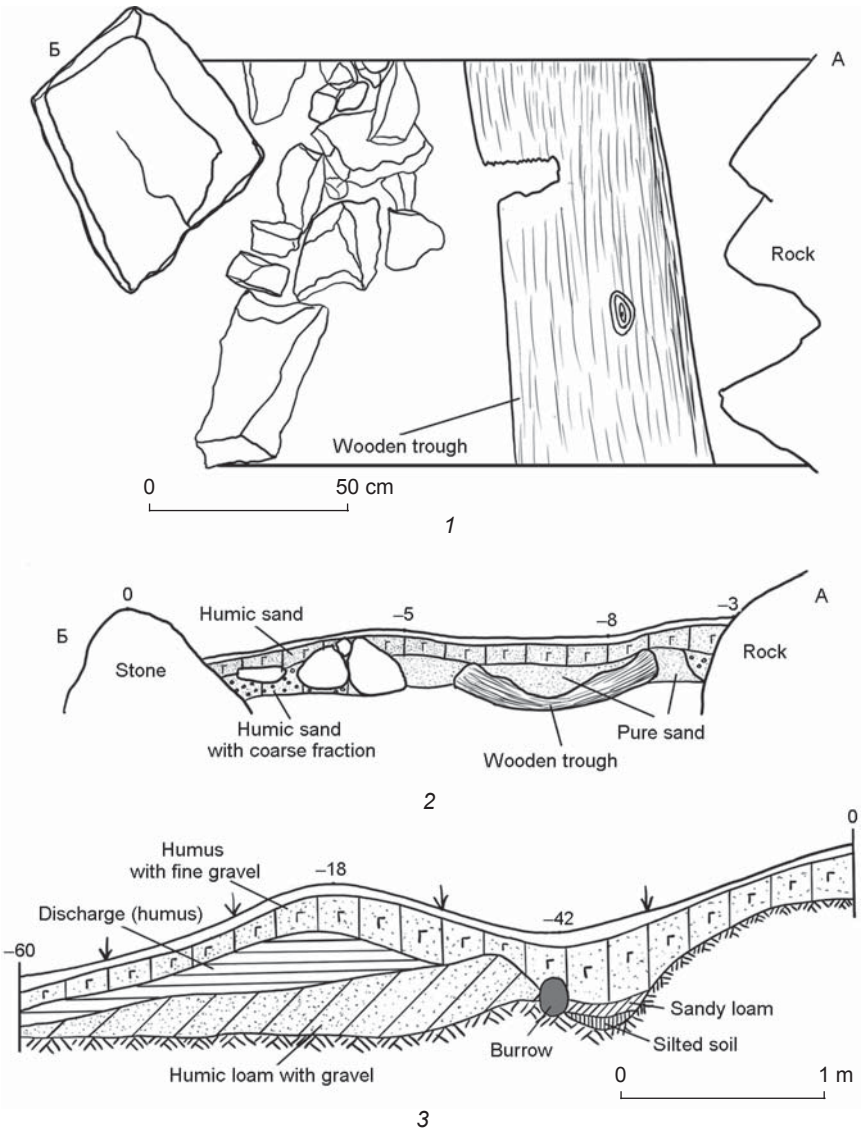

Fig. 6. Plan (*1*) and cross-section (*2*) of the Cheba main canal excavation, cross-section of the Tenga main canal (*3*).

Radiocarbon dates of the main canals in the Altai

Site	Material	Code	Age, BP	Calibrated date (probability)
Cheba	Wood of the trough	SOAN-6618	285 ± 30	16th century (60 %)
Oroktoi	"	SOAN-6619	420 ± 50	15th century to the first third of the 16th century (69.8 %)
Tenga	Sediments of soil from the bottom of the canal	SOAN-6620	1340 ± 100	6–9 centuries (95.4 %)
	Soil of the ancient buried surface from the outer side of the canal	SOAN-6621	2395 ± 65	761–384 BC (95.4 %)

efficiency of such canals is provided by the natural slope of mountains and river valley bottoms.

The most difficult issue is to determine the time of construction of the canals. In mountainous terrain, the main canals were usually laid only once. These passed at the optimum level and could be used repeatedly. In Soviet times, such canals were rebuilt, often with the use of concrete and metal structures.

The results of radiocarbon dating attribute the wooden troughs from the Cheba and Oroktoi canals to the Late Middle Ages (see *Table*). These dates correspond to the last stage of the canals' use. However, the dating of the initial stage of their construction and use still remains open. According to radiocarbon analysis data, the silty soil from the bottom of the Tenga canal belongs to the Early Middle Ages.

The use of irrigation canals by the local population for watering the crops is confirmed by direct reports from researchers in the 19th century (Vdovina, 2004: 116). Settlements and other utility sites of the Altai are poorly studied, but there is a lot of evidence of agriculture in the Altai from antiquity and the Middle Ages.

Such materials include millet grains found in mound 1 at the Tuektacemetery (Scythian time) (Rudenko, 1960: 200). In Denisova Cave, an accumulation of wheat (about 15 kg) was found, dating back to the last centuries of the 1st millennium BC (Derevianko, Molodin, 1994: 26, 105; Orlova, 1994: 202). During paleobotanical study, a large number of cereal-type starch grains were revealed in soil samples from the cultural layer of the medieval settlement of Kozholyu-1. Pollen from cultivated cereals was not found, probably owing to its low concentration in general.The presence of starch grains in soil samples is not considered reliable evidence of agriculture, since the conditions for their preservation and distribution in various types of sediments are poorly understood (Haslam, 2004; Hutschenreuther et al., 2017). However, a large number of cereal-type starch grains, in combination with other data, may suggest farming practices.

The early medieval moldboards and ploughshares are another evidence of agriculture (Kubarev, 1997; Polosmak, Dyadkov, 2021: 605). At the cemeteries of Kok-Pash (4th–5th centuries AD), Kudyrge (6th–8th centuries AD), and in the upper layer of the Tytkesken-3 settlement (1st millennium AD) (Bobrov, Vasyutin A.S., Vasyutin S.A., 2003: 175, fig. 6, *19*; Gavrilova, 1965: Pl. V, *3*; Kungurov, 1994: Fig. 4, *9*), iron sickles and reaping-knives were found (Fig. 7, *1*). During the study of archaeological sites of the Altai, dating from the Early Scythian time to the Middle Ages, millstones of hand mills (Fig. 7, *2*, *3)* and their blanks were found (Surazakov, Tishkin, 2007: 63–69; Molodin, Borodovsky, 1994; Soenov, Konstantinov, Trifanova, 2018: 51). The sites of various times contained numerous grinding stones (Fig. 7, *5*) (Soenov, 2003; Shulga, 2015: 54–57).

It is believed that mechanical (water) mills appeared in the Altai at the end of the 19th century (Torushev, 2017: 96), with

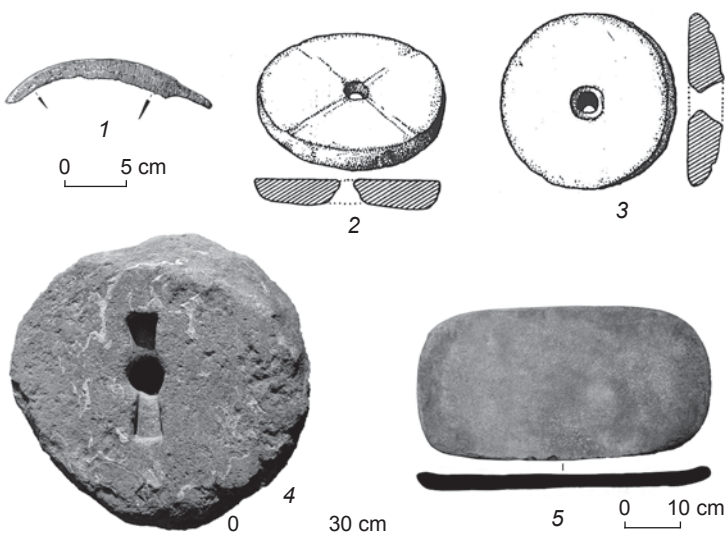

Fig. 7. Agricultural tools.
1 – sickle knife; *2*, *3* – millstones of hand mills; *4* – millstone of mechanical mill; *5* – grinding stone. *1* – Kudyrge cemetery (Gavrilova, 1965: Pl. 5); *2*, *3* – Kurai VI cemetery (Evtyukhova, Kiselev, 1941: Fig. 21); *4* – Karasu River (Chulyshman valley); *5* – Kozholyu-1 settlement.

the arrival or under the influence of Russian settlers. However, in 1880, N.M. Yadrintsev discovered in the Chulyshman valley the abandoned large millstones of a mechanical mill, obviously belonging to an earlier period (1883: 192). In 2020, we examined probably one of these millstones stored in the same place at a livestock camp (Fig. 7, *4*).

Discussion

Sites of ancient and medieval irrigation are known both in the territories adjacent to the Altai and in the more distant ones. The remains of irrigation systems are often found in Southern Siberia. Canals in Khakassia, similar in structure to those in the Altai, also belong to the gravityirrigation system. Researchers associate them with the Tagar time (Kiselev, 1949: 149, 322; Levasheva, 1965; Sunchugashev, 1973; and others). Irrigation canals are also well known in Tuva (Rodevich, 1912: 17–18; Grumm-Grzhimailo, 1926: 356). The results of studying the Tuva irrigation systems are given in summarizing works (Prudnikova, 2005, 2018; Ashak-ool, 2005).

Recently, the irrigation canals of Xinjiang have been explored, the dates of which correspond to the Early Iron Age—the Han Period. The emergence of irrigation traditions in this area, according to scholars, was the result of Western influence or of the local development of the integrated farming culture (Li et al., 2017: 31, tab. 1).

The most important region, which may be associated with the spread of irrigation traditions in Southern Siberia, is Central Asia (Tolstov, 1962; Andrianov, 1969). In this area, with ancient agricultural culture, different methods of irrigation were used. Notably, even in Soviet times, when studying the irrigation sites of the region, special attention was paid to aerial photography (Igonin, 1968), which is still used today (Galieva, 2007). This method greatly facilitates the process of studying the complexes occupying large areas.

In view of the poor knowledge of the paleo-economics of the Altai, the question of the period in which agriculture appeared here remains open. Archaeological sources indicate that agriculture in the Altai was quite well developed already in the Early Iron Age, and flourished in the Middle Ages (Soenov, 2003: 171–172). Taking into account the arid climate of this territory, it can be assumed that the need to create irrigation canals arose along with the emergence of agriculture (Ibid.: 171).

The results of a paleo-botanical study of the soil in the Kurai basin in 1935, where there was a large irrigation system, led S.V. Kiselev to the conclusion "that the Tötö steppe was plowed and seeded in ancient times" (1949: 277). On the basis of stratigraphic observations, the researcher attributed the canals in this area to the Early Middle Ages (Ibid.: 288).

According to the data recorded by researchers and travelers in the 19th to early 20th centuries, canals in the valleys of the Chulyshman, Chuya, Katun and their tributaries were built to irrigate cultivated areas. One of the earliest reports is that of A.A. Bunge about the irrigated plots of barley, rye, and wheat in the central Altai, which he saw in 1826 (Ledebur, Bunge, Meyer, 1993: 204). Later sources also contain numerous references to the agriculture of the Altaians. Ethnographic observations, including modern ones, showed that canals were also used for irrigation of haylands; these were laid most often in floodplain zones. Such canals were usually shallow, short in length and simple in design.

All the canals, as noted, belonged to the drift/gravity irrigation method, effective in mountainous terrain. S.P. Shvetsov divided the irrigation systems of the Altai into two groups, similar in operation (1900: 280–281). The locals showed him the elaborate irrigation systems built by the "Chinese", and the simple canals that the locals believed had been dug by the more "ancient people".The researcher wrote that the former represented a regular and more complex network (these were the canals in the interfluve of the right tributaries of the Chuya-Bilgebash and Sarduma rivers). Irrigation systems called "more ancient" consisted of one or two ditches.

Complex systems include such irrigation objects as Bilgebash-Sarduma (Chuya valley), Karasu-Chulcha (Chulyshman valley), and Tötö (Kurai basin), as well as some irrigation systems in the central Altai. These were apparently large agricultural centers. This assumption is supported by the large millstones found near one of these systems at the Karasu River, in the Chulyshman valley.

The complex irrigation systems mentioned above may have been created centrally by one of the medieval states. However, until a series of dates is obtained, it is not possible to establish which state formation was associated with the construction of canals.

Conclusions

Irrigation systems are widespread in the Altai Mountains. As shown by the 19th century ethnographic sources, the canals were used mainly for watering cultivated areas with grain crops. To a lesser extent, they served to irrigate haylands.

Archaeological materials indicate that the Altai population has practiced agriculture since at least the Early Scythian times. However, it is still difficult to understand what the level of development of this economic activity in different historical periods was. It is also not clear whether irrigation was used in the early days of agriculture. According to ethnographic observations, even small plots, cultivated by hoeing, were irrigated with water coming through long canals (Ledebour, Bunge,

Mayer, 1993: 204). Owing to the low precipitation, high water permeability, and low moisture capacity of soils in the areas suitable for cultivation and sowing, irrigated agriculture was the only onethat could be practiced in the Altai (Soenov, 2003: 171). Possibly, the earliest and the simplest irrigation systems of the Altai were created by the first farmers.

In the Early Middle Ages, agriculture flourished in the Altai, as evidenced by such finds as plows and hand mills, as well as traces of agriculture at the Kozholyu-1 settlement and the construction of irrigation system in Tötö, Kurai basin. It is likely that the construction of other complex irrigation systems was associated with this period.

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An Old Believers' Skete near Maltsevo, Fort Chaus, Based on Mid-18th Century Documents and Their Comparison with Ethnographic and Archaeological Sources

This study focuses on an Old Believers' skete near the village of Maltsevo, Fort Chaus, north of modern Novosibirsk, where, according to mid-18th century documents, community members committed self-immolation. Documents differ as to where the rite occurred, how many people died, and how the skete was built. As compared to other contemporaneous sketes in Russia, this one is described in more detail. To all appearances, its construction resembled that of other Siberian forts. Similarities include an outer palisade wall, up to 2.45 m high, and the use of the logwork of houses as towers. The reason behind those parallels may be that preachers and community members were familiar with the fortifications of Fort Chaus. Fortified Old Believers' sketes are known in the Upper Ob region. The estimated living space of the log cabins fully corresponds to written data about the number of persons who took refuge in the skete. The search for the actual remains of the skete is ongoing and should be continued because this architectural structure, which existed for no more than one and a half months before the fire (May–June 1756), is a unique site of the late 18th century.

Keywords: *Upper Ob region, 18th century, Old Believers, skete, self-immolation, wooden architecture, Russian forts.*

Introduction

The mid-18th century in Russia was marked by the last surge of wide-scale self-immolations of Old Believers. Such events took place not only in the European part of Russia (Entala in Ustyuzhinskaya Volost in 1753, Nimenskaya Volost in Kargopolsky Uyezd in 1754), but also in southwestern Siberia (the village of Gilyova in Tyumensky Uyezd in 1751, village of Luchinkina in Tyumensky Uyezd in 1753, in the vicinity of the village of Maltsevo under the administration of Fort Chaus in 1756) (Pulkin, 2013: 266). For over a hundred years since the first publications in the academic literature (Sibirskaya Zhizn, 1897; Belikov, 1905: 38), the incident of self-immolation near the village of Maltsevo has accumulated a substantial number of inaccuracies regarding the location of the rite (Pulkin, 2013: 85), number of burned persons, and structural features of the skete, which have been reproduced in a number of publications.

There are some discrepancies even concerning the location of the village of Maltsevo. In the late 19th century, it was reported that "self-burning" occurred in the village of "Maltsova located beyond Fort Chaus" (Sibirskaya Zhizn, 1897). A publication of the early 20th century did not indicate the exact location of the village (Belikov, 1905: 38). A modern viewpoint, which does not fit the historical facts, suggests that the self-immolation in the vicinity of the village of Maltsevo took place near the city of Barnaul (Pulkin, 2013: 211). In the first half of the 18th century, Fort Chaus was the nearest

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administrative center of the Kolyvan-Voskresensk mining district, with the head office in the town of Barnaul. It administered the population living in the surrounding villages (including the village of Maltsevo). From 1730 to the 1760s, the inhabitants of these settlements were listed as being assigned to factories to work off a part of their state tax (Mamsik, 2009: 5, 11).

Therefore, it is necessary to discuss the location of the skete in the vicinity of the village of Maltsevo in some detail. The choice of the place for self-immolation was determined by several factors: first, the large spread of influence on the part of Old Believers' Orthodoxy and absence of repressions experienced by the Old Believers in the area; and second, the "last straw" effect, when general oppression by the authorities became especially intense (Pulkin, 2013: 85). All these factors were fully present when a skete in the "forests and swamps" was created near the presently non-existent village of Maltsevo (Belikov, 1905: 38). However, the "Petition" containing the reasons for the decision to die voluntarily, which was sent to the authorities by the inhabitants of the skete at the end of May–beginning of June 1756, is a reflection of economic pressure. This document speaks of the hardships and deceit of officials when paying for delivery of state provisions to Yamyshevo fortress in 1747, and problems in executing the order for delivering provisions to the Kolyvan-Voskresensk factory in 1753. The "Petition" also mentions the need for providing supplies of state-owned provisions to the town of Kuznetsk in 1755–1756, and it mentions unpaid work for repairing ships near Fort Chaus (Ibid.: 39). In addition, we should point to the decree of May 1756 in the Siberian Governorate concerning coach horse service along the Tara-Tomsk section of the Moscow highroad (Minenko, 1990: 37). A possible additional reason was that the Cossack Maltsev brothers, who were among the initiators of the self-immolation, might not have received official permission to legalize the place of their new settlement, since in the mid-18th century, the authorities strongly disapproved of such independent resettlement activities, especially in terms of its official recognition of them (Bulygin, 1974: 86).

Speaking about the possible location of the skete in the vicinity of the village of Maltsevo, we should keep in mind that in the mid-18th century administration of Fort Chaus was in the present-day Kolyvansky District of Novosibirsk Region (Mamsik, 2009: 7). However, today, there is no settlement with the name "Maltsevo" in this administrative entity. In the list of settlements of the Novosibirsk Okrug of the Siberian Territory, in the early 20th century, there were several small villages and farms with names "Maltsev" or "Maltsevo" (Spisok…, 1928: 533). However, these all were founded in 1923–1924 and were located outside the area of the present-day Kolyvansky District of Novosibirsk Region. In this area, within the boundaries existing in 1928, there was "Maltsev's mill", on the Oyash River. The year of its foundation is unknown (Ibid.: 472).

Furthermore, there is no exact indication of where the village of Maltsevo was located on the maps and in the documents of the first half of the 18th century, although an unnamed point corresponding to the symbolic designation of a village was marked northwest of Fort Chaus, in the swampy sources of the Boyarka River, on the "Map of peasant dwellings under the Administration of the Office of the Kolyvan-Voskresensk mining authorities; their distance from the factories and mines, as well as positions of places where they are", composed February 14, 1771 (RGIA. F. 485, Inv. 5, D. 478, fol. 1) (Fig. 1). According to the written sources, the brothers Stepan and Fyodor Maltsev were among the initiators of the skete (Belikov, 1905: 38). Names of villages most often originated from the names or surnames of their founders (Bulygin, 1974: 33). It is possible that the Maltsevs founded a single-household village, which was called after their last name (or nickname). Such a situation was very common in the Novosibirsk part of the Ob region (Minenko, 1990: 40), but was not welcomed by the local authorities in the second half of the 18th century (Bulygin, 1974: 86). There are no such data in the documents of the Chaus administrative office, which are kept in the State Archives of the Novosibirsk Region, but there is a document from October 19, 1755 on the trial and return of stolen property to the Cossack Fyodor Maltsev (GANO. F. D-107, Inv. 1, fol. 138/1298).

The issue of how those events became reflected in the memory of people should also be discussed for

Fig. 1. Fragment of the "Map of peasant dwellings under the Administration of the Office of the Kolyvan-Voskresensk mining authorities; their distance from the factories and mine, as well as positions of places where they are" composed February 14, 1771 (RGIA. F. 485, Inv. 5, D. 478, fol. 1).

locating the burned skete in the vicinity of Maltsevo. According to M.V. Pulkin, who is the leading expert on self-immolation of the Old Believers in the 17th–18th centuries, information about such places and specific aspects of their marking has been preserved in this part of traditional non-material culture. The location of the self-immolation of the Old Believers in 1756 has not yet been identified in the present-day Kolyvansky District, which was once under the administration of Fort Chaus. There may be several reasons for this. One of them is the selectivity and local nature of people's memory (Gromyko, 1991: 227). However, a certain toponymic reflection of the presence of Old Believers in the past in the vicinity of Fort Chaus has still survived in the name of the Kerzhenets River—a small channel of the Kazyki lake system. There were many sketes on the river of the same name in the Nizhny Novgorod Governorate in the 17th–19th centuries. The hydronym "Kerzhenets" later led to the nickname of the Old Believers as "Kerzhaki".

Materials and sources

In analyzing the modern interpretation of the events in the skete near the village of Maltsevo, one should note the discrepancies concerning the number of Old Believers who were burned to death. The early editions indicated 174 (Sibirskaya zhizn, 1897) or 175 persons (Belikov, 1905: 38; Minenko, 1973: 60), while later 172 persons (Pulkin, 2013: 266) to 200 persons (Romanov, 2019: 260). These differences may have been caused by a change in number of people for various reasons during the siege of the skete. One of the reasons could have been the flight of some of those who gathered for self-immolation; another reason could have been voluntary or forcible incorporation of some of the Cossacks who lay siege on the skete into the group of schismatics (Belikov, 1905: 39). In this regard, we can provide a similar example of the siege of a skete of Old Believers in 1742, which took place in the village of Lepikhino under the administration of the town of Kuznetsk. The plan was to send Cossacks and cavaliers (dragoons) dressed in "the fashion of beggars" to penetrate the skete using trickery, and arrest everyone who was planning to die in the fire (Pulkin, 2013: 120).

Other inaccuracies are related to the description of structural features of the inner fence of the skete near the village of Maltsevo. One of the first newspaper publications mentioned that the skete was "surrounded by a palisade with considerable fortifications" (Sibirskaya Zhizn, 1897); a publication of the early 20th century said that "log houses were surrounded by a wooden solid post and rail fence (*zaplot*)", which one person climbed on to escape during the "burning" (Belikov, 1905: 38). A modern monograph on self-immolation of Old Believers in the 17th–18th centuries mentions an episode of someone being saved on the "palisade fence" (Pulkin, 2013: 211). Solid post and rail (*zaplot*) fences and palisades are completely different types of enclosures, which essentially distorts the structural description of the skete. The *zaplot* fence in Siberia meant a solid fence made of boards or logs laid horizontally (Etnografiya…, 1981: 116), while a palisade is a wall of logs, vertically dug or driven into the ground to one third of their length (Tolkoviy slovar…, 1882: 6). It is known from written sources that the height of *zaplot* fences could reach one sazhen (2.16 m) (Shostyin, 1975: 256, 259), but they could also be lower than 2 m. For example, a description of the inner fence in Fort Chaus from the first quarter of the 18th century, mentions "a solid post and rail fence (*zaplot*) with planks waist high" (Minenko, 1989: 86).

There is an opinion in the archaeological literature that processing logs and setting up a palisade was more labor-intensive than solid post and rail (*zaplot*) fences. This is explained by the large amount of earth work (palisade ditch) and need to burn the bases of the logs for their better preservation (Skobelev, 2012: 191). However, such processing was not always carried out. Archaeological research has not revealed that the bases of the surviving palisade logs were burned (Borodovsky, 2021a: 373). In addition, even if the amount of earth work during construction of a palisade wall was larger than with digging holes for the infrequent posts of a *zaplot* fence, the amount of wood in both cases was approximately the same. The width of the span between posts was at least 3–5 m; it required no less logs than a similar section of a palisade. Another argument in favor of the *zaplot* fence was that it was difficult to build a palisade on certain types of (stony) soils (Skobelev, 2012: 191). However, this argument was irrelevant for the loam of the Upper Ob region. But a solid post and rail (*zaplot*) fence did have one advantage over palisade walls. Judging by the results of experimental restoration of walls at Fort Umrevinsky, unburned palisade logs quickly began to protrude from their position in the row, if there was no wooden platform on the inside of the palisade; whereas separate sections of horizontally laid logs of the *zaplot* fence had more rigid fastening in the grooves of the supporting posts set vertically. These posts had to be quite thick as opposed to the horizontally laid logs.

The above discussion of the structural features of the inner fence of the skete in the vicinity of Maltsevo should not be viewed as a criticism of the publication by Pulkin (2013), but as desire to correctly interpret the information about this structure in the original publication (Belikov, 1905: 38, 40, 41). It should also be emphasized that it gives probably the most detailed description of an Old Believer skete where "burning" occurred in the 18th century as compared to similar objects (Pulkin, 2013: 266). No less

important is the fact that during construction of the skete in the vicinity of Maltsevo, the technique of setting up defensive structures (palisades) typical for Siberian forts was used. This is not an isolated case in the Upper Ob region. For example, several log houses and a fort were built in the forests along the Chumysh and Losikha rivers in 1739 before the burning incident (Ibid.: 264).

Discussion

Thus, according to the written sources, the skete in the vicinity of the village of Maltsevo was enclosed by a palisade wall on the outside, behind which there was an interior solid *zaplot* fence. The height of the palisade walls was "three and a half arshins" (Belikov, 1905: 38), that is 2.45 m (Shostyin, 1975: 256, 259). Considering that the size of palisade logs dug into the ground had to be at least one third of their total length, logs about 3 m long were used for the palisade. According to the data obtained from archaeological excavations at Fort Umrevinsky, the diameter of the logs varied from 15 to 25 cm, and their parts surviving in the palisade ditch were 70–80 cm long (Borodovsky, Gorokhov, 2008: 75; Borodovsky, 2021b: 96) (Fig. 2). Trees (pines) of this thickness usually grew in the forest thicket, where they strove for light and had fairly long trunks (up to 15–20 m) with more or less uniform diameter. At least three palisade logs could be prepared from this raw material (Fig. 3). For setting up the palisade, a ditch had to be dug (Fig. 4). Archaeological studies at Fort Umrevinsky have allowed for the identification of such an earthen structure filled with decay from palisade logs. The depth of the ditch was 0.87 m, the width was 0.5 m (Borodovsky, Gorokhov, 2009: 74; Borodovsky, 2021b: 94).

The known parameters of the palisade make it possible to calculate the total labor costs and volume of raw materials. For some forts, written sources indicate the exact number of palisade logs that had to be set up during construction or repair of palisade walls. For example, at least 1500 logs were procured in 1753 to repair the palisade at Fort Ilimsk (Russkiye, 2003: 19). The total length and configuration of the palisade wall of the skete near Maltsevo is unknown. However, taking into account the fact that the palisade protected the interior solid *zaplot* fence and nine densely set log houses, the area of this object was relatively large. During the excavations at Fort Umrevinsky, a well-preserved 1.5 m section of palisade wall was discovered, which consisted of seven logs up to 20 cm wide (Borodovsky, Gorokhov, 2009: 34). These were made of logs split in half, well hewn, and very tightly fitted to each other. It is quite possible that J.G. Gmelin observed precisely such a palisade when he visited that fort in 1741 (Borodovsky, 2021b: 99). Experimental restoration of the palisade at Fort Umrevinsky from logs with a diameter of 15–20 cm has shown that there were five or six logs per meter (Borodovsky, Gorokhov, 2020: 61–63) (Fig. 5). According to the written sources, 648 palisade logs were set up between two towers covering a span of 61 sazhens (131 m 76 cm) in 1703 at Fort Ilimsk (Russkiye, 2003: 19). Therefore, their diameter was 20 cm or slightly more. Such parameters are quite comparable with the size of small and medium Siberian forts.

Fig. 2. Surviving parts of palisade logs of Fort Umrevinsky.

Fig. 3. Experimental production of logs for Fort Umrevinsky.

Fig. 4. Palisade ditch of Fort Umrevinsky.

As far as the *zaplot* fence is concerned, structures of this type in the 18th century were typical not only of residential and utility buildings, but also of some forts (Forts Selenginsk, Yenisei, and Irkutsk) (Kradin, 1988: 63, 73, 123). Such a fence was discovered during the excavations at Fort Sayansk on the Middle Yenisei River (Skobelev, 2012: 190; 2013, 2018; Mainicheva, Skobelev, Berezhenko, 2018). In the north of the Upper Ob region, Fort Berdsk (Minenko, 1989: 90; Rezun, Vasilyevsky, 1989: 107; Russkiye ostrogi…, 2003: 13), and the Suzun copper smelter had such a fence. Archaeological studies of the Suzun copper smelter have revealed that a "stronghold" up to 3 sazhens (about 4.5 m) high, mentioned in written sources when describing fortifications of this object, was actually of the solid post and rail (*zaplot*) type (Shapovalov, Roslyakov, 2013: 178–179). During the excavations, it was possible to trace the length between posts, reaching up to 5 m. The *zaplot* fence of the skete in the vicinity of Maltsevo could have had a domestic purpose. It was already mentioned above that during self-immolation, one living person was removed from this fence (Belikov, 1905: 38). This means that the height of the *zaplot* fence was not too large (no more than 1.5 m), if a person could climb it. It might have been conceived of not only as one of the lines of fortification, but also as an enclosure for the future "cemetery" of Old Believer new martyrs after their self-immolation. It should be added that support posts of a *zaplot* fence were observed in the course of archaeological research studying the inner space of Fort Umrevinsky, which was later used as a cemetery in the late 18th–19th centuries (Borodovsky, Gorokhov, 2009: 80; 2020: 86–89; figs. 50, 52, 59, 60, 63, 68).

The skete in the vicinity of the village of Maltsevo consisted of nine log houses with cellars, two of which were "placed close to one other" (Belikov, 1905: 38). The size of these log buildings is unknown. However, using ethnographic data it is possible to calculate several variants for the total area of the living space in them. It is known that the average size of a Russian peasant log house ranged from 4 × 4 to 5.5 × 6.5 m; among wealthy peasants, it reached 8 × 9 or 9 × 10 m (Russkiye, 2003: 280). Seven out of nine buildings in the skete were residential. Since the double log house served as a prayer house (Belikov, 1905: 38), its size will be considered separately. With log houses measuring 4 × 4 m, the area of seven buildings would have been 112 m^2, and with a size of 5.5 × 6.5 m the area would have been 250.25 m^2. With a size of 8 × 9 m the area would have been 504 m^2, and with a size of 9 × 10 m it would have been 630 m^2. However, it should be taken into account that approximately a fourth or fifth part of a Russian log house was taken up by the stove (Russkiye, 2003: 280). The description of another skete of Old Believers in the vicinity of the village of Filippovo on the Chumysh River from 1759 mentioned that "a new adobe stove was built in the hut" (Belikov, 1905: 38). In this case, the total living space of seven log houses 4 × 4 m would have been 84.0–89.6 m^2, while that of seven 5.5 × 6.5 m houses would have been 187.6–200.2 m^2. The total living space of seven log houses

Fig. 5. Restored palisade wall of Fort Umrevinsky.

8 × 9 m would have been 378.0–403.2 m^2, while that of seven 9 × 10 m houses would have been 472.5–504.0 m^2. However, sizes of stoves in the mid-18th century, judging by the stove foundation measuring 3.4 × 3.0 m (Borodovsky, Gorokhov, 2009: 59), which was discovered at Fort Umrevinsky, were somewhat different. If we take into account the stove area (10.2 m^2), the variants for seven log houses of the above sizes would have been 40.6 m^2; 178.85 m^2; 432.5 m^2; and 558.6 m^2. Then we should calculate the area of the religious building, which consisted of a double log cabin. If each part was 4 × 4 m, the total space of the joint room would have been 32 m^2, and with each part being 5.5 × 6.5 m it would have been 71.5 m^2. If each part was 8 × 9 m, the total space of the joint room would have been 144 m^2, and with a size of 9 × 10 m it would have been 180 m^2. In fact, sizes of the log cabins could have been different, and this building could have had a stove. However, in general, this structure can still be described as a two-row residential building (Etnografiya…, 1981: 122, fig. 3, *e*).

Thus, the total area of log houses of the skete in the vicinity of Maltsevo could have ranged from 184.6 to 738.6 m^2. Calculations of the living space are necessary for assessing the capacities for accommodating people in the skete. If the total number of those who took refuge there initially reached 200, with a total area of 184.6 m^2, each person would have had up to 0.9 m^2, and with 738.6 m^2 – up to 3.6 m^2 of living space.

The prayer house (double log house) was a building for mass occupancy of people. With an area of 144 m^2, each person would have had 0.72 m^2, and with 180 m^2, 0.9 m^2. Assessing this area to determine the density of people can be calculated using Herbert Jacobs' method of crowd size estimation. The calculation is carried out by adding the length and width of the area occupied by the crowd of people, and multiplying it by the density factor: 10 for a dense crowd and 7 for a sparse crowd. In accordance with such calculations, people standing at arm's length occupy 1 m^2 each; the density when it is still possible to pass between people is 2 persons/m^2, and if they stand shoulder to shoulder, the density is 4 persons/m^2. This method of calculation, which has many times been verified empirically, makes it possible to give an estimate with an accuracy of up to 20 %. Application of such a computational technique to the situation in the skete seems to be quite correct, since in the Old Believer practice, when preparing and carrying out self-immolation, "crowds repeatedly gathered to be burned" (Pulkin, 2013: 211).

It would be important to discuss specific features of the residential log buildings in the skete in some detail. Since "guards with guns in their hands stood on the roofs of the houses day and night" (Belikov, 1905: 38), it may be assumed that the roofs were flat. Judging by ethnographic data, in Siberia, the upper layer of logs in some log houses could have served both as a ceiling and a roof. A thick layer of earth was placed on top of such a roof for heat- and waterproofing (Etnografiya…, 1981: 112). However, if the roofs were used as watchmen posts, the log houses should have been clearly higher than the outer palisade wall (2.45 m). Taking into account the distance from the palisade wall, a height of 3 m would have been quite sufficient for the roof to serve as a fighting platform. The logwork of the house could have served as a battle tower. For example, when describing Fort Kashtak created in 1697, it is indicated that "four log houses were built at the corners, and three towers were built on three log houses" (Kashtakskiy serebroplavilniy promysel, 2016: 98).

The buildings of the skete in the vicinity of the village of Maltsevo under the administration of Fort Chaus described above reveal that the Old Believers' "teachers of self-destructive death" clearly possessed the necessary technical knowledge (Pulkin, 2013: 241). In this regard, the figure of the preacher Fyodor Nemchinov, the son of a Cossack chief, who had the rank of "head", is noteworthy (Belikov, 1905: 38). In addition to a family connection with a fairly high ranking officer of the Cossacks, who were engaged not only in military service, but also in fort construction, his originating from the city of Tara is important. Since the 1720s, many immigrants from this town and its vicinity fled from persecution for refusing to swear allegiance to Empress Catherine I, after Peter's decree on succession to the throne of 1722, and lived in the administration of Fort Chaus (Minenko, 1984: 9). They included Old Believers, some of whom suffered during the anti-government unrest in the town of Tara (Pulkin, 2013: 213). Notably, quite a few peasants either living in forts (the native of Fort Berdsk, who led self-immolations on the Chumysh and Losikha rivers in 1739) (Ibid.: 264), or working for a long time in their immediate vicinity (peasants from the skete in the vicinity of Maltsevo) (Ibid.: 40, 41), were involved in building Old Believers' sketes in the Upper Ob region. In addition, peasant estates were also sometimes surrounded by walls of the fort type (Etnografiya…, 1981: 116).

Conclusions

Detailed analysis of information from written sources about the Old Believer skete in the vicinity of the village of Maltsevo under the administration of Fort Chaus, which burned down in 1756, confirms the long-term preservation of fortification traditions of the Tsardom of Muscovy, which received their final shape in the 17th century. This was a result not only of the ideological commitment of the Siberian Old Believers to the "rules of antiquity", but also of the practice of building Russian forts in the Upper Ob region in the 18th century

following the "standards" of the pre-Petrine period. One illustrative example is the result of archaeological research at Fort Umrevinsky, where defensive structures (towers) of the *basteya* type, protruding at the corners of the fortification wall, rather than bastion-type fortifications, continued to be built until the first third of the 18th century (Borodovsky, 2021b: 100).

During construction of the skete in the vicinity of Maltsevo, a large amount of earth work was carried out. In addition to the outer palisade ditch and pits for the posts of the inner solid post and rail (*zaplot*) fence, cellars were dug under the huts, where straw and pitch wood were stored for self-immolation (Belikov, 1905: 38). There might have been nine or eight cellars, if the prayer house (double log house) had a joint cellar. Specific features of the earth work are extremely important in the case of the possible future discovery of this skete as an object of archaeological heritage. At the level of the conventional natural layer, its remains should be surrounded by the palisade ditch, behind which there should be individual pits remaining from the posts of the interior *zaplot* fence. In the central part of this site, there should be several foundation pits (from cellars), one of which may be larger than the others. The cultural layer should contain numerous traces of burning. This is typical not only for compact complexes of wooden structures that burned simultaneously, but also for objects such as forts that constantly suffered from fires (Borodovsky, 2021a).

Wooden fortifications and protective structures of the Old Believers' skete in the vicinity of Maltsevo were distinguished by a combination of the *zaplot* technique, with horizontal placement of logs between the posts, and the palisade wall-building technique. According to the written sources and archaeological research, this was typical of wooden fortifications at a number of Siberian forts (Forts Selenginsk, Yeniseisk, Irkutsk, and Sayansk). In the Upper Ob region, the Suzun copper smelter and mint also had walls of this type. However, such fences may theoretically be correlated with cemetery enclosures, as was archaeologically established at the necropolis that emerged at the turn of the 18th–19th centuries in Fort Umrevinsky. Identification of the place where a short-lived, burned skete near the village of Maltsevo was located would be very important, since it would make it possible to study archaeologically one of the representative complexes of the Old Believer culture at the beginning of the second half of the 18th century in the Upper Ob region.

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Artifacts from the Ural-Hungarian Center (800–1000 AD), Recently Found at Ob Ugrian Sanctuaries

This article introduces four silver dishes and a copper plaque from Ob Ugrian sanctuaries in the Yamal-Nenets and Khanty-Mansi (Yugra) Autonomous Okrugs. A dish representing a bird snatching a fish; a dish and a plaque representing deer; a medallion of a dish showing a griffin and two flying birds; and a dish (sliced into pieces) with a scene of a wedding feast were apparently manufactured at the Ural-Hungarian center in the 9th or 10th century. Parallels from medieval workshops of Iran and Central Asia are listed. In terms of technology and ornamentation, seven artifacts from the Ural-Hungarian center can be regarded as a separate subgroup. Each is made from three superimposed silver sheets without gilding and has a thin punched ornamentation on the face (its negative image is clearly visible on the reverse side). The ornamentation includes a border consisting of two parallel arches and a vertical dash with three round imprints of a punch, arranged in a pyramid, and a punch imprint on the animal's paw. Both humans and animals have large almond-shaped eyes with iris but no pupil. A dish with a scratched drawing superimposed on the principal composition is the first known example of such an item among the Ural-Hungarian artifacts. An explanation is provided as to why those artifacts survived in the ritual practice of Ob Ugrians, and ways they could be used in the ritual are suggested.

Keywords: *Ural-Hungarian center, silver, dish, deer, horseman, griffin.*

Introduction

Over the past half century, the north of Western Siberia has acquired the status of a treasury of silver vessels from Iran, Central Asia, Byzantium, Volga Bulgaria, Europe, etc., which ended up on this territory in the Middle Ages (see, e.g., (Sokrovishcha Priobya, 1996; Sokrovishcha Priobya…, 2003; Baulo, 2002; Fedorova, 2019; and others)). Noteworthy are several silver vessels that B.I. Marshak originally attributed to an early Magyar group (Sokrovishcha Priobya, 1996: No. 53–55). According to the researcher, there was a manufacturing center in Eastern Europe, whose products were similar in style to those of both the late Sogdian craftsmen of the early 9th century, and the Magyar people of the late 9th–10th centuries. Although, items of the early Magyar group were not found on the territory of Hungary ("country of Atelkuz"), where the Magyars came in the last years of the 9th century, nor along the path of their resettlement in the 8th–9th centuries (Marshak, 1996: 16). N.V. Fedorova, having studied all such items, known in the early 21st century, and places of their discovery, suggested that these were the products of Hungarian masters of "Great Hungary" (or original Hungary, which was associated by Eastern geographers with the country of the Bashkirs), i.e. Ural centers of Hungarian settlement before their resettlement to Europe (2003: 141–144).

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The items discovered in the early 21st century at the sanctuaries of the Khanty people in the Shuryshkarsky District of the Yamal-Nenets Autonomous Okrug (YaNAO), in particular a large dish representing an eagle owl standing on the back of a deer, became additional evidence in favor of the Ural localization of the Hungarian group of silver dishes. It became clear that these were not the products of Danubian Hungary, and that the iconography and style of these vessels combined the features of the emerging art of the Eastern European nomadic Hungarians, the old Ural tradition of their ancestors, and the toreutics of the Abbasid Caliphate and the Samanid state (Baulo, Marshak, Fedorova, 2004). The masters of this center followed the traditions of Central Asia. As samples, they chose the Sogdian and Khorasan vessels from the collection of their workshops, and then developed and varied the motifs of their ornamentation. Some images and ornaments on the products of this center find parallels among Central Asian and Iranian artifacts of the 10th century (Marshak, 1996: 16–18). Diagnostic features of products of the Ural-Hungarian center are the following ornamentation elements: a border of two arches, with a dash extending from them; a dash with three dots arranged in a triangle; a punch imprint on the animal's paw. In addition, the dishes are manufactured using the technique of superimposition of three metal sheets on top of each other.

Prior to the publication of this article, the group of Ural-Hungarian silver products of the 9th–10th centuries consisted of seven silver vessels (Fedorova, 2019: 75). This article is aimed to introduce five items that, according to the above features, can be classified as Ural-Hungarian, as well as to identify vessels of this group made in the same workshop.

Description and attribution of the new finds

In June 2022, the Museum of Nature and Man in Khanty-Mansiysk hosted the opening of the exhibition "Ob Ugrians: Home and Cosmos", dedicated to the anniversary of the famous ethnographer I.N. Gemuev (1942–2005). During this event, I became acquainted with a man—a representative of one of the families of the Khanty people, living in the Nazym River basin (Khanty-Mansiysky District, Khanty-Mansi Autonomous Okrug-Yugra (KhMAO-Yugra)). He said that his grandfather, who lived in the upper reaches of the Nazym, had some "heirloom antiques", which, after his death, were taken to an apartment in the city. These turned out to be the items of traditional utensils, made of birch-bark and woolen cloth, as well as ritual items — a silver bowl and a large copper plaque, wrapped in scarves. The man did not know how the things got to his grandfather and how they were used in the ritual sphere, he only told that the bowl and the plaque were kept in a small chest in the sacred corner of the house.

A silver dish (bowl) representing a bird of prey and a fish (Fig. 1, *a*, *b*). The dish is round, with a diameter of 20.5 cm, made by forging from three superimposed metal sheets; its vertical rim is thickened and chased on the lower part of the front surface. There is a thin punched ornamentation on the front surface. Its negative image is clearly visible on the reverse side.

The ornamentation is concentrated in the central medallion. The medallion is round, 11 cm in diameter, surrounded by a border 0.5 cm wide. The border is ornamented with a pattern consisting of two parallel arches, going across it, and a vertical dash, extending from them, with three round imprints of a punch, arranged in a pyramid. The composition consists of two interacting characters: a bird of prey is holding a large fish in its paws.

The body and head of the bird are depicted in profile, the wings are open, and powerful clawed paws hold the fish. Six feathers ornamented with notches descend from each wing. The body is smooth and unornamented. Paws are four-toed, with one toe sharply set aside, and on each paw, there is an imprint of a punch. The tail consists of six feathers, shaded with notches, and is separated from the body by a string of pearls. The eye is round with a pupil; there is a line running from the eye to the right. The beak is bent down, and at its base there is a punch imprint. The lines of the wings at their base and those of the torso are completed with a pattern in the form of three imprints of a punch arranged into a pyramid.

The fish is shown in profile, with its tail and fins highlighted. The scales are rendered as ovals outlined with notches, oriented to the left; inside each oval, there is an additional notch. The eye is indicated by a punch imprint.

On the chest of the bird, there is a barely visible engraved anthropomorphic mask, which is a later addition (Fig. 1, *c*). This is the first time when graffiti, made on top of the existing image, was found on the items of the Ural-Hungarian group.

Parallels. A bird of prey is usually shown standing on an animal: on a late Sasanian dish of the 7th–8th centuries, an eagle with spread wings is standing on the back of a fallow deer (Trever, Lukonin, 1987: 116, cat. No. 29); a bird of prey on the back of a gazelle is depicted in the oval medallion of a silver bottle of the 6th–7th centuries, which was discovered near the village of Kurilova, Osinsky Uyezd, Perm Governorate (Ibid.: 116, cat. No. 31), and on a dish of the 7th–8th centuries from a hoard found near the village of Maltseva, Kudymkarsky District, Perm Governorate (Ibid.: 119, cat. No. 41); the plot of "a bird on the back of a deer" is conveyed on a dish of the 10th century from the Tomsk Governorate (Sokrovishcha Priobya…, 2003: Cat. 28), and on a dish of the 9th–10th centuries from

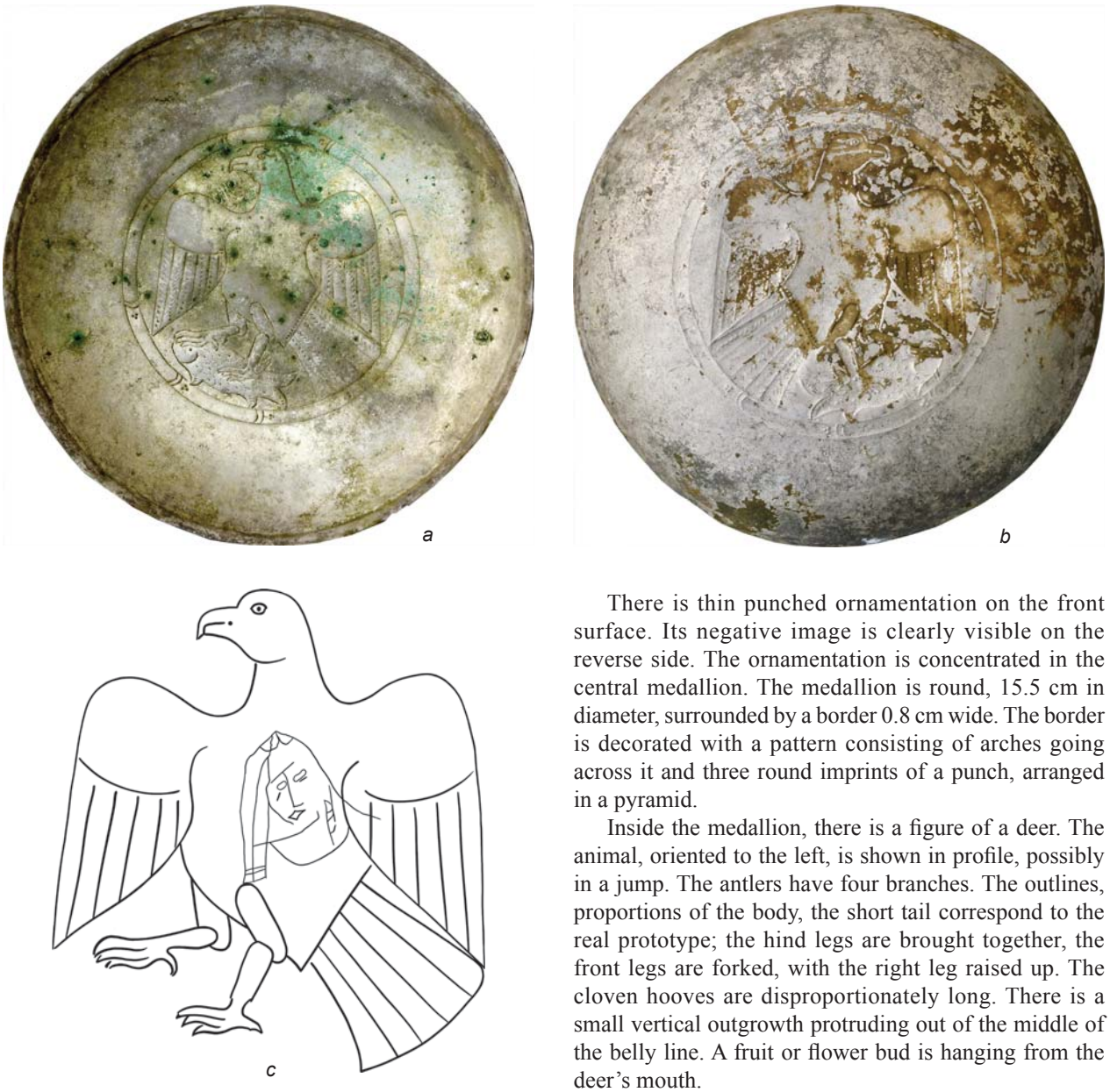

Fig. 1. Silver dish representing a bird snatching a fish. Ural-Hungarian center, 9th–10th centuries.
a – front side; *b* – reverse side; *c* – graffiti in the form of a mask on the chest of a bird.

the Shuryshkarsky District, YaNAO (Baulo, Marshak, Fedorova, 2004: 108, fig. 1).

Large plaque showing a deer (Fig. 2). Its diameter is 19.5 cm, weight 144 g. This item is made from a forged copper sheet, and is slightly convex. On the edge of the plaque, large round pearls were minted from the reverse side. In the upper part of the plaque, on the reverse side, two large holes were drilled; two other holes, of a smaller diameter, are under the deer antlers. Since no pearls were minted in the zone of large holes, it can be assumed that the four holes were drilled for attaching a handle.

There is thin punched ornamentation on the front surface. Its negative image is clearly visible on the reverse side. The ornamentation is concentrated in the central medallion. The medallion is round, 15.5 cm in diameter, surrounded by a border 0.8 cm wide. The border is decorated with a pattern consisting of arches going across it and three round imprints of a punch, arranged in a pyramid.

Inside the medallion, there is a figure of a deer. The animal, oriented to the left, is shown in profile, possibly in a jump. The antlers have four branches. The outlines, proportions of the body, the short tail correspond to the real prototype; the hind legs are brought together, the front legs are forked, with the right leg raised up. The cloven hooves are disproportionately long. There is a small vertical outgrowth protruding out of the middle of the belly line. A fruit or flower bud is hanging from the deer's mouth.

In the lower part of the medallion, from the border, a palmetto-shaped flower is rising on a stem; its upper petals are ornamented with a pattern in the form of three circles on a short stem. Such a floral motif is typical of toreutics in the eastern regions of Central Asia in the 8th–9th centuries (Darkevich, 1976: 87).

Parallels. The ornamentation of the edge with a strip of pearls minted on the reverse side is typical of round forged silver West Siberian plaques of the 10th–12th centuries (see, e.g., (Spitsyn, 1906: Fig. 53, p. 32; Chernetsov, 1957: 243; Baulo, 2011: 124, 243–244; and others)). Similar pearls adorn a bronze cast plaque of the 10th–11th centuries, with the figure of an eagle owl, found in the burial 73 at the Saigatinsky VI cemetery (Drevniye bronzy Obi…, 2000: Cat. No. 28), which is identical to the image of an owl on a Voikary dish

Fig. 2. Copper plaque representing a deer. Ural-Hungarian center, 9th–10th centuries.
a – photograph; *b* – trace-drawing.

(Baulo, Marshak, Fedorova, 2004: 108, fig. 1), and a plaque from the 9th–10th centuries, with images of a bear, a fish, and two snakes, from the basin of the Konda River (Baulo, 2013: Fig. 4). On the described plaque with a deer, the pearls along the edge of the item may have been a later addition; the edge of a silver plaque of the 9th–10th centuries from the Konda cemetery was finished in a similar way (Ibid.: Fig. 1).

Silver dish representing a deer (Fig. 3). The dish is stored in the Khanty people camp in the basin of the Okhlym River (Khanty-Mansiysky District of KhMAO-Yugra). Diameter is 19 cm. The dish is forged from three superimposed metal sheets. The vertical rim is thickened, embossed on the lower part of the front surface. There is thin punched ornamentation on the front surface. Its negative image is clearly visible on the reverse side. A small hole is drilled under the rim.

The ornamentation is concentrated in the central medallion. The medallion is round, 12 cm in diameter, surrounded by a border 0.5 cm wide. The border is ornamented with a pattern of two parallel arches going across it.

The figure of a deer is situated within the borders of the medallion, while three branches of the antlers overlap the border, which suggests that the deer was depicted first, and then the lines of the border were drawn around it. The animal is shown in profile, moving to the left. Antlers have six branches. Large oval eyes are without pupils. On the torso, ribs are marked by two boat-shaped lines. A fruit or flower bud is hanging from the deer's mouth. The outlines, proportions of the body, the short tail, and the hooves correspond to the real prototype.

Fig. 3. Silver dish representing a deer. Ural-Hungarian center, 9th–10th centuries.

The medallion of the silver dish. It is kept in a chest in a sacred shed of the Kazym Khanty as an offering (Fig. 4). The item is cut from a large dish, the medallion's diameter is 14 cm, the width of the border is 0.6 cm (Fig. 5). The border is ornamented with a pattern consisting of arches going across it and three imprints of a punch, arranged in a pyramid. There is thin punched ornamentation on the front surface. Its negative image is clearly visible on the reverse side.

Fig. 4. Sacred shed of the Khanty people.

The central place in the composition is taken by the figure of a griffin, with flying ducks depicted above and below it.

The griffin—a mythical beast with the body of a lion and the head of an eagle—is shown in profile, walking to the left. He has a massive body and powerful clawed paws. On each paw, there is a punch imprint. The upturned tail, with a palmette-shaped tassel, is decorated with a wavy line. The lines of the belly and paws have hatching strokes, possibly showing the fur; the lines at the base of the left paws and the lower line of the head end in a pattern of three imprints of a punch, arranged in a pyramid. The lines of the upper wing and ribs are decorated in the same manner. In the middle of the belly line, there is a small vertical outgrowth protruding out. Lines of the ribs are rendered schematically. On the neck, in the center of the torso, there is an ornament in the form of three round imprints of a punch, arranged in a pyramid. On the back, there are two wings of six feathers each, shaded with hatching strokes. The griffin has a small head, which is not proportional to the massive body, the beak bent down (with a punch imprint at its base), and the ear shown at the top of the head. The eye is almond-shaped, with a pupil.

The ducks are shown in profile, in flight towards the viewer. The beak is elongated, rectangular in shape. The long neck is stretched out and shaded with hatching strokes, the wing is raised, the foot is tucked under the stomach. The wing and tail of the upper bird show five feathers each; those of the lower bird, four feathers; all feathers are ornamented with short notches. On a smoothly outlined foot, pressed to the stomach, there is an imprint of a round punch.

Parallels. The images of the Senmurv (Simurgh?), very close to the griffin, are known on Iranian and Sogdian

Fig. 5. Medallion of the silver dish representing a griffin and flying birds. Ural-Hungarian center, 9th–10th centuries.
a – photograph; *b* – trace-drawing.

silver vessels of the 7th–8th centuries (Darkevich, 1976: 64, fig. 4; tab. 5, *3*; Marshak, 1971: 21, 22). Griffins are depicted on two golden vessels of the 7th century from the Nagy Szent Miklos treasure (the territory of modern Romania): a single image of a griffin is on a bowl with a buckle, a griffin tormenting a deer is on one of the medallions on a jug. The treasure itself has long been a subject of controversy: it could have been buried by the ancient Bulgarians or Avars; the vessels therein were possibly made by the Khazars. Many researchers are of the opinion that the owners of the treasure vessels in the 10th–11th centuries were Hungarians (The Gold of the Avars…, 2002: 17, No. 2; p. 40, No. 20; p. 59–61). In Sogdian art, noteworthy are the murals of the 7th century that adorned the palace in Varakhsha: a warrior and an elephant rider are fighting off griffins; one of the halls was called the "Gryphons Hall" due to its décor (it dates back to about the 7th–8th centuries) (Dyakonov, 1954: 93, fig. 2; p. 142–143, fig. 14).

In the Bolshiye Tigany cemetery of the 9th century (Alekseevsky District, Republic of Tatarstan), which is attributed to one of the groups of early Hungarians who lived on the left bank in the lower reaches of the Kama River, belt plaques were found, bearing the images of Senmurv dogs, according to the definition of the authors of the excavations (Finno-Ugry…, 1987: 238, 239; 352, fig. 9); these creatures also resemble young lions with wings and bird's heads, i.e. griffins. In the village of Lopkhari, Shuryshkarsky District, YaNAO, a hoard included a large silver bowl showing a scene of Alexander flying on griffins (Byzantium, late 12th to early 13th centuries) (Sokrovishcha Priobya, 1996: Cat. 69). A hoard discovered in the Tazovsky District, YaNAO, contains a large silver plaque with a figure of a griffin (diameter 12 cm; stored in the collections of the Tazovsky Regional Museum of Local Lore) (Fig. 6).

The image of a griffin on a dish from the shed of the Kyzym Khanty, in contrast to the graceful lion-shaped figures in the art of Iran and Sogd, is massive. Filling the order, the master was most likely guided by the figure of a bull—an animal that he could actually see in real life.

Silver dish sliced into pieces (Fig. 7). A large fragment of the upper part of the bowl and five narrow pieces have been preserved. According to the information received from local residents, the pieces were sewn onto the fur clothes of a person interred in an unknown burial ground in the Priuralsky District of the YaNAO.

The original diameter of the find was 26 cm, that of the medallion 20 cm. There is thin punched ornamentation on the face.

The medallion contains a composition of a man and a woman sitting in armchairs opposite each other; between them, there is a rectangular vessel for the wine (?), with two handles. The woman is passing with her right hand a mug with a rounded bottom to the man, and he is reaching for her head with his left hand, probably trying to hug her. A fragment of a wall painting in Panjakent (object XVI, room 10) shows that the Sogdians of the Early Middle Ages held mugs for wine in their hands with the help of a special shield-guard attached to the top of the handle, where the thumb was located (Marshak, 2017: 503, fig. 21).

Fig. 6. Silver plaque representing a griffin.

The faces of the characters are oval, and their long eyebrows are located parallel to the upper contour of large almond-shaped eyes with iris but no pupil.

The line of a straight nose stretches from the inner corners of the eyes; the mouths of the characters are small; and the man has a short mustache. The woman has a semi-circular chin, and the man has a wedge-shaped one—perhaps, a small beard is conventionally conveyed in this way. The man's hair is short, shown with lines above the forehead, with dots on the back of the head; the small right ear is visible. The woman's hair is rendered in two shaded waves; the small left ear is visible. Hands show marked nails.

The both characters are wearing long shirts. Pointy boots with heels are visible from under the hem of the shirts. Shirts are with narrow neck openings, without collars, and with long narrow sleeves. The collar of the woman's shirt is decorated with embroidery or sewed-on pieces. Narrow belts are ornamented with a pattern of two transverse parallel arches, from which a dash with a dot is extending. From the belts, short rectangular strips are hanging, designed in the same way as the belts. Possibly, these show hangers for a sheath of a sword or dagger of the man. The woman is depicted with three long narrow cords, with bell-shaped pendants, hanging from her belt; the cords are ornamented with small circles.

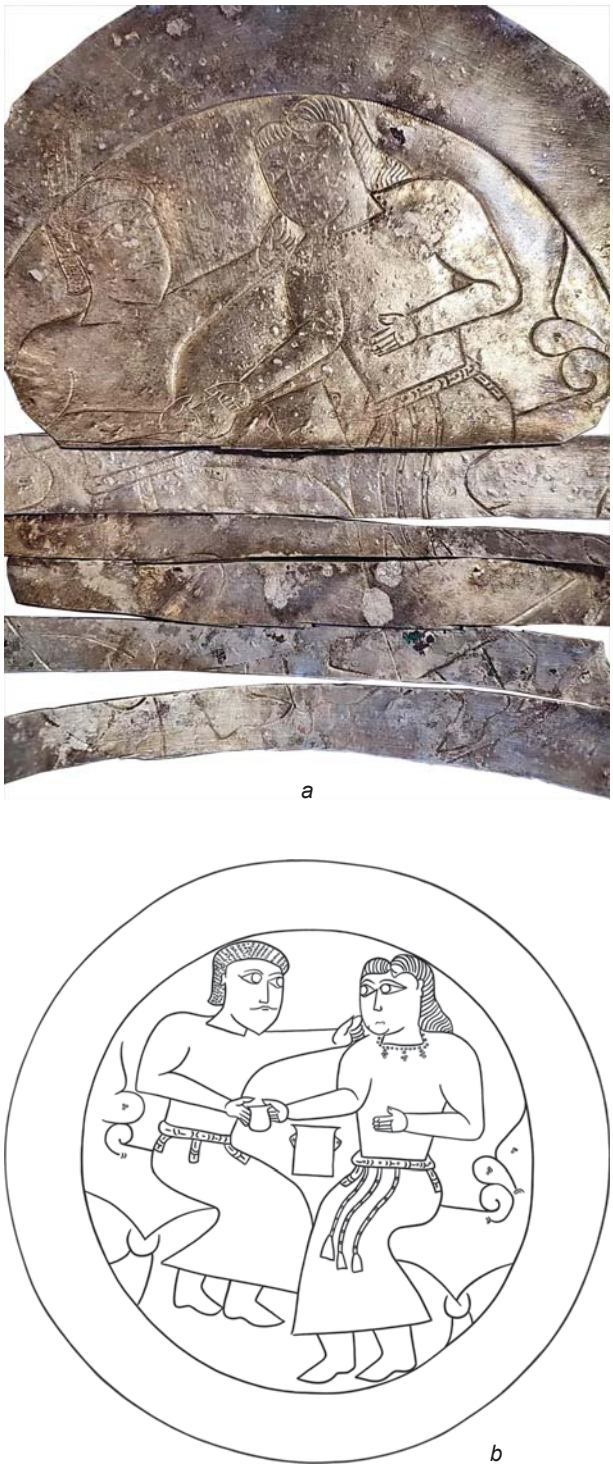

Fig. 7. Silver dish sliced into pieces. Ural-Hungarian center, 9th–10th centuries.
a – photograph; *b* – trace-drawing.

The dish was preserved in the form of pieces; therefore, it is impossible to describe the armchairs in detail; their backs are ornamented with a pattern in the form of palmettes (inside them, there are patterns of three round imprints of a punch, arranged in a pyramid), and the legs of the armchairs are depicted as columns inserted into the balls.

Parallels. Cut silver bowls are known in the materials from medieval sites. Among them, there are pieces of the central medallion of a dish representing a horseman (Ural-Hungarian center, 9th century), which presumably comes from the Kheto-se cemetery in the south of the Yamal Peninsula (Sokrovishcha Priobya…, 2003: Cat. 22). Another example is the medallion sliced into pieces from a cup of the 9th–10th centuries, with an image of a man and a woman, found in the upper reaches of the Konda River (Sovietsky District, KhMAO-Yugra): the burial contained the remains of the deceased, dressed in a fur coat; on top of the coat, in the area of the chest, silver pieces were evenly laid face down (Baulo, 2013).

Belts with pendants on laces are the elements of women's clothing, shown on a jug with images of musicians and on a silver dish with a scene of a royal feast. B.I. Marshak identified the both vessels as Sogdian items and dated them to the 8th–9th centuries (1971: 23, 91, 92), and V.P. Darkevich attributed them to the products of Eastern Iran of the second half of the 8th to the first half of the 9th century (1976: 40, 41; tab. VI, *4*; VII, *4*). Belts in the form of a narrow strip with three hanging straps are known from the frescoes of Samarra (Iraq) and Lashkari Bazar (Afghanistan); similar belts are represented on two characters shown on the ladle of the 11th century, found near the village of Shuryshkaryh (Sokrovishcha Priobya, 1996: 85–89), and on a man depicted on a Konda silver plaque of the 9th–10th centuries (Baulo, 2013: Fig. 1).

The table scene is depicted on the outside of a silver bowl (Northern Tokharistan (?), 6th–7th centuries) found in the Perm Territory: a woman on the left and a man on the right, with a glass raised in his hand, are sitting in the lotus position (Marshak, 2017: 496, fig. 16). At the bottom of a silver bowl found in Kustanai (Kazakhstan) (Tokharistan or the lands to the south of it, 4th–5th centuries), with scenes from the tragedies of Euripides, a man is depicted sitting on the left and a woman on the right (Ibid.: 498, fig. 18). In the 7th–8th centuries mural on the southern wall (object XXIV) in Penjikent, a feast scene is shown: a man and a woman are sitting opposite each other on a long bench, each holding an ornamentated rhyton in the hand (Srednyaya Aziya…, 1999: Pl. 33, *4*). In the murals of Panjakent, A.M. Belenitsky identified illustrations to the legend of Rostam (room VI/41) from the poem *Shahnameh* ("The Book of Kings") by Ferdowsi (1973: 47, 48). It can be assumed that the well-known plot of this poem is reproduced on our bowl: "Rostam marries the daughter of Shah Samangan—Takhmina".

Thus, all the previously mentioned features of toreutics allow the unambiguous attribution of the introduced artifacts to the production of the Ural-Hungarian center of the 9th–10th centuries.

On identification of a group of products of the Ural-Hungarian center made in the same workshop

Today, already 12 products of the Ural-Hungarian center are known, 11 of which are made of silver, and one of copper*. These are dishes representing the following: a horseman with a spear—from the territory of the YaNAO (Sokrovishcha Priobya…, 2003: Cat. 19), a lion—from the village of Kudesova, Cherdynsky Uyezd (Ibid.: Cat. 20), a rider in armor—from the village of Muzhi (Ibid.: Cat. 21), a horseman with a bird of prey—from the Heto-se burial ground (Ibid.: Cat. 22), a horseman with a bird of prey and a servant—from the Utemilsky settlement in Vyatsky Uyezd (Darkevich, 1976: Pl. 56, *4*), an eagle owl on a deer (Baulo, Marshak, Fedorova, 2004: Fig. 1), a rider and a lion (Ibid.: Fig. 3) (the last two are from the Voikar River basin, Shuryshkarsky District, YaNAO), as well as five items described in this article. Geographically, the products are divided into two groups: two dishes from the Kama region, and the rest from the territory of the YaNAO and KhMAO-Yugra. Four bowls are made with gilding, the others show no signs of gilding.

Notably, the subjects depicted on the vessels of this group date back to the art of Iran and Central Asia (Marshak, 1996: 16–18); they do not have any Siberian specificity. Consequently, the products that ended up in the north of Western Siberia were not custom made for the local nobility; they were ordinary workshop products that were exported as part of some kind of exchange relations.

An analysis of the main details of all the 12 finds makes it possible to combine five items published for the first time, and two Voikar dishes (with an eagle owl standing on a deer, and with a rider killing a lion (Baulo, Marshak, Fedorova, 2004)) into a subgroup of products of the Ural-Hungarian center. With a reasonable degree of certainty, the products of this subgroup can be attributed to one workshop. The main features of this subgroup are as follows (see *Table*):

technological—the items are made of three superimposed silver sheets**, without gilding; the vertical rim is thickened, and embossed on the lower part on the front surface; thin punched ornamentation is made on the front surface; its negative image is clearly visible on the reverse side;

ornamental—the pattern on the border consists of two parallel arches going across it, and a vertical dash extending from them, with three round imprints of a punch, arranged in a pyramid; completing the line with a pattern of three imprints of a punch, arranged in a pyramid; a punch imprint on the animal's paw; a punch imprint at the base of the beak; vertical outgrowth on the belly line; decoration of the tail feathers and wings with hatching strokes; long cloven hooves; large, almond-shaped eyes with iris but no pupil, in humans and animals. The silver dish showing a figure of a deer, from the basin of the Okhlym River, has the fewest details typical for the Ural-Hungarian artifacts.

Conclusions

The publication of five new items made it possible not only to add to the list of known products of the Ural-Hungarian center, but also to identify a subgroup of items therein, possibly produced in the same workshop. The area of toreutics from the Ural-Hungarian center in the territory of Western Siberia is now expanded to include southern regions up to the mouth of the Irtysh.

All the previously found dishes from this center represent images of real people and animals. The medallion of the Kazym Khanty dish is the first product of this center that depicts a mythical creature—griffin. Moreover, its resemblance to the figure of a griffin on the cast silver plaque is obvious. Let me remind you that N.V. Fedorova considered one of the main features of the Ural-Hungarian artifacts to be their similarity with bronze artistic castings of West Siberian production (for example, a dish showing an eagle owl standing on a deer) (2019: 76); her opinion can be extended to the cast silver items. These plaques probably also belonged to the products of the Ural-Hungarian center; therefore, they can be dated to the 9th–10th centuries.

Another feature of the products described in this article is the first recorded graffiti, which was applied over the already existing composition. It is important that the anthropomorphic face was scratched on the chest of a bird of prey (see Fig. 1, *c*). The author of the drawing possibly used the bronze cast image of a bird with open wings and a mask on its chest as a model. Such castings often occur at medieval sites in the north of Western Siberia (see, e.g., (Baulo, 2011: Cat. 290, 292, 294, 300, 301; and others)).

There are two answers to the question of why the silver dishes and the copper plaque survived in the ritual practice of Ob Ugrians. First, the images of a deer or a bird snatching a fish were understandable to the Siberian population. Second, there is a connection with the mythological ideas manifested in the images on the silver medallion from the Kazym River: they could have

*According to N.V. Fedorova; the same group may include two bronze ladles with handles, which depict a seated man with a beaver in his arms (2019: 76); however, these ladles are not addressed in this article, because they do not possess all the main features of the Ural-Hungarian artifacts.

**A quantitative chemical analysis revealed the content of silver in the upper, middle, and lower layers of a silver dish representing an eagle owl standing on a deer: 60.5; ~37.0; ~63.6 %wt, respectively (Baulo, Marshak, Fedorova, 2004: 110).

The main technological and ornamental features of the Ural-Hungarian center products of the separate subgroup

Features	Eagle owl on a deer* (bowl)	Horseman and lion* (bowl)	Bird and fish (bowl)	Deer (plaque)	Deer (bowl)	Griffin (medallion)	"Feast" (bowl)
Bowl made of three silver sheets	+	+	+	– (copper)	+	+	+
Pattern of two parallel arches and a vertical dash with three round imprints of a punch, arranged in a pyramid	+ (On the border)	+ (On the horseman's belt, on the horse's harness)	+ (On the border)	+ (On the border)	+ (On the border: only arches)	+ (On the border)	+ (On the belt)
Completion of lines with a pattern of three imprints of a punch, arranged in a pyramid	–	–	+	–	–	+	–
Punch imprint on the paw	+	+	+	+	–	+	–
Punch imprint at the base of the beak	–	–	+	–	–	+	–
Vertical outgrowth on the belly line	+	+	–	+	–	+	–
Ornamentation of feathers of tail and wings with notches	+	+	+	–	–	+	–
Long cloven hooves	+	+	–	+	–	–	–
Large almond-shaped eyes with iris but no pupil	–	+ (Horseman, horse, lion)	–	–	–	–	+ (Man, woman)

*Published (Baulo, Marshak, Fedorova, 2004).

been correlated with a deity popular among the Voguls and Ostyaks—*Mir-susne-khum*, who in the legends rode a winged horse*, which in time of danger was able to turn into a goose (Gondatti, 1888: 18).

Unfortunately, information about the use of these items is minimal, which is largely due to the concealment of the religious sphere of the Ob Ugrians**; in any case, they are classified as "antiques". The dish with the figure of a deer, judging by the presence of a hole in it, was hung up during ritual actions; other dishes were probably used to place sacrificial food on them during ritual actions with a request for successful deer hunt, safety of deer herds, rich fish catch, etc.

The publication of new samples of toreutics of the Ural-Hungarian center allows us to specify its main features and bring more clarity to the complex picture of the formation of art schools in young states and pre-state formations in the north-east of Europe, such as Volga Bulgaria, Great Hungary, and the Kama towns.

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*A griffin with wings could have been perceived as an image of a winged horse of Mir-susne-khum.

**In one of the camps in the north of the Shuryshkarsky District, YaNAO, in a sacred sled, a silver dish is kept, which is apparently also a product of the Ural-Hungarian center; in its medallion, a figure of a *Senmurv* is minted—with a magnificent tail in the form of a trefoil, large open wings, a head with an open mouth and four fangs, and a long horn. The owner of the bowl did not allow us to take a photo of it.

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"Mountains" on the *Draft of the Land of Fort Narym* by S.U. Remezov

This article describes an unusual source—the "Draft of the Land of Fort Narym" from the "Sketchbook of Siberia" by Semen Remezov. This is a spatial-graphic model, rendering late 17th-century realities in a conventional schematic manner. It covers the Narymsky and Ketsky uyezds (currently, northern Tomsk Region, known as Narym Territory). The encoded information relates to the history, geography, ethnography, settlement, and infrastructure at this territory in the late 17th century. One of the features represents elevations. We discuss its accuracy and relevance to the history and culture of the Narym Territory, and outline the ways of solving related problems. To render elevations, the cartographer used two types of conventional signs: those actually representing mountains and ranges, and thick lines. We conclude that "mountains" on the draft refer to real geographic features of the Narym Territory, described by 17th–19th century travelers and scholars and by the local oral tradition, and supported by modern geographical records. S.U. Remezov represented elevated areas with reference to their practical meaning for Russian reclamation.

Keywords: *"Draft of the Land of Fort Narym", S.U. Remezov, "mountains", 17th–19th centuries, historical and geographical context, methods of analyzing spatial symbols.*

Introduction

The process of development of Siberia is reflected in various cartographic materials. These included geographical drafts attached to descriptions of new lands (*rospisi*), which already in the 17th century became common reporting documents compiled at the request of the government, making it possible for the central and local administration to direct, monitor, control, and regulate the processes of settlement and development of the vast Siberian lands.

The history of study of the S.U. Remezov's heritage begins with publication of the *Sketchbook of Siberia* in the late 19th century, which made this unique document accessible to many scholars. Over the following almost 150 years of analyzing rich information provided in atlases, a wide range of scholarly literature has emerged (Andreev, 1940; Goldenberg, 1990; Umansky, 1996; Matveev, 2009; Tikhonov, 2013; and others). Specialists in various disciplines have discussed Remezov's maps in terms of various scientific scopes and specific objectives. Although we are unable to give a detailed historiographic review, we should acknowledge the undoubtably valuable contribution of our predecessors to revealing the information capacity of these maps.

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Remezov's atlases contain a great array of primary evidence collected and compiled in the field. This is all the more important because a large amount of original evidence has perished under various circumstances, while information selected and systematized on the basis of it has survived only in Remezov's "sketchbooks". Like any cartographic document, Remezov's drafts represent a spatial-graphic model, reproducing reality in a conventional schematic form. The process of mapping involved an inevitable generalization of the displayed realities, which also implied mandatory selection of the most substantial and meaningful features. The mapmaker selected the objects from the natural and historical landscape, as well as the means of rendering them on the draft (Chernaya, 2002: 10–13). When creating his maps, Remezov was not only focused on accurately depicting the area's features, but also prioritized selecting elements that would be useful for land development. As a serviceman and the son of a boyar, he carried out his work "by the decree of the Great Sovereign"; hence, he viewed the hierarchical importance of the parts of the map through a practical lens, giving primary importance to the reliability and usefulness of the objects depicted.

Indeed, one should take a critical and differentiated approach to assessing how adequately the objects were represented on Remezov's drafts. This study intends to analyze one of the elements called "mountain(s)", and to establish geographical and historical facts hidden behind it. This will be done by using the "Draft of the Land of Fort Narym" from the "Sketchbook of Siberia" (Chertyozhnaya kniga…, 1882: Fol. 10). This article initiates a series of publications presenting a detailed historical, geographical, and archaeological analysis of this unique source.

A.V. Kontev noted that the name "mountain" was absent from Russian maps until the late 17th century, and appeared only on the drafts by Remezov (2022: 163). Kontev also cited the opinion of C. Kudachinova that mountains in Russian sketch maps were "either reduced… to short thick bands, which almost did not differ from water flows, or were ignored for the sake of ample depiction of rivers… There was no obvious need to depict them. They played an insignificant role, if any, in the Russian world… Unlike rivers, natural elevations were too extravagant and had no special value that would make them worthy of being represented" (Ibid.: 163–164).

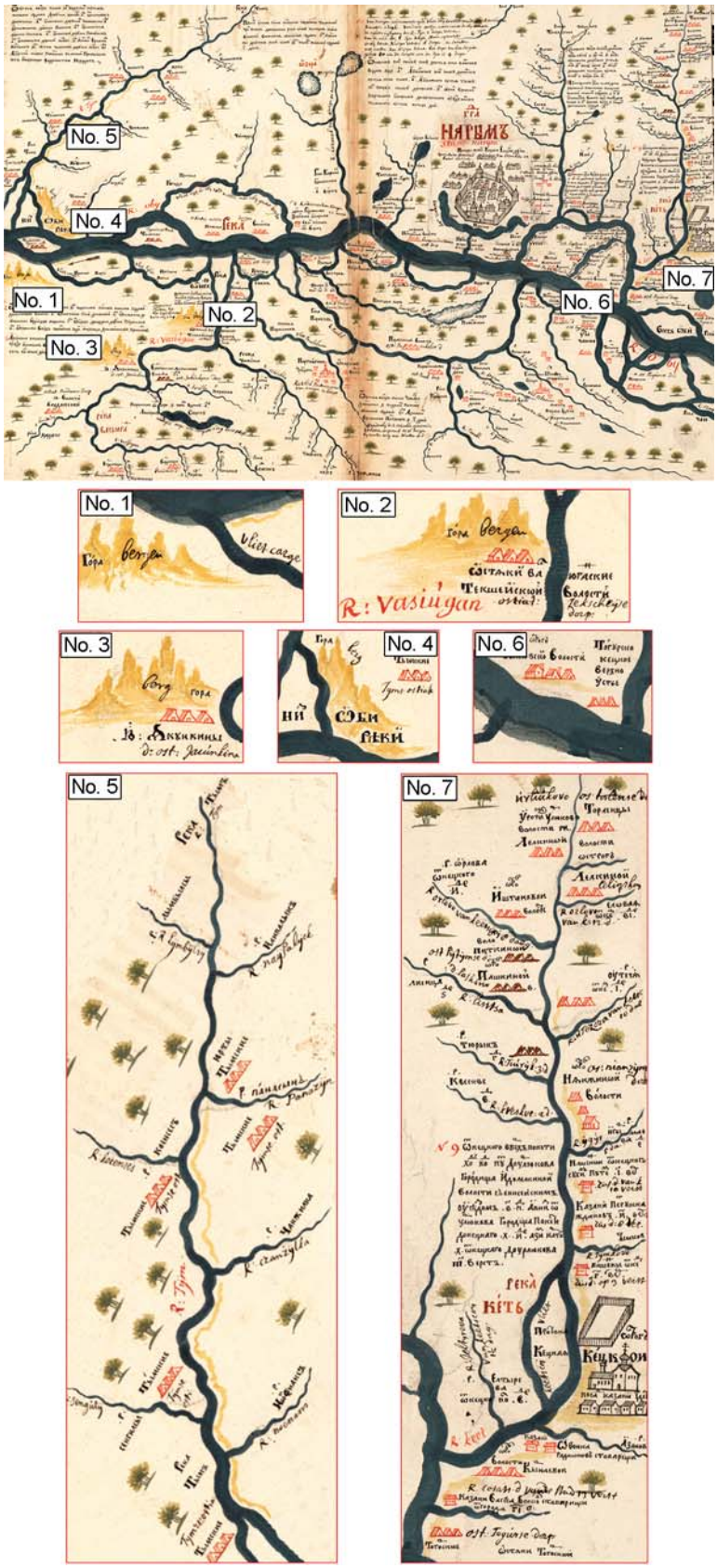
Elevations on the "Draft of the Land of Fort Narym"

We should analyze the "Draft of the Land of Fort Narym" (hereafter, the "Draft"), where the objects "mountain(s)" were marked, and try to discover why Remezov considered them "worthy to be represented". At the time of its creation, the "Draft" covered the Narymsky and Ketsky uyezds, populated mainly by the Selkups, as well as the southern part of the Surgutsky Uyezd, which included the Vasyugan and Tym River basins, where the population was apparently a mix of the Selkups and Khanty. On modern maps, the territory represented on the "Draft" is located in the northern part of the Tomsk Region, almost completely occupying its four largest districts. Despite several administrative transformations, this territory is known as the "Narym land".

High swampiness, which implies low-lying landscape, is the hallmark of the region. Although information about the features of the terrain, even in the late 19th century, was relatively modest, the conclusions in a few summarizing works were unambiguous: "There are no mountains in the entire space of the Narym land" (Kostrov, 1872: 1); "Narym means swamp, a swampy country, which quite correctly describes this area, not at all rich in elevations" (Plotnikov, 1901: 1, 3). In the context of these conclusions, the "Draft of the Land of Fort Narym" is of undoubted interest, since even a cursory acquaintance with the "Draft" gives a different idea of the natural and geographical situation in the region. The conventional signs used by Remezov include those that are unambiguously interpreted as positive topographic forms, such as various elevations of several types (see *Figure*). Taking into account the prevailing notions about the Narym region, this particular detail seems contradictory. Additionally, the "Draft of the Town of Tomsk" (which encompasses the northern foothills of the Kuznetsk Alatau and is adjacent to Narym) does not feature any such markings (Chertyozhnaya kniga…, 1882: Fol. 11).

It is possible that a clear lack of information on the geography of remote parts of Siberia, one of which was the Narym land, in the 17th century, was the reason behind inaccuracies and errors, including those in rendering the terrain. A good illustration is the "Plan of the Town of Narym" published by N. Witsen, where a mountain range with "peaks into the sky"—nonsense for the marshy Narym region—is located behind the residential area (Okladnaya kniga…, 2015: 186–187).

As a working hypothesis, we suggest that Remezov used conventional signs for positive topographic forms not formally, but with objective reasons associated with the subsistence system of local inhabitants, information about which was available to cartographers of the 17th century. Let us analyze the hypothesis in the context of modern geographical knowledge and information from written sources, for establishing the importance of these elements of terrain for the life of the local population.



Positive topographic forms on the "Draft of the Land of Fort Narym" by S.U. Remezov (Chertyozhnaya kniga…, 1882: 10).

Remezov used two types of conventional sign for designating positive topographic forms, which differed greatly in the manner of execution, but were painted yellow-brown of varying intensity. The first type is undoubtedly associated with the depiction of a mountain range, or an individual mountain. The visual identity of their execution on the "Draft" makes it possible to combine these signs into a single group. In addition, such images were supplemented with a clarifying inscription in Russian and Dutch. Two variants have been identified: in the first case, the indicator "mountain" was supplemented by the Dutch "berg", while in the second case, the same Russian term was given with the stress on the first syllable (*góra*) and was accompanied by the Dutch word "bergen", which indicates the plural.

The second type of conventional sign is a thick line, painted yellow-brown in the same way as "mountains". This designation was usually confined to the valleys of large rivers; the line runs parallel to the channel, often repeating its bends. If the symbol crosses any river or its tributary, the line is interrupted and continues on the other bank.

The first travelers and scholars who were familiar with the region first-hand agreed that all natural elevations there were associated with river channels. The local population called them *uvaly* ('slightly sloping extended hills') and riverbank cliffs (Kostrov, 1872: 1). On the "Draft", symbols of elevations are also associated with main watercourses, which clearly demonstrates their specific localization linked only to four rivers—the Ob, Tym, Vasyugan, and Ket. This is not surprising, since even in the second half of the 19th century, distinctive "ridges and riverbank cliffs" were mentioned only with reference to the Ob, Ket, and Vasyugan rivers (Ibid.).

The northernmost elevation is located on the left bank of the Ob River, approximately opposite the delta of the Tym River (see *Figure*, No. 1). It is indicated by the drawing of mountains and inscription "góra–bergen" (in plural). The mountains begin at the lower mouth of the "Karge" channel, and extend parallel to the Ob channel to the border of the draft.

At this section, the Ob River valley shows pronounced asymmetry. On the left bank, floodplain terraces are rare and occupy small areas. They are concentrated mainly on the right bank, while the channel is located at the left side of the valley and approaches the watershed plateau—*materik* ('continent'), exposing its geological structure in high and steep Chagin, Viskov, and Kargin *yars* ('steep banks') (Priroda…, 1968: 13–14). This "continent" and steep banks were well known to the local population and were observed by scholars and travelers who visited the Middle Ob region. One of the first persons who mentioned them was the Russian envoy to China Nikolai Spathari, who traveled along the Ob River in 1675: "…Veskov yar, with a forest on it: cedar pine, fir, spruce, meadowsweet, and many others. And at the end of that Veskov yar, there stands the yurt of the Ostyak Vesk…" (Puteshestviye…, 1882: 64). The place must have owed its name to the Ostyak Vesk. In the mid-18th century, G.F. Miller wrote in detail about steep banks in that section of the Ob River: "Beskov yar in the Ostyak language; in the Narym language, Wesmadschi, and in the Surgut language, Wes-jach-wont, an elevated steep bank on the left side of the river… which, according to the Ostyaks, should be associated with the repeatedly mentioned so-called *materik*. Here, however, it extends only for 4 versts along the Ob River, where it again alternates with low places… Kychagin yar, in Ostyak, Seajago-wont, on the left bank, 24 versts from the previous Beskov yar, of which it is a continuation, extends for 2 versts" (Sibir…, 1996: 200).

Viskov yar is also interesting because in July 1912, in its outcrops, paleontological excavations were carried out. The "hills of Veskov yar" were examined by the Finnish scholar K. Donner. He intended to find a mammoth skeleton, but owing to the soil's hardness, and lack of time, he could find only several large bones, the species of which remained unclear (Donner, 2008: 44). "Veskov yar" is mentioned in the sources most often; apparently, it stood out by its physical features and impressive appearance. In addition, according to the data from the 19th century, it was used as a landmark for determining the northern border of the Narym land, which ran "4 versts from the Viskov yar locality" (Plotnikov, 1901: 1).

A section of a watershed plain in the area under discussion is separated from the Ob River valley, which constitutes the floodplain on the left bank, by a steep ledge rising 30–40 m high above the floodplain's surface, 40–50 m above the water line, and clearly expressed in the relief. The Ob River comes close to the plain only in a few places, forming high exposed steep banks (Priroda…, 1968: 11–12). The "continent" itself extends parallel to the Ob River for several dozens of kilometers, sometimes approaching the channel and sometimes moving away from it. In the present-day Aleksandrovsky District, this section of the watershed plain appears under the name of "Mount Poludennaya".

As compared to the low-lying landscapes of the Narym land, the "continent" stands out for its high, steep banks that overlook the river. The local population and travelers may have even perceived them as mountains, which is evident from the place names such as "Mount Poludennaya". The Ob part of the left-bank plain, which is intersected by several rivers and streams, is well-drained, resulting in minimal swampiness. In the Soviet period, this "progressively drained territory" was recommended for priority economic development (Ibid.: 11). Modern pipelines and the related communication corridors in the north of Tomsk Region were placed precisely on the elevated left bank. Currently, the settlements of Vertikos and Oktyabrsky are located there. In the same area, the village of Karga (Ust-Karga) is known. In the late 19th century, it was inhabited by Russian peasants, although it was situated on the lands of the indigenous population of Tym Volost (Plotnikov, 1901: 183, 245–246). The geomorphologic situation contributed to the emergence of small arable lands and vegetable gardens near the village, which was an important indicator of good prospects for the development of the Narym land (Karta naselennykh mest…, 1914).

Images of mountains identical to those described above also appear at two points on the left bank of the Vasyugan River. In the estuary section, the sign is accompanied by the inscription in plural: "góra–bergen" (see *Figure*, No. 2); in the middle reaches of the river, where the channel makes a huge bend, the inscription appears in singular: "gora–berg" (see *Figure*, No. 3). It can be logically assumed that the elevations in the Vasyugan basin indicated by Remezov were associated with the river valley, its terraces above the floodplain, and adjacent areas of the watershed. Scholars and travelers repeatedly mentioned that the Vasyugan River in its lower reaches significantly differed from the Ob River precisely by the presence of elevated banks and high *yars* adjacent to the riverbed (Shostakovich, 1877: 5). This was also typical of its tributaries, for example, of the Chizhapka River, about the banks of which the locals said: "The mountains are so high that the hat falls off the head when you look at the top" (Ibid.: 3).

In the 19th century, the local population called "rocks" the complexes of high promontories and outcropping *yars*, overlooking the Vasyugan River, which stood out against the background of the monotonous, flat Narym landscapes, and associated various legends with them. According to the surviving written evidence from the second half of the 19th century, over a dozen such "rocks" were known (Plotnikov, 1901: 194–202). Therefore, Remezov's signs used for marking the elevations in the Vasyugan basin can be explained. However, we should keep in mind that "mountains" were indicated on specific

sections of the left bank and only in two places, although, according to written information, "rocks" occurred along the entire length of the valley.

We should analyze the locations of "mountains" indicated by Remezov using modern information about the terrain and geomorphologic features of the Vasyugan River valley. A high bank can be seen on its left side, in the lower reaches, but it is no different from the opposite bank, and is even inferior to it in height. Nevertheless, the presence of the indigenous settlements in the estuary part of the Vasyugan River precisely on its left bank in the 19th century is curious. These settlements occupied the sections of high terraces facing the river, which at that time were designated by the term "pine forest bank" (Shostakovich, 1877: 5). Yurts Yugin were the first, then followed Naunak. This section is designated as a "bank with bedrock edges" on the pilot charts of the Vasyugan River. Several such areas are mentioned on the left bank in the lower reaches. As a rule, within them, settlements were located (Karta reki Vasyugan…, 1982: 98, 104). Up to the 20th century, local indigenous population preferred to settle on this segment of the left bank of the Vasyugan River, and not on the right bank. Remezov pointed to the presence of places convenient for "settlement" of peasants in one day's journey on a boat from the mouth of the Vasyugan River (Chertyozhnaya kniga…, 1882: Fol. 10). In the swampy Narym land, such places were rather exceptional and were well-known to the indigenous population. These places, convenient for "settling", could have been associated precisely with the "mountains" mentioned above. Thus, we believe that designation of "mountains" by Remezov in the lower reaches of the Vasyugan River could have been caused by the presence of watershed plain, which in this section approaches the river valley from the north, passing into the third terrace above the floodplain. The "pine forest bank", in several places directly reaching the riverbed, has been used for building the settlements and utility structures of the local population for centuries.

Although the presence of "mountains" on the "Draft" in the lower reaches of the Vasyugan River finds its confirmation in the modern geographical features of that area, their designation in the middle reaches of the same river causes a number of difficulties (see *Figure*, No. 3). In that area, on the left bank, several high outcropping *yars* are identified, which are distinguished by the local population. The most interesting, and probably the most famous, is the elevation in the boundaries of the modern village of Sredny Vasyugan, which in the late 19th century was called Vasyuganskoye. The elevation is referred to as Shaitansky, Shamansky, or Shamanny promontory. Shostakovich was one of the first travelers to mention it. According to his information, Shaitansky promontory was located near the village church. A larch tree grew there, on which the locals hung "sacrifices to shaitan, so he would not cause obstacles and losses to the sacrificer; and in particular, would not go ahead of him during the hunt and chase away the animals" (Shostakovich, 1877: 14). Ten years later, N.P. Grigorovsky visited the village of Vasyuganskoye and noted the impressive size of the elevation, calling it a mountain. In fact, this is a part of a high terrace, which protruded in the form of a promontory into the channels of two watercourses—the Vasyugan River and its tributary Varingyogan River (old, Varen-Yogan). On the Vasyugan pilot chart, on this section of the bank, a part of a rock terrace is marked, and archaeologists describe this place the same way (Sredniy Vasyugan…, 2000: 8).

A legend about the origin of Shaitansky promontory was recorded from the locals in the late 19th century. Its unusual name was explained in a simple manner: "this mountain has such a name because in former times unclean spirits lived on it…". Grigorovsky, who visited the village of Vasyuganskoye in 1883, examined the promontory and noted two sacred trees next to it. One was a fir tree, dedicated to local spirits. Many gifts for them were hung on the branches: ribbons, strings, rags (mostly red), and animal skins, as well as several arshins of chintz and other inexpensive fabric. The second tree, almost on the edge of the promontory, was a thick larch; a wooden barn (the "dwelling" of the spirit) was made near its lower branches. This place was revered not only by the indigenous people. Among the gifts, Grigorovsky saw eight arshins of chintz, which were "hung" in the autumn of 1881 by the watchman of the Vasyugan grain store, Cossack A. Sosnin, who suffered from fever all spring and summer and, on the advice of a well-known Vasyugan shaman, brought a gift to the spirits (Grigorovsky, 1884: 23). Unfortunately, already in the late 19th century, the sacred place was repeatedly robbed by visiting merchants, who knew that one could profit in such places from money and valuables left by the indigenous people in cracks and roots of a tree. Therefore, by the time Grigorovsky visited the village, the indigenous inhabitants of the Vasyugan had moved the barn with the image of the spirit to another place, which was kept secret (Ibid.).

Shaitansky promontory is known well in the archaeology of the Tomsk Region (Chindina, Yakovlev, Ozheredov, 1990: 179–181). Shostakovich—the first scholar who visited the place—discovered archaeological evidence of ancient blacksmithing: "About four versts from this place, there is another, 'fox' promontory, where, according to oral tradition, a forge used to be. Indeed, on an overgrown elevated sandy hill, I found waste from smithery—slag. Now, this promontory is a favorite place for pine forest birds and foxes" (1877: 14). A number of archaeological sites have been discovered there. The most famous is the lost fortified settlement of Shamansky Mys, of the Early Iron Age. A small but distinctive collection

of religious bronze castings therefrom is kept in the Novosibirsk Museum of Local History.

The choice of this particular place for building a church was not accidental. First, it is situated in the middle section of the Vasyugan River, making it accessible to residents of both the upper and lower reaches. Second, this section of the riverbank held a prominent position in the middle reaches, and played a significant role in the religious practices of the local indigenous population. The construction of a church on a site that was sacred to these people was intended to maintain continuity in the religious realm, while altering the object of worship. However, this resulted in the church and the sacred site existing in parallel, as noted by the clergy. Evidently, the Narym "Draft" referred to this well-known elevation among the local population.

Remezov marked several elevations on the right bank of the Ob River. One of these was south of the mouth of the Tym (see *Figure*, No. 4), which flows into the Ob River in several branches. The northern (right-bank) part of the Tym delta is distinguished by extremely low elevations, which rarely exceed 50 m. The local terrain is composed of huge segments of floodplain and a heavily swampy complex of terraces above the floodplain, cut by numerous channels and residual water bodies, often swampy. There are also large and long channels in the area, including the Milya, Kievskaya, Radaika, Zharkova, Paninsky, Murasovsky Istok, etc. The watershed plain becomes visible only in the extreme northeast of the present-day Tomsk Region. Against this background, the geomorphologic situation in the area of the main mouth of the Tym River and to the south looks highly advantageous. It is no coincidence that the modern villages of Ust-Tym and Tymsk are located there. Hypsographic marks in this part exceed 60 m. Elevated, non-swampy areas suitable for development are confined to the edges of the terraces facing the streambeds. On the "Draft", the "mountain" was indicated at the southernmost branch of the Tym River. On modern maps, it corresponds to the Langa channel, stretching from the main channel of the Tym and almost reaching the village of Tymsk. On the "Draft", the Shedugol River (the present-day Shedelga River) is the conventional boundary of the "mountains" from the south.

In the late 19th century, the location of the village of Tymsk was described as follows: "…located on the right bank of the Ob River and the Tym channel. The place occupied by the village is where pine forest grows; it is high and consists of 34 houses" (Plotnikov, 1901: 245). K. Donner also mentioned that the village was "on the high hills". In the 17th century, the height of the terrace in that location could have been even greater. According to information from the early 20th century, the river actively eroded the bank in this section (Donner, 2008: 20). A fragment of the terrace occupied by the village stands out against the background of low marshy spaces of the Tym delta. It was also well known to the indigenous population. There was a Selkup cemetery on the Langa channel on one of the low ridges, which in the Soviet period received the name "Myasokombinat" (Yakovlev, 1994: 36). Moreover, a section of the bank at the upper mouth of that channel was chosen for building a church and later a Russian village, many times mentioned by travelers and scholars. Already in 1740, the Tymsk cemetery with the church of the Life-Giving Trinity for the local Ostyaks was located there. Only dwellings of clergy at the church were there; there were no Russian or indigenous buildings (Sibir…, 1996: 199). These lands belonged to the indigenous people of Tym Volost. "They allotted 99 desiatinas of haying land for the clergymen from their land. Merchants, commoners, and peasants, who settled there by the permission of the indigenous people in 1820, first for fishing in the form of tenants of land, had temporary booths for living, which they later replaced by permanent dwellings and became settled residents thus forming the 'mixed-class' Tymsk rural society" (Plotnikov, 1901: 185).

The natural and geographical situation contributed to the development of significant areas for vegetable gardens in the village of Tymsk in the late 19th century (Karta naselennykh mest…, 1914). As compared to the opposite bank of the Ob River, which is almost 30 m higher, this area hardly looked like a mountain. Yet, Remezov did not attempt to match the elements of landscape and their height, but recorded only specific areas that for some reason were distinguished by the local population. Such was precisely the area of the bank adjacent to the southern branch of the Tym River (Langa channel), standing out against the background of the low and swampy Tym delta, which covers a segment of the right bank of the Ob River for over 100 km. Similarly to the village of Vasyuganskoye, this place was chosen for constructing a church.

On the left bank of the Tym River, Remezov marked another elevation as a yellow-brown band, stretching parallel to the channel and ending in the middle course (see *Figure*, No. 5). The geographical literature emphasizes that rivers on the right bank of the Ob usually have high left banks (Grigor, 1951: 158). With a similar situation on the right and left banks of the Tym River, the "continent" or watershed plateau approaches the river precisely from the south, between the former Lymbel-Karamo yurts and the mouth of the Koses River, and ends with the steep slope; in some places, there are outcrops (Barkov, 1951: 178). In the context of the problem we are discussing, we should point to two features of the Tym River valley. First, the river flows in the valley of the ancient channel, which locally has well-marked sides, with the southern one close to the channel and the northern one located several dozens of kilometers away. Second, although the hypsographic marks of the terraces at the right and left banks of the

Tym are close, modern maps and satellite images of the Tym River basin clearly show differences caused by the asymmetry of the valley. The right tributaries of the Tym are longer. For example, the length of the Sangilka River is 335 km. The left bank is not less swampy than the right bank, but the lengths of even the largest tributaries do not exceed dozens of kilometers. The watershed in the south, between the Tym and Paidugina rivers, is located on average at a distance of 12–20 km from the main channel of the Tym River, and is distinguished by significant hypsographic marks, and, most importantly, does not constitute continuous swamp. The band indicating elevation on the "Draft" ends between the mouths of the Tym tributaries Koses and Lymbelka. The watershed between the Tym and Paidugina Rivers, which has its sources in the swamps and Komarnoye lake system, ends approximately in that area. The watershed is clearly marked on the "Draft" by a straight line of conventional tree signs between the sources of the Tym tributaries and watercourses flowing from north to south. The vegetation on the right bank of the Tym River is marked differently, with trees concentrated between the Tym tributaries and not organized into any system.

The key to the "Draft" indicates the winter "sledge" route to the mouth of the Lymbelka River, where the local population hunted. It is possible that the watershed of the Tym and Paidugina Rivers was used for this purpose, in order to avoid crossing numerous valleys of the Tym tributaries. In this case, the geomorphologic features of the left bank area of the Tym, well-known to local residents, were of interest to them. These points could have been behind the designation of the elevations by Remezov precisely on the left bank. A similar conventional sign marks an elevation on the left bank of the Ket River, along which, as indicated by written sources, the old winter route from the village of Togur to Yenisei Governorate ran (Pelikh, 1981: 65).

Several elevations are also marked in the southern part of the "Draft". One of these was designated with a yellow-brown band on the promontory section of the island formed by the Togur Ket River and the Togur channel of the Ket (see *Figure*, No. 6). From the geomorphologic point of view, remnants of terrace II above the floodplain, which were not flooded in spring, were located there. The presence of high places in the area in the upper mouth of the Ket River has been known since the first half of the 17th century, when building a fort on the "division" of the Ket River was discussed, which was supposed to replace forts Narym and Ket: high areas suitable for building fortifications and for agriculture were reported (Miller, 2005: 428).

An extended elevation on the left bank of the Ket River was marked, not by a continuous band, but by separate yellow-brown segments, bounded by the valleys of its left tributaries (see *Figure*, No. 7). This high place begins at the upper, "Togur" mouth of the Ket River, practically opposite the positive topographic element described above. In the area of Fort Ket, it forms a kind of promontory. Field studies at the location of this settlement have confirmed that it occupied an elongated promontory with high steep banks. From Fort Ket, the band denoting a high place stretches along the left bank, parallel to the channel of the Ket River, to Nyanzhin indigenous volost. It becomes interrupted in this place and continues beyond the "Outechya" River, located 10 days from Fort Ket. It is probably the Utka River, at the mouth of which the village of Stepanovka is currently located. Behind the "Outechya" River, the band is much thinner than in the estuarine part of the Ket River, which probably means leveling of the elevation.

Travelers and scholars of the 17th–19th centuries often called the left bank of the lower Ket River *kryazh* ('ridge'). For example, in the first detailed description of the river, N. Spathari reported: "And they went from that Filkin yar through Angina channel, and there is an Ob *kryazh* on that Angina channel. There is also a two-hour trip through that channel for 2 versts. And that channel is on the right side of the Ket River [N. Spathari was traveling up the river and mentioned the banks along his way. – *the Authors*]. *Kryazh* is on the right side of the channel. <…> And Fort Ket stands in a beautiful place, on the same *kryazh*, on the right side of the Ket" (Puteshestviye…, 1882: 73). In the Dictionary of Vladimir Dal, "kryazh" means continent; solid separate part of something, constituting a whole in itself; dry, unplowed place, strip; "materik"—a virgin layer of earth's surface, ridge, natural, not filled-up, not alluvial (1994: 533, 795). On modern maps, there is a place called Belsky Kryazh in the interfluve of the Ket, Ob, and Chulym Rivers. Fragments of watershed plateau and high floodplain terraces, which break off in steep outcrops, come close to the riverbed on this segment of the Ket River. The *kryazh* stretches along the river for dozens of kilometers. As already mentioned, the old winter route from the village of Togur through Tainye yurts to Orlyukov yurts and further to Yenisei Governorate ran along the left bank of the Ket River (Pelikh, 1981: 65).

Analysis of the settlement system in the Ket River basin in the 17th–19th centuries shows that Russian villages emerged in the region, with rare exceptions, in the area along the left bank of the river in its lower reaches, approximately to its tributary, the Peteiga River. There were several dozens of Russian villages and hamlets there, which constituted Ket Volost in the 19th century (Karta Tomskogo okruga…, 1890). The designation of an elevation by Remezov precisely at this segment of the Ket River could have resulted from the location of the "kryazh" in that area, where the Russian villages were. They were marked on the "Draft", although some remained unnamed. At the time the map was created, there were lands suitable for arable farming in that area,

which is confirmed by numerous written sources about the agricultural occupations of the population living on the Ket River in the 17th–19th centuries. This is clearly demonstrated by the maps of the late 19th–early 20th centuries, where significant areas of arable land and gardens were marked on the left bank of the estuarine part of the Ket River (Karta naselennykh mest…, 1914). In the first quarter of the 20th century, scholars pointed to specific features of the "Ket Kryazh". V.Y. Nagnibeda determined its borders from the Tainye yurts to the village of Chernaya and Paidugin yurts. The economy of the local population was based on agriculture, as well as hunting and fishing (Nagnibeda, 1920: 37). Apparently, by the late 17th century, the area was already known as a place meeting the needs of peasant economy and suitable for agriculture.

Conclusions

Analysis of conventions denoting elevations on the "Draft" makes it possible to argue about the objectivity and validity of their designation. They reflected real natural and geographical features of the territory, which were of practical importance for the local population. These elevations were known long before the compilation of topographic maps with contour lines. These elements of terrain were described by travelers and explorers of Siberia of the 17th–19th centuries, and were mentioned in the legends of the local population.

Thus, "mountain(s)" and "kryazhes" on the "Draft of the Land of Fort Narym" are not an "empty" illustration. Serviceman S.U. Remezov was fulfilling a government task, and displayed real elements of terrain, practically useful in land development, which is supported by the analysis of the current natural and geographical situation, as well as written records.

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From the History of Ethnographic Studies in the Yenisei Region: F.A. Fjelstrup's Siberian Materials

This article describes the works of Theodor (Fedor) Fjelstrup (1889–1933)—a Russian ethnographer, one of those who laid the groundwork for the systematic studies of the Turkic world of Central Asia. We used materials from the archives of the Institute of Ethnology and Anthropology RAS (F.A. Fjelstrups' holding): the diary of the Minusinsk-Abakan 1920 Expedition and the notebook. We discuss the hitherto unknown episodes in the ethnographic studies of the Yenisei region, the foundation of the Institute for the Study of Siberia, the organization and work of the Minusinsk-Abakan 1920 Expedition, whose records we introduce, and its route. Data on settlements, utensils, clan structures, systems of kinship, family rites, folklore, and shamanic beliefs are analyzed. Using the historical approach, Fjelstrup traced the dynamism of the Khakas culture, being one of the first to discuss the syncretism of their beliefs. Using materials of the Minusinsk-Abakan Expedition, we demonstrate that he implemented a comprehensive approach combining linguistic, ethnographic, and anthropological evidence. This scholarly tradition, which was widely practiced in the 20th century, maintains its importance in future studies of the Turkic groups of Central Asia.

Keywords: *Institute for the Study of Siberia, Minusinsk-Abakan Expedition, Khakas traditional culture, F.A. Fjelstrup's archives, ethnography, the Khakas people.*

Introduction

In recent decades, the Russian Humanities, which have been reassessing their approaches and values, manifest great interest in personalities and destinies of scholars who worked in the time of changing ideological doctrines and methodological concepts. Since the 1990s, many publications have been focusing on the persecuted ethnographers. Collected studies and monographs discuss outstanding scholars, such as Y.V. Bromlei, L.P. Potapov, G.M. Vasilevich, P.I. Kushner, N.P. Dyrenkova, D.A. Klements, and others. An approach corresponding to the concept of new biographical history ("personal history"), focusing on personal information, followed in these studies. This approach emerged as a part of the "anthropological turn" and new understanding of man in history, and is distinguished by rejection of typification and by close attention to the context of personality formation. Working with author's narrative has become an important task. Systematic study of personal archives has made it possible not only to clarify the facts of biographies, but also to identify socially important trends

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that influenced the values of scholars and determined their scholarly endeavor.

Growth of interest in the collections of documents belonging to Russian ethnographers of the early 20th century is associated with prospects for reconstructing "creative laboratories" of scholars who collected unique evidence, but did not implement their projects. These archives include the materials left by the Russian and Soviet scholar, ethnographer, and traveler Fedor A. Fjelstrup (1889–1933), whose name came back from oblivion only in the late 1980s (Fig. 1). His scholarly biography was reconstructed in the memorial edition "Persecuted Ethnographers" by the efforts of B.K. Karmysheva (2002).

It is known that Fjelstrup was born in St. Petersburg, in the family of a successful Danish engineer, who took the Russian citizenship. Fjelstrup graduated from St. Petersburg University, here he received a comprehensive education in the Humanities. As a student, he traveled to the Caucasus, Mongolia, and South America. For the report on the native Americans of Brazil, together with his colleagues, Fjelstrup was awarded the small silver medal of the Imperial Russian Geographical Society. Since 1916, after graduating from the university, Fjelstrup was an employee of the Museum of Anthropology and Ethnography (MAE)/Kunstkamera; since 1918, he collaborated with the Commission for Studying the Tribal Composition of the Population of Russia, compiling ethnic maps of the Cis-Urals. After that, Fjelstrup was invited to Tomsk University, where he taught a course in geography. In 1920, he became a member of the Minusinsk-Abakan Expedition. Since 1921, being an employee of the Ethnography Department of the Russian Museum, he carried out ethnographic research in the Crimea, Central Asia, and the Caucasus. In 1933, Fjelstrup was persecuted and died during investigation; he was cleared of all charges in 1958 (Ibid.; Professora Tomskogo universiteta…, 2003).

During his lifetime, F.A. Fjelstrup published only several articles. In the early 2000s, all his manuscripts and field diaries were donated by his heirs to the Institute of Ethnology and Anthropology of the Russian Academy of Sciences, and formed collection No. 94, containing Fjelstrup's field materials and studies of the 1920s. By the 2000s, the fragments of this archive on the Kyrgyz and Kazakhs were reviewed by B.K. Karmysheva, G.N. Simakov, and O.B. Naumova (Karmysheva, 1988; Simakov, 1998; Naumova, 2006a, b). Most of the field materials of Fjelstrup on the rituals of the life cycle among the Kyrgyz were edited and published by B.K. Karmysheva and S.S. Gubaeva in 2002 (Gubaeva, Karmysheva, 2002; Fjelstrup, 2002). All other materials, including the results of the Minusinsk-Abakan Expedition of 1920, have never been discussed. The information collected during this expedition appears in the diary (D) and notebook (NB) of Fjelstrup. His field materials (FM) were supplemented with

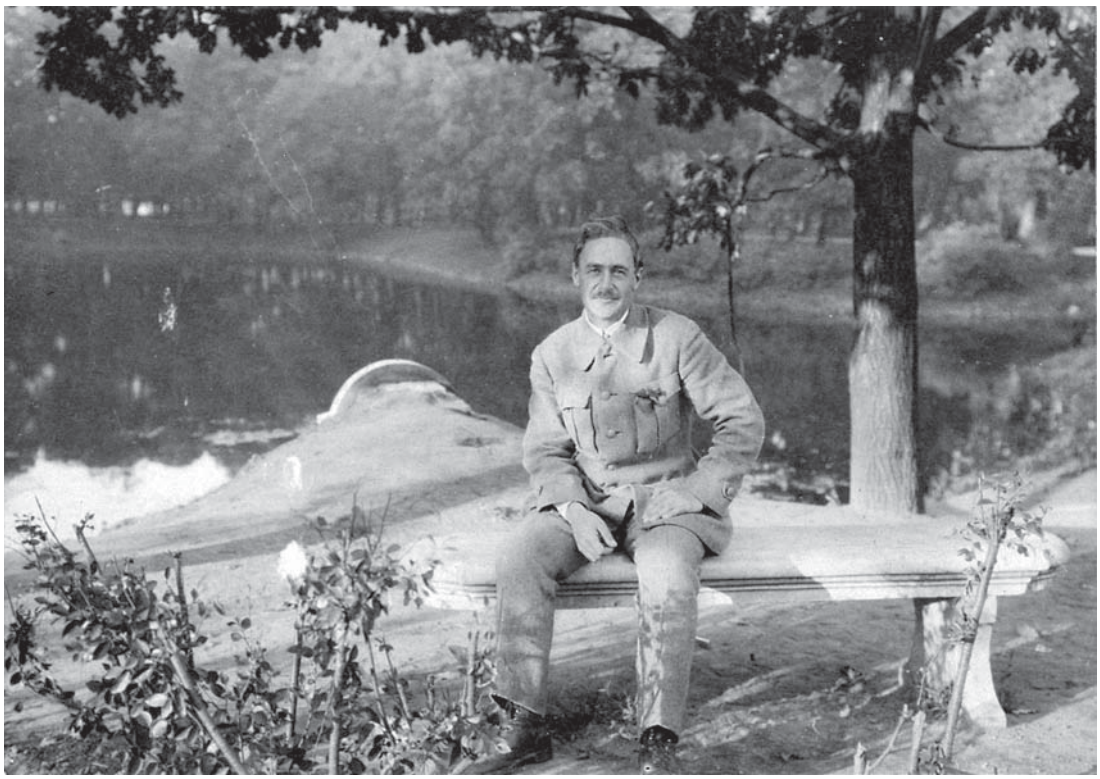

Fig. 1. F.A. Fjelstrup. Photo of the 1920s. Archive of IEA RAS. F. No. 94.

extracts from publications and descriptions of museum exhibits. This article intends to describe and discuss this evidence.

This article analyzes the Siberian part of the Fjelstrup's archive, which is about 400 pages of text, and interprets it in the context of his research, taking into account systemic transformations that took place in Siberia in the early 20th century.

Background of the Minusinsk-Abakan Expedition

The Minusinsk-Abakan Expedition of 1920, in which Fjelstrup was a member, was organized by the Institute for the Study of Siberia together with Tomsk University. In compiling the plan for the journey, its organizers relied on available experience of studying Siberian regions.

By the early 20th century, the valley of the Middle Yenisei River was one of the best studied areas in Russia. The first sensational discoveries there were associated with activities of illegal grave robbers in the early 18th century. The "Golden Siberian grave things" became known in the capital city in 1715, when the Siberian Governor General Prince M.P. Gagarin brought several items to Peter I. In 1718, Peter I signed a decree on the Siberian Expedition under the leadership of Dr. D.G. Messerschmidt, who was invited to Russia. In 1720–1726, Messerschmidt traveled from the Urals to Lake Baikal and from the Sayan to the Lower Ob region. Part of his route passed along the Yenisei lands, which in 1707 became a part of Russia. The objectives of the expedition included studying "pagan idols", "ancient writings," "stone statues," etc. Messerschmidt excavated burial mounds on the left bank of the Abakan River, sketched rock art on the Yenisei River, and was the first scholar to describe the ritual of worshipping the stone statue of Ulug Khurtuyakh Tas (Kyzlasov, 1983). Scholarly expeditions in the region were carried out during the 18th–19th centuries. In 1893, the Danish linguist V.L. Thomsen read the inscriptions on the Uybat monument—the stone stele discovered by Messerschmidt. The decryption of runic script as the Orkhon-Yenisei ancient Turkic script, as well as discovery of sites from different periods, opened up the discussion on the emergence of cultures in the region (Ibid.).

The study of the Yenisei region at the turn of the 19th–20th centuries was associated with the names of famous scholars, such as F.Y. Kon, D.A. Klements, A.V. Adrianov, N.F. Katanov, S.D. Mainagashev, and others. The Minusinsk Museum, founded in 1877, acquired the status and reputation of one of the leading research centers of Siberia (Kon, 2019). In 1900, vast ethnographic collections of the museum were presented in a catalog prepared by E.K. Yakovlev (1900).

Researchers from Kazan University, where a school of comparative historical study of languages and cultures of the Turkic peoples had emerged by the early 20th century, had a noticeable influence on research in the Altai-Sayan region. V.V. Radlov, Professor of Kazan University in the 1870s, became one of the leading scholars in that field. He was a versatile and outstanding Turkologist, well-versed in linguistics, ethnography, and archaeology of Siberia and Central Asia, and supported research in the Altai-Sayan region already in the rank of Academician and Director of the MAE/Kunstkamera (Kononov, 1972).

The work of N.F. Katanov—one of the most famous linguists of Russia and representative of the indigenous population of the Yenisei region—was also associated with Kazan University. After graduating from St. Petersburg University in 1889–1892, he focused on studying the Turkic world. In 1919, he was elected Full Professor. One of his students was S.E. Malov—a native of Kazan, graduate of the local Theological Academy, and subsequently of St. Petersburg University. Still during the years of his studies, with the support of Radlov, Malov traveled to the south of Siberia. During the trip, he became interested in ancient runic script, language, and views of the indigenous inhabitants of the region. In 1917, Malov became a professor at Kazan University (Kormushin, Nasilov, 1978).

In this center of research, much attention was paid to the theory of the Altai linguistic unity and Altai-Sayan (Central Asian) ancestral homeland of the Finno-Ugric peoples. This theory was proposed in the mid-19th century by the Finnish scholar M.A. Castrén, but was later refuted. However, in the early 20th century, linguists, archaeologists, and ethnographers actively participated in the discussion about this theory. Minusinsk and Achinsk uyezds (previously, okrugs) of the Yenisei Governorate were the regions where such studies were carried out. In 1912–1913, S.A. Teploukhov—at the time, a junior representative of one of the dynasties of entrepreneurs and scholars in the Urals—worked there. He was a graduate of Kazan University, and had additional training at St. Petersburg University, focusing on anthropology and archaeology. In 1918, being in the Urals, which at that time was under the rule of Kolchak, Teploukhov was sent to Tomsk, together with other professors of Perm University. Some employees of Kazan University were also transferred there (Kitova, 2010).

Working prospects for the scholars who ended up in Tomsk were associated with the foundation of the Institute for the Study of Siberia. The Institute was intended to serve as All-Siberian Center, which would foster the study of the region. The Department of History and Ethnology, which was expected to "study history (including archaeology), everyday life, disposition, language, literature, beliefs, and art of the peoples of

Siberia (Russian, foreign, and indigenous population), and protect all kinds of antiquities and documents of the past and present" (Trudy syezda…, 1919: 33), became a part of the Institute. The Institute was created during the establishment of the Soviet power in 1917–1918, but acquired the status of a state institution after receiving support of the Kolchak's regime, which was established by the fall of 1918 and overthrown in December 1919. In 1919, the Institute was headed by V.V. Sapozhnikov, Professor of Tomsk University; Department of History and Ethnography was headed by S.I. Rudenko (Nekrylov et al., 2012; Molodin, 2015).

A graduate of St. Petersburg University, S.I. Rudenko had a reputation of one of the most effective Russian scholars focused on systemic archaeological, ethnographic, and anthropological studies. Since the early 1900s, he worked in the Ukraine and Western Siberia; in 1915, he became an Assistant at the Department of Geography and Anthropology of Petrograd University; in 1916, he published the book "The Bashkirs: Experience of Ethnographic Monograph", and was appointed Academic Secretary of the Commission for Studying the Tribal Composition of the Population of Russia and Adjacent Countries. In 1919–1921, Rudenko worked at Tomsk University as a Privat-Docent, then Professor and Head of the Department of Physics and Mathematics. He combined teaching with working in the Institute for the Study of Siberia; at the same time, he headed the museum at the Department of History and Ethnography of the Institute and Commission on compiling maps of peoples (tribes) of the region (Kiryushin, Tishkin, Shmidt, 2004).

In the scope of the Commission's work, Yenisei region was of great interest for scholars and practitioners. There, in April 1918, the Minusinsk Council of Workers', Peasants', Soldiers', and Cossacks' Deputies recognized the rights of the indigenous population and approved its single self-name as "Khakas". Thus, the historical ethnic name related to the state of medieval Kyrgyz people was returned from the oblivion. The establishment of the name "Khakas" leveled the exo-ethnic names of the Minusinsk, Kuznetsk, and Achinsk Tatars, and marked the process of consolidation of clan-related and tribal associations of the Sagai, Beltir, Kacha, Koybal, and Kyzyl, who emerged in the Kacha, Koybal, Kyzyl, and Sagai indigenous administrations. This actualized the study of ethnic history of self-regulated Khakas people, their linguistic and cultural unity, and ethnolocal differences (Efremova, 1972). Addressing ethnic and historical issues involved reliance on comparative linguistic, archaeological, ethnographic, and anthropological studies, which were planned as a part of the Minusinsk-Abakan Expedition. This was the first integrated expedition in Siberia, still experiencing the consequences of the Civil War. Its strategy was determined by the concept of one of the leaders of the Russian ethnography of D.N. Anuchin, who advocated the trinity of sciences—ethnography, archaeology, and anthropology (Levin, 1947).

Organization and work of the expedition

The Minusinsk-Abakan Expedition of 1920 was headed by S.I. Rudenko; F.A. Fjelstrup was one of its members. He came to Tomsk on recommendation of Rudenko, whom he knew from St. Petersburg University. Together they mapped settlement places of the peoples of the Urals in 1918. In Tomsk, Fjelstrup served as a Junior Assistant at the Department of History and Ethnography of the Institute for the Study of Siberia, and worked as interpreter in the government of Kolchak.

In the summer of 1920, Fjelstrup joined the integrated expedition, which included the following members: S.A. Teploukhov, at that time a Senior Assistant at the Department of Geography and Anthropology of Tomsk University, I.M. Zalessky—ornithologist and artist, A.K. Ivanov—geographer, Junior Assistant (later, Associate Professor) at the Department of Physics and Mathematics of Tomsk University and his wife K.P. Kuzmina—a doctor. The team had three students, including M.P. Gryaznov—a student at the Division of Natural Sciences of the Department of Physics and Mathematics, and later one of the leading Russian archaeologists of Siberia (Rudkovskaya, 2004; Kitova, 2010; Berezovikov, 2017). A group of mineralogists in the Minusinsk-Abakan Expedition (professors and students) worked under the supervision of S.M. Kurbatov, Professor of the Department of Mineralogy and Geology of Tomsk University. When leaving Tomsk, the team of 11 people with equipment (and two wagons) occupied two heated freight cars (Archive of the IEA RAS, F. 94, D, fol. 1).

According to the Fjelstrup's notes, the expedition lasted from June 1 to September 27, 1920. The first pages of his diary were filled with descriptions of the blooming steppe. During the field work, there were rains, hurricane winds, and a sandstorm. Snow fell during the last days of the expedition.

After leaving Tomsk, the expedition reached Achinsk, then traveled on horseback through the villages of Andropovo, Uzhur, and Kopyevo, reaching Lake Shira. The situation with the population in uluses and villages along the route of the expedition was often disastrous. By the summer of 1918, the Soviet power had been overthrown in Siberia. The civil war continued in 1918–1919. By the beginning of 1920, Siberia was almost completely liberated from the Kolchak troops. The Soviet power was restored in the Minusinsk region, but there were still "gangs of rebels against the authorities", who

were engaged in plundering. The region was flooded with military units. In his diary, Fjelstrup wrote: "We ended up in inconvenient time for driving along the highroad; an entire army division is returning from the Minusinsk region. Columns of black dust rush along the road; villages feed everything clean to hungry soldiers; housing is taken by the military units; all carts are busy on assignments. There is no oats and hay; horses are fed with straw…, with great difficulty I got a horse in a cart in the ulus; all carts were taken by the Reds, and other carts were mobilized to transport coal to Ust-Abakan…; boats were taken by the Whites, and the rest were destroyed by the Reds" (Ibid.: fols. 7, 73–74).

Research works were carried out in a very difficult situation. Yet, despite all difficulties, thanks to human and professional qualities, as well as experience in the field, Fjelstrup and his colleagues managed to accomplish a large amount of archaeological and anthropological research, and capture the life of the Khakas people in first post-Revolution years in all its diversity.

The program of ethnographic research was outlined by Fjelstrup on the first pages of his notebook (Fig. 2). It included the following sections: social system, knowledge about man and nature, cosmogonic and astronomical concepts, description of shamanism, etc. He also mentioned the topics studied by S.I. Rudenko (cattle breeding, clothing, leather and bone processing, art, childbirth, burials) and I.M. Zalessky (hunting and fishing). Teploukhov collected information on economic activities, food, housing, games, etc. (Ibid.: NB, fols. 1r–1v).

Throughout June, Fjelstrup and his guides traveled around the uluses of Bolshiye Vorota, Dzheroma, Marchilgas, Malyi Kobezhekov, and Efremkin, the villages of Tyun, Chernov, and others, where he collected rich linguistic, folklore, and ethnographic evidence. Near Efremkin ulus, the members of the expedition examined several caves. Since the beginning of July, near the village of Buzunovo (the former Cossack village) and the ulus of Asochakov (Achanai), excavations of burial mounds were carried out under direction of Rudenko (Fig. 3).

From Asochakov ulus, Rudenko and Fjelstrup went to the headwaters of the Askiz River, and further up the Kamyshta River. In August, the season of sacrifices and weddings began. Scholars attended traditional rituals and collected evidence about shamans, singers, and storytellers in the uluses of Asochakov, Charkov, Tazmin, Ulen, and others. One of their interpreters and guides on the travels along the Beya River was F.Y. Saradzhakov. At the end, he went with the expedition to Tomsk to do the eye surgery (Ibid.: D, fols. 73, 74v.).

As a part of the 1920 expedition program, Teploukhov studied collections in Krasnoyarsk and Minusinsk museums; a microdistrict for systematic excavations was chosen near the village of Baten, on the left bank of the Yenisei River. Since the beginning of September, the expedition members carried out archaeological research in the uluses of Aeshino and Kopyevo, where six burial mounds were excavated.

Historiographers believe that four cemeteries of the Tagar culture, with the total of 15 burial mounds, were excavated under the leadership of Rudenko during the

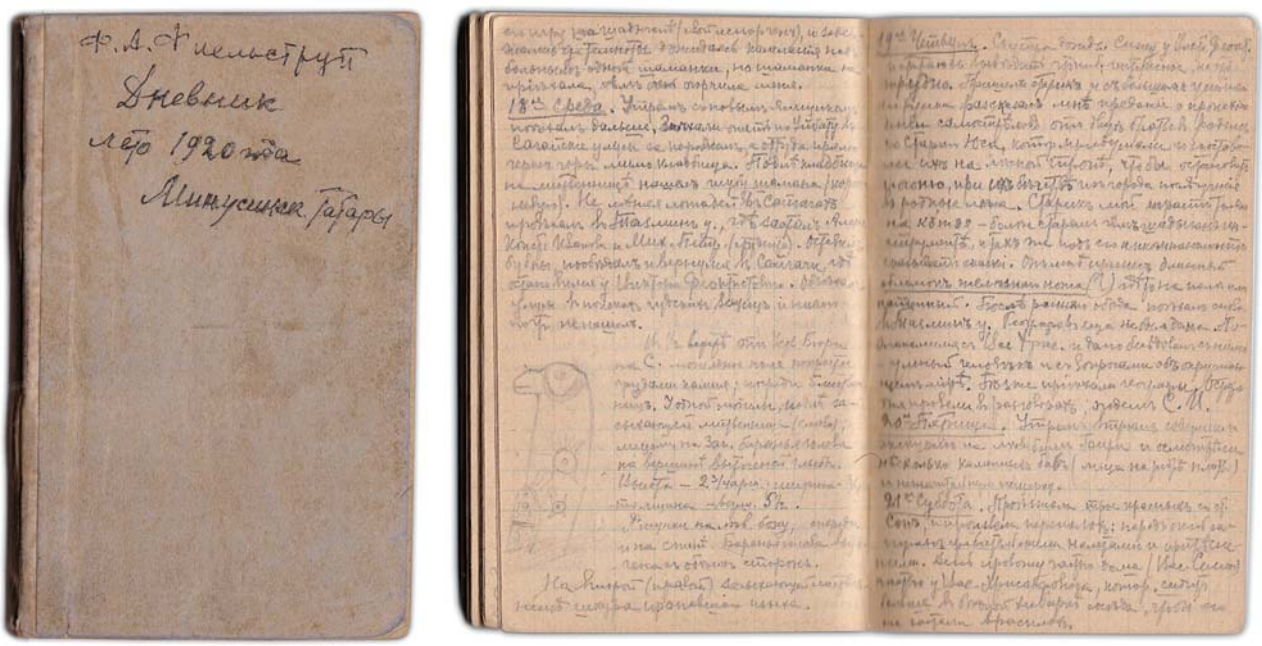

Fig. 2. Cover and pages of the Fjelstrup's diary. Minusinsk-Abakan expedition of 1920. Archive of IEA RAS. F. No. 94.

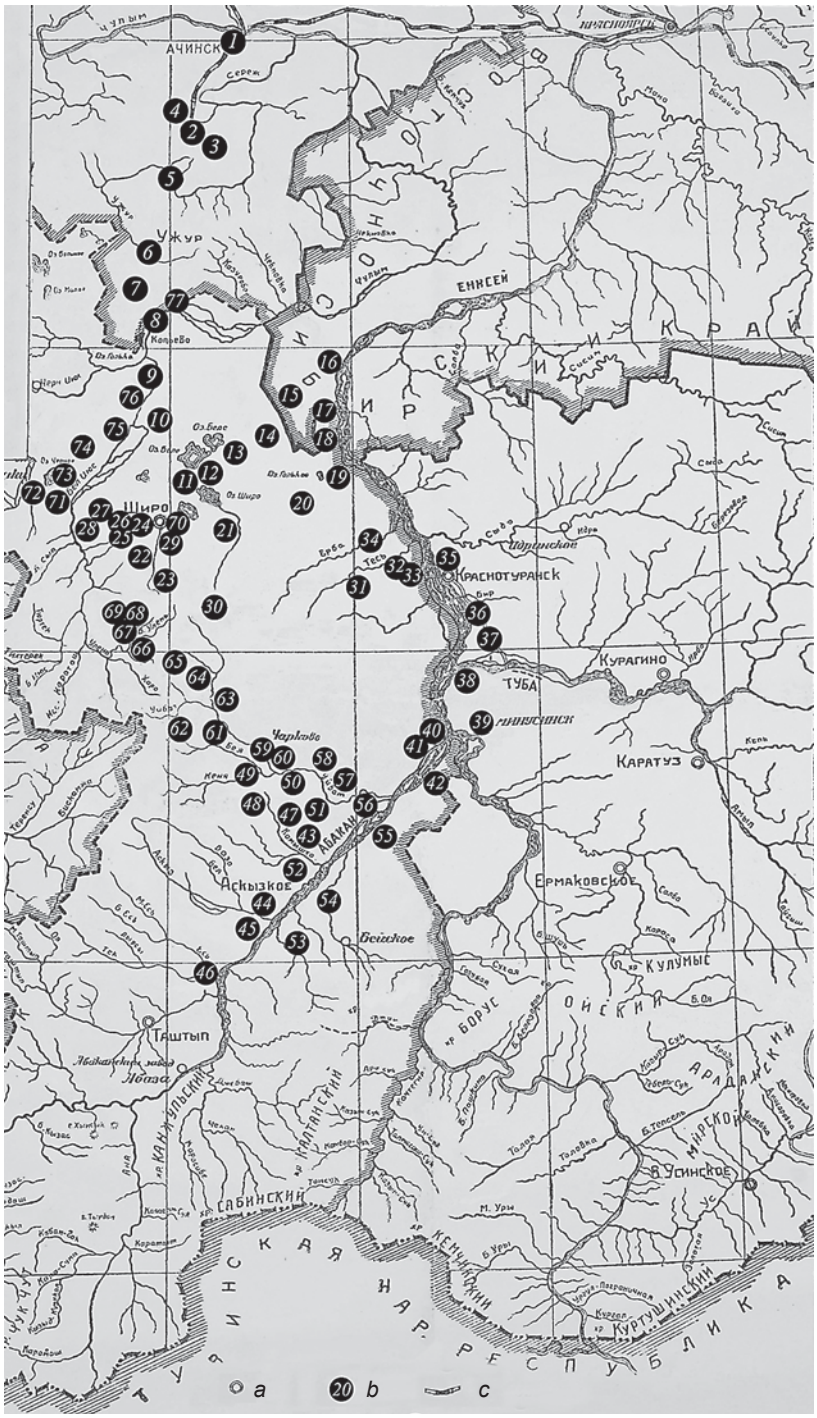

Fig. 3. Area of work of the Minusinsk-Abakan Expedition of 1920. This layout was compiled using the map of Khakassia of the late 1920s–early 1930s by O.A. Mitko.

1 – Achinsk; *2* – Glyaden; *3* – Stepnaya; *4* – Antropovo; *5* – Maryasovo; *6* – Uzhur; *7* – Uchumskaya ekonomiya; *8* – Kopyevo; *9* – Syutik; *10* – Solenoozerskaya (Solyanoi Forpost); *11* – health resort on Lake Shira; *12* – Kolodets; *13* – Bolshiye Vorota; *14* – Idzhim; *15* – Tyup; *16* – Ayoshki; *17* – Chernovo; *18* – Saragash; *19* – Ekonomiya Chetverikova; *20* – Beibulak; *21* – Alekseevskiy Rudnik; *22* – Oroshtaevskiy; *23* – Verkhniy Tuim; *24* – Marchelgash; *25* – Malyi Kobezhekov; *26* – Topanov; *27* – Aeshin; *28* – Efremkin; *29* – Malyi Spirin; *30* – Son; *31* – Potekhino (Bolshaya Erba); *32* – Sukhaya Tes; *33* – Abakano-Perevoz; *34* – Znamenka; *35* – Abakanskoye; *36* – Buzunovo; *37* – Listvyagovo; *38* – Gorodok; *39* – Minusinsk; *40* – Ust-Abakanskoye; *41* – Sapogovskiye Ulusy; *42* – Beloyarskiy; *43* – Ust-Kamyshta; *44* – Askiz; *45* – Asochakov (Achanai); *46* – Ust-Es; *47* – Epishekov; *48* – Sinyavino; *49* – Kolpakov; *50* – Pokoyanov; *51* – Balaganov; *52* – Sarazhakov; *53* – Uty; *54* – Aidolovskiy; *55* – Arshanov; *56* – Kalagashev; *57* – Kapchaly; *58* – Verkhneye Kobelkovo; *59* – Charkov; *60* – Nizhniy Charkov; *61* – Tokamesov; *62* – Maganak; *63* – Ust-Byur; *64* – Sagaichi; *65* – Tazmin; *66* – Bolshoi Ulen; *67* – Malyi Ulen; *68* – Ultugash; *69* – Sichentash; *70* – Kamyshev; *71* – Tarcha; *72* – Chebaki; *73* – Chernoye Ozero; *74* – Zaplot; *75* – Bolshoi Klyuchikov; *76* – Kozhakov; *77* – Torchuzhany.

a – settlements on the basic map; *b* – settlements on the route of the expedition, identified by O.A. Mitko; *c* – railway.

Minusinsk-Abakan Expedition (Rudkovskaya, 2004). At the end of the expedition, the Department of Geography at Tomsk University received eight archaeological collections and anthropological remains—evidence from the excavations. Fjelstrup was in charge of assembling ethnographic collections during the expedition. In Bolshoy Ulen ulus, he acquired a cradle frame, mill, deer pipe, and other things; in Malyi Ulen he procured a copper dagger; in Ulgutas mittens and cradle, etc. At the end of September, the team shipped the equipment and exhibits, and set off on the return journey from Achinsk to Tomsk (Ibid.).

Field materials of F.A. Fjelstrup

Records of Fjelstrup made during the expedition of 1920 were divided into several sections. For the field studies,

he elaborated a sophisticated system for the recording of sounds, using the Latin and Cyrillic scripts, following the methods of his teachers and colleagues, linguists S.E. Malov and S.A. Samoilovich. Fjelstrup recorded his informants "from the voice", capturing both dialect-related and individual features, which made it possible to convey the "actual fluid nature and character of the language" (Malov, Fjelstrup, 1928: 291).

Linguistic evidence included names of seasons of the year, months, time of day, etc.; astronomical, geographical, and meteorological vocabulary; names of body parts, plants, wild and domestic animals, fish, birds, insects, parts of the dwelling, as well as musical instruments and feasts.

Starting with the Minusinsk-Abakan Expedition, Fjelstrup paid great attention to collecting terms. He was one of the first scholars who appreciated the importance of their recording for recreating the dynamic image of culture ("archaeology of culture"), attached exceptional importance to etymology, which not only revealed the nature of things and phenomena, but also fostered building ethnogenetic models, which was particularly interesting for the scholar. He made records among all groups of the Khakas people—the Kacha, Sagai, Beltir, and Kyzyl—which made it possible to conduct further comparative and linguistic studies. In his diary, Fjelstrup described the linguistic situation in the region as a whole. For example, working in Marchelgash ulus, he wrote: "My interlocutors speak Russian rather well… The acclimatization of the Russian language among the local Kacha people quickly advances: they constantly insert Russian words into their speech and replace their own words with Russian words. In several cases, I noticed the loss of consciousness that this word was of Russian origin (for example, *taz*, *kolechko*, etc.) among young people… The assimilated Russian words are, of course, subordinated to the grammatical system of the Tatar language" (Ibid.: D, fol. 57).

Another significant section of evidence included the terms of kinship, names of *sööks* (patrilinear exogamous units), as well as information about *tamgas* and their images. After conversations with informants, Fjelstrup compiled kinship tables. He probably wanted to prepare a summarizing publication on the system of clan structures and relations of the Turkic world, since his manuscripts contained extracts from rare studies of the early 20th century on the Kacha and Beltir people, Chuvashes, Kazan Tatars, Bashkirs, Kazakhs, and Tuvans (Ibid.: FM, fols. 43, 44, 60–61) (Fig. 4).

The Fjelstrup's manuscripts contain records on family rites and customs of avoidance; rituals associated with hearth, setting up the yurt, etc. They include extensive information about settlements, dwellings, household items and utensils of the Khakas people, as well as descriptions of musical instruments, techniques of playing them, and restrictions regarding the performance of music.

Information on the traditional worldview of the Khakas people, represented by shamanic rituals that he attended, very widely appears in the Fjelstrup's holding. In his field studies, the scholar used the already known publications of A.V. Adrianov, D.A. Klements, N.F. Katanov, S.E. Malov, and others (Klements, 1892; Katanov, 1897; Adrianov, 1909; Malov, 1909; and others).

In Efremkin ulus, Fjelstrup recorded a story of the local resident P.F. Kishcheev about the masters of mountains. The old man complained that "people do not believe in God, do not like shamans, do not believe that there are masters of forest, mountains, and water"; people had not been offering sacrifices to the sky for ten years, from which misfortunes came (Ibid.: D, fols. 61–66).

The Khakas people believed that masters of mountains loved fairytales, and in order to win their favor they took fairytale-tellers with them to the hunt. This is reflected in the story told by P.F. Kishcheev: "Once, when he was young, people from different uluses came to a mountain to gather lingonberries; at some distance, they made fires. People were reckless; they laughed, made noise; some were telling fairytales, but many were not listening. But the master often listens to fairytales; if he likes a fairytale and people attentively listen to it, he leaves satisfied, laughs, whistles; he can be heard when he walks—he paces heavily. Thus, he began to bark like a small dog with a thin voice behind the mountain, then whistle sharply, so the ear hurt. And in the morning, two men went crazy, and they had to be tied and taken home. You can rarely see the master. Once Pavel listened to a fairytale somewhere by the fire… When the fairytale was over, the master apparently liked it and left satisfied; it was heard how he was knocking and walking, passing by them. Usually, only a shaman can see the master" (Ibid.: Fols. 62–63). According to P.F. Kishcheev, the mountain people live like ordinary people—they get married and have children; sometimes, they appear among the living. "Masters are not all in one place, but they come every now and then. Sometimes, he even comes to the ulus, enters, drinks a little of wine, and then, as he goes out the door, he puts on the skis and quickly leaves like the wind. They have a house somewhere. There was one hunter (his grandson still lives in Kabezhikova), …he was in the forest, staying there. A girl arrived and asked him to come to help—a woman was trying to give birth the third day, but was not able to—he did not believe, did not go. Then again, already two, this girl and husband of the woman in labor; they were really asking and promising to reward him whatever he wished, just let him help. They looked, as he said, like all people, only was there no hair on the eyebrows. Well, he went, arrived at a rock where the

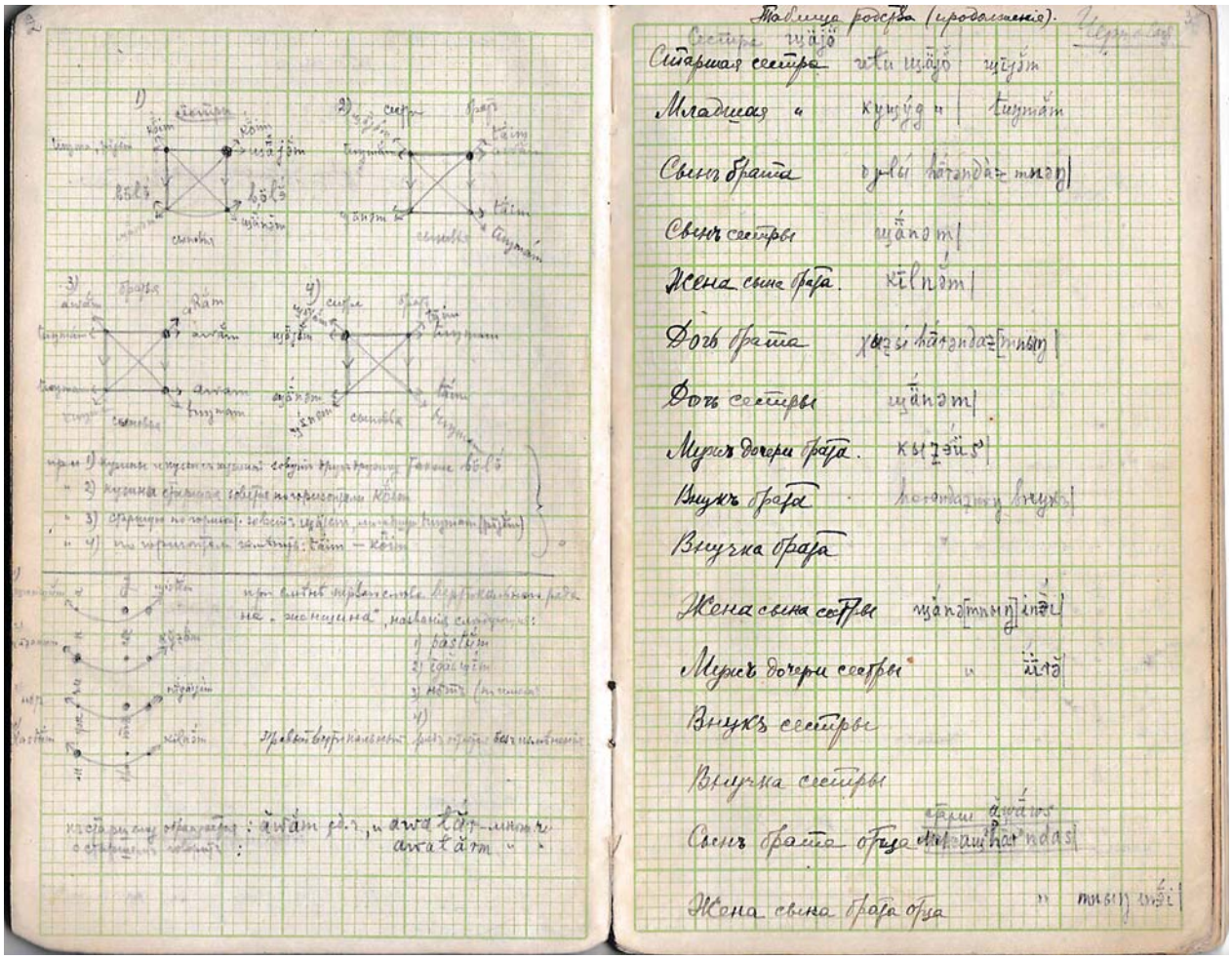

Fig. 4. Pages of the Fjelstrup's notebook, with information on the Khakas kinship system. Archive of IEA RAS. F. No. 94.

entrance was just a crack. They opened it, let him in, one in front, the other behind. Inside, everything was like in a real house, and everything in the world was there. A woman lay there too. He did not know how to help… So, he pressed somewhere, and the woman gave birth, to a boy, I think. Then they said: 'Take whatever you want as a reward'. They led him to the next room (it was light everywhere, as it should be). There was everything whatever one may wish. Gold, silver, furs… But they could not give him anything, because he did not want to take. Some blood got on his clothes. 'Then, they say, here is a reward for you—you will be a great shooter until old age, and you will feed on hunting all your life; you will never starve; you will always find the animal and kill it'… And indeed, he was a great shooter. He was a hundred years old when he killed the last bear. … That's the story, I know myself, but people don't believe that there is God and the masters!" (Ibid.: Fols. 64–66).

Contrary to skepticism of the informant, according to the Fjelstrup's observations, the Khakas people regularly revered mountains and their masters. In the Askiz area, the expedition members saw an altar *yzykh-taikh*; near Epizhekov ulus, they observed the sacrifice to the "stone woman" (transported to the Minusinsk Museum); in August, the team was planning to attend four local *taikhs*.

Evidence on shamanism occupies a large part of the Fjelstrup's records. He described the rituals of the Sagai shamans, including the "foot shaman", who did not have a tambourine, perceived as a riding animal. The Khakas people called the shamans who had the outfit and tambourine "horsemen". Despite the fact that the sacred attributes were the taboo in the traditional culture of Khakas people, Fjelstrup, according to his own words, easily found tambourines and clothing of the deceased shamans, using the help of his guides (Ibid.: Fols. 73v, 76v–77v).

On the pages of his notebook, Fjelstrup described in detail the healing session of a child by a Sagai female shaman. The rite lasted all night, and was preceded by long preparations. After fortunetelling on a cup, the shaman found out what things she needed. For performing the rite, a lasso was stretched on the left of

the door, on which nine clothes turned inside out were hung. These were intended for the spirits that inflicted the disease. Two birch branches used for cleansing were placed nearby. A ram was slaughtered; its head, heart, and liver, right shoulder blade, and ribs were boiled. Next to the clothes, the shaman put a table covered with a ram skin, then poured araka in nine bottles, and set them there. She laid out the cooked meat into three wooden troughs, and put two of them on the table. For sprinkling ("*sökenye*"), wild thyme grass was brewed, and milk was boiled. Before the session, the fur coat and tambourine were sprinkled with araka. The owner of the yurt (the husband of the shaman) walked around the yurt and thurified everything with wild thyme. First, the shaman treated the child with "spells and sweeping with the old *lopot*", that is worn clothes.

Fjelstrup observed the rite and noted that its participants were not allowed to sleep; otherwise, it would be difficult for the shaman to perform the ritual; people staring also disturbed her. At times, those who were present helped the shaman by repeating her exclamations over the patient. Those who entered the yurt later were also fumigated with wild thyme. Describing the rite, Fjelstrup paid attention to the local features: "The Kacha shamans perform rituals only at night, while the Sagai shamans at any time" (Ibid.: FM, fols. 1, 4v).

In 1920, Fjelstrup described four shamanic tambourines in detail. One of them, according to the instructions received by shaman in a dream, was covered by drawings: "8 red helpers and 1 senior helper with a bow, 1 rider with an extra horse; a frog, a snake, and a dog – with red paint, and a white birch on the right – below". At the top, there were images of "a red sun, a white crescent moon, 2 red eagles, 2 white eagle owls, a red fir tree, and a white izykh". The scholar described the clothes and headwear of the shaman, and found out that he was made to perform the ritual by "black people"—helpers of his predecessor; they also "gave him words" (Ibid.: NB, fols. 100–101; FM, fols. 1– 2v).

According to the Fjelstrup's informants, "black people" also sent the diseases to a person by the wind. It is known that the element of the wind, according to the Khakas people, was associated with spirits; black color served as a distinctive feature of the underworld (Burnakov, 2008: 614).

"Black people" were mentioned in the Fjelstrup's records about the fortuneteller on a shoulder blade: "They [the so-called black people – *the Authors*] led him into the hut, where white (not burnt) and black (burnt) ram shoulder blades hang on the walls on the right and left, and told him to make a fortunetelling. He refused to tell fortunes on white shoulder blades, because they were dazzlingly bright and he could not look at them. Two patients lay in front of him: one was ill for a long time, and the other became ill very recently. He began to tell fortunes on the burnt shoulder blades and saw that the person who was sick for a long time was destined to recover, while the other person was destined to die. 'Black people' taught him the incantations and methods of fortune telling. The shaman whom he asked for interpretation of the dream told him that he should become a fortuneteller" (Ibid.: FM, fol. 3) (Fig. 5).

The story of the transformation of shamans into eagle owls was recorded by Fjelstrup from the Kacha people: "Sometimes, late travelers meet an eagle owl on the road. If this eagle owl is a shape-shifting shaman, then, seeing a

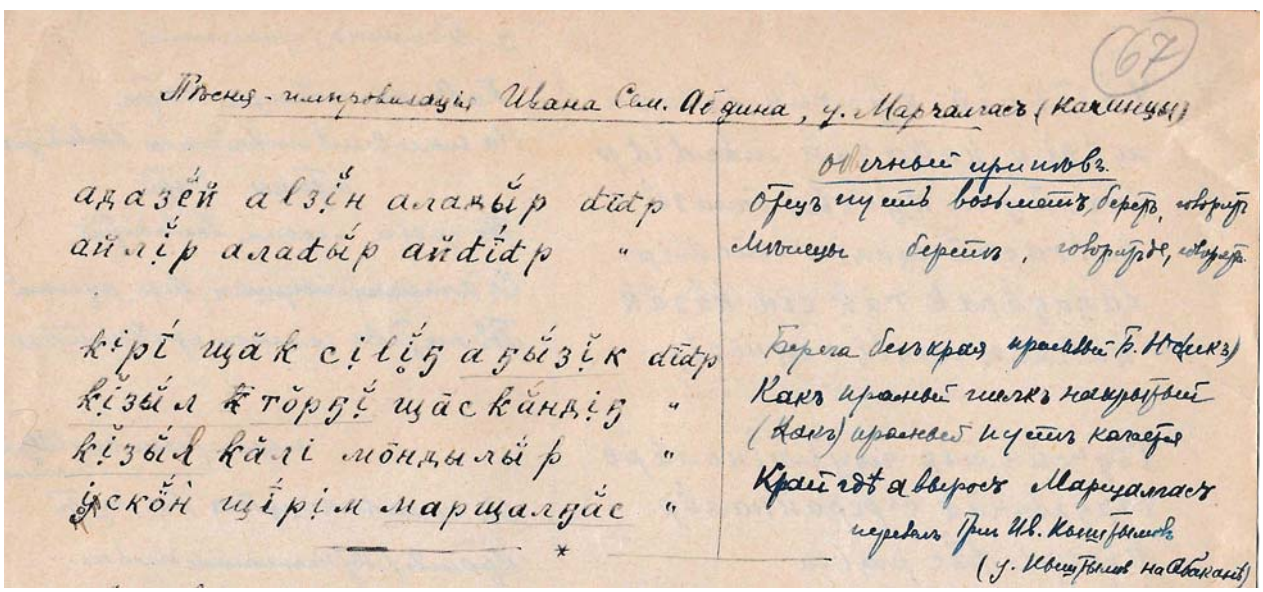

Fig. 5. Pages of the Fjelstrup's field records with folklore records. Archive of IEA RAS. F. No. 94.

man, he will shake and make sounds similar to tambourine clinking. To prevent harm, the traveler throws him cereals or something from his supplies. If one shoots such an eagle owl, the shaman performing the ritual at that same time would immediately die" (Ibid.: Fol. 1).

Judging by numerous extracts from literature and museum inventories, Fjelstrup thoroughly studied the topic of *töses*—anthropomorphic and zoomorphic images of family and clan patrons and helpers of shamans. He himself also described several of such images. One of them—"tileg tös" (the patron of livestock, keeper of ayran and dairy products)—he saw among the Sagai people: "tilég-tös is a short wooden fork on a very long stem. The ends of the fork are connected across by a band made of goat skin. From this band, the following ends are hanging: small blue and larger green scraps, and fringe in almost a quarter made of woolen yarn twisted in two threads of gray and brown wool"; it is kept on the female half of the house, behind the dishes. Fjelstrup also recorded: "altynnik-tös" (altyn tös) – the golden *tös*, and two "aba tös" – bear *töses*. Each of them looked like "a piece of skin from the head of a bay horse, with tendon" and was stored in the corner, to the left of the door (Ibid.: Fols. 5v, 7).

Noteworthy are two *töses* that Fjelstrup called "ōdinäzy". One of them was "a rectangle of canvas measuring ca 4 × 6 vershoks, with traces of red lines from the drawing… splattered with sacrifices. A red scrap was tied to the left corner, and a strand of combed tendons was next to it. In the middle, three pieces of otter skin were sewn in a row, at some distance from each other". The other *tös* had a drawing, which did not survive on the first one: "red drawing on white canvas: three people stand in a row, with a tree having its roots up and a tree having its roots down on the right and left sides from them; above the trees, there are the crescent moon and the sun; the drawing is framed by a zigzag. A wooden ring, implying shaman's tambourine, is sewn to the sun; under it, there is a strand of combed tendon (not a sheep's). A scrap of red fabric is tied to the right corner of the canvas. Otter skins are between the sun and the moon" (Ibid.: Fol. 5v). Judging by modern research, this was *chalbakh tös*—one of the most revered *töses* among the Khakas people (Burnakov, 2020: 48).

Three of the *töses* described by Fjelstrup ("korshä", "kinen," and "kuryon-yzykh") were tied to *yzykhs*—sacred horses that, according to the beliefs of the Khakas people, served as riding animals for the spirits (Burnakov, 2010). *Korshä* was an autumn squirrel skin, a gray *yzykh* horse was dedicated to it; *kinen* was in the form of sable skin, a chestnut *yzykh* was dedicated to it (Ibid.: Fol. 7). *Kinen tös* is well known to modern scholars (Butanaev, 1986: 89–107; Burnakov, 2020: 93–96). *Korshä tös* (in the description of Fjelstrup) could have been *khorcha tös*—the celestial fetish, patron of gray horse-*yzykh*, according to V.Y. Butanaev. However, according to the description made in the 1990s, it was very different from that given by Fjelstrup. Butanaev supposed that *khorcha tös* was a birch fork with a "face" from a scrap of golden brocade, with "eyes" made of blue beads, and grouse wings (1999: 191).

Kuryon-yzykh as a *tös* has not been described in the literature. Its name comes from the word "kÿren" ('brown/dark reddish'), because the *yzykh* of brown color was dedicated to it. Kuryon-izyk, according to Fjelstrup, was "the old shirt of the owner, to which a red scrap was sewn on the right side, 2 pieces of otter skin, a gold thread, a strand of tendon, and an iron wedding ring covered with sheet copper (substituting the tambourine?)" (Ibid.: Fol. 7).

While recording information about *töses* and *yzykhs*, Fjelstrup paid attention to the related rites: "Izykh is kept for 9 years (3 × 3)*. On the third taik (in the 9th year), new töses are brought, together with candidate-colts"; old *töses* are not let down on the river on the raft, but "people take them to the taiga and hung them on the birch, tying them tightly so they don't fall down. …If izykh dies, people tear off the skin from it (and take it for themselves), and hang the head and legs on the birch. The new izykh is then washed at home, without shaman; old töses remain until the expiration of their term. While washing the izykh, special dishes are used"; izykh "cannot be harnessed, and a woman should not come close to it; only the owner can use it and only for riding. Izykh at the taik is tied to a birch…, in the case of change, along with the candidate. After the taik, after washing a new izykh… they release it into the wild. People also keep izykhs at home. These are dedicated during going to pastures in the spring, are sprinkled with araka, washed with milk, and released into the wild" (Ibid.: Fols. 6r–6v).

When describing the location of *töses* in the yurt, Fjelstrup always mentioned their position in relation to the "icon wall"; he also noted that the Khakas people "while entering the yurt, always make the sign of the cross (even when they are completely drunk), and then make a greeting" (Ibid.: D, fol. 54). It is known that by the early 20th century, most of the Khakas people were baptized in Orthodoxy, which probably had a "ritualistic" nature. In Asochakov ulus, Fjelstrup was shown a gold-laced caftan sent from the Imperial Court to clan chief Apak for the baptism of three thousand of indigenous persons on one day in 1877, as evidenced by the corresponding letter** (Ibid.: Fol. 75).

*In the traditional Khakas culture, sacrificial rituals dedicated to the sky and powers of nature were usually carried out once every three years.

**According to Y.A. Shibaeva, mass baptism of the Khakas people occurred in 1876; for more details, see (Shibaeva, 1979: 182).

Observing and describing everyday and ritual practices of the Khakas people, Fjelstrup mentioned the phenomenon of dual faith, although he did not investigate it on purpose. For example, in one of localities on the Tuim River, he saw a larch that was charred at the base from bonfires; a pelvic bone of an animal (evidence of sacrifice) hung on the branches of the tree; and a large Orthodox cross was carved on the trunk (Ibid.: Fol. 51). Many decades later, this syncretism of the beliefs and rituals of the Khakas became the subject of research by ethnologists and religion scholars.

Conclusions

F.A. Fjelstrup intended to continue the systematic study of beliefs and culture of the Khakas people, initiated by the Minusinsk-Abakan 1920 Expedition, next year, but the situation changed. When the Soviet power in Siberia returned, the work of the Institute for the Study of Siberia was aborted, and it was closed on July 1, 1920 by the order of the Siberian Revolutionary Committee (Zhurnaly zasedaniy…, 2008). The persecution of university professors who collaborated with the Kolchak government began. In 1921, Fjelstrup returned to Petrograd together with Rudenko and Teploukhov. Their further work was associated with the Russian Museum, Academy of the History of Material Culture, and Petrograd University. Gryaznov (a student of Teploukhov) transferred to Petrograd University (Karmysheva, 2002; Pshenichnaya, Bokovenko, 2002: 20; Kiryushin, Tishkin, Shmidt, 2004).

Although the ethnographic studies initiated in 1920 were discontinued, the findings of the integrated Minusinsk-Abakan Expedition were of great importance. The observations of Rudenko and Fjelstrup—members of the Commission for Studying the Tribal Composition of the Population of Russia—were apparently taken into consideration during ethnic-territorial zonation of the Yenisei region. In 1923, the Khakas Ethnic Uyezd, which later became okrug and then autonomous region, was created in the area where the community accepting the name of "Khakas people" lived (Efremova, 1972).

The results of the expedition were used by its participants in preparing summarizing publications. Using the evidence collected, Teploukhov developed the chronology of archaeological cultures of the Khakas-Minusinsk Basin, which corresponded to evolutionary-paleoethnological concepts followed by the author and his colleagues. In line with the same concepts, Fjelstrup wrote articles describing wedding dwellings and dairy products; he published folklore texts in collaboration with Malov (Kitova, 2010; Fjelstrup, 1926, 1930; Malov, Fjelstrup, 1928).

The research carried out by Fjelstrup was aimed at identifying ethnogenetic, historical, and cultural patterns in the development of the Turkic peoples of Siberia and Central Asia. Since 1921, being an employee of the Russian Museum, he Fjelstrup has made a number of expeditions to Central Asia and Kazakhstan (Karmysheva, 1988). He analyzed new field evidence focusing on comparative analysis of cultures and languages of the Khakas people, Kyrgyz people, Kazakhs, Crimean Tatars, and Nogais, which resulted in some prospects of further studies of the Turkic population living in Central Asia. Unfortunately, these plans were not destined to be fulfilled, since repressions began in the country. In 1930, Rudenko, in 1933, Gryaznov, Teploukhov, Fjelstrup, and others were arrested on false charges. After exile and forced labor camps, Rudenko and Gryaznov returned to scholarly work; Teploukhov and Fjelstrup died in prison; Zalessky and Ivanov were executed (Karmysheva, 2002; Professora Tomskogo universiteta…, 2003). Archives preserved the results of their work, which show the capacities of the scholars and opportunities given by the integrated approach to archaeological and ethnographic studies practiced in Russia in the early 20th century.

The Fjelstrup's manuscripts of 1920s reflect the state of Russian Turkic Studies of his time and marked the directions for future research. The topics addressed in them became analyzed only many decades later. Systematic study of the traditional worldview of the Turkic peoples of Siberia has began since the 1960s. In the 1970s, Y.A. Shibaeva studied religious syncretism; comprehensive works of M.S. Usmanova, V.Y. Butanaev, and V.A. Burnakov on shamanism and mythological worldview of the Khakas people were published in the 2000s (Usmanova, 1982; Butanaev, 1986, 2006; Burnakov, 2006, 2010, 2020; and others). Since the 1990s, the academic series "Folklore Heritage of the Peoples of Siberia and the Far East" has been published under the auspices of the Siberian Branch of the Russian Academy of Sciences. Several volumes of the series contain the Khakas epic and fairytale tradition. In 1999, the Khakas-Russian Historical and Ethnographic Dictionary, prepared by V.Y. Butanaev, was published (1999). In 2006, in the series "Peoples and Cultures", the volume "Turkic Peoples of Siberia" came out, which comprehensively described the Turkic indigenous communities of the Altai-Sayan region, including the Khakas people (Tyurkskiye narody Sibiri, 2006).

Much of what Fjelstrup planned in the 1920s has become a part of modern ethnography and ethnology. But comparative historical studies of the Turkic communities of Central Asia, viewed through the dynamics of their development from antiquity to modernity, using linguistics, ethnography, anthropology, and archaeology, have remained relevant until today. A comprehensive integrated approach, which was elaborated by Russian Turkologists in the early 20th century, retained its

importance and still determines the prospects of cultural, historical, and ethnogenetic studies of Central Asia.

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A Metric Analysis of a Human Cranium from the Khatystyr Cave, Republic of Sakha (Yakutia)

We present the results of a metric study of a male Early Holocene cranium found in a cave near the Khatystyr village, Yakutia, in 1962. Eight measurements taken on the specimen were subjected to canonical discriminant analysis, using individual data on 14 ancient samples from Siberia and the Far East. Euclidean distances between these samples were calculated, and k-means clustering was performed. Results revealed similarity of the Khatystyr individual with Serovo crania from Cis-Baikal and with the Neolithic series from the Baraba forest-steppe. This suggests that the Khatystyr

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male is closely related to the earliest Upper Paleolithic populations of North Asia. A related component, assimilated by members of later migration waves, was also detected in other Northeast Asia territories, including Sakhalin, but is absent in the Neolithic samples from Primorye, in the Old Koryak and Old Bering Sea samples. Comparison with the Late Neolithic Ymyyakhtakh sample from Diring-Yuryakh, Yakutia, reveals no continuity between Early and Middle Holocene groups of that region. The Diring-Yuryakh sample shares no similarity with any other group, and likely represents an isolate.

Keywords: *Early Holocene, Yakutia, craniometry, peopling of Northern Eurasia, paleogenetics, Khatystyr.*

Introduction

Early Holocene human skeletal remains are rare in North Eurasia; thus, each specimen becomes the focus of close attention of archaeologists and anthropologists. This article outlines the first results of the study of a specimen discovered in 1962 by a foreman of the Aldan timber industry enterprise A. Ivanov in a cave near the Khatystyr village in the Aldansky District of the Republic of Sakha (Yakutia). The cave is located at the right bank of the Aldan River, two kilometers from the village (58°55′07″ N, 125°10′25″ E; Fig. 1). This is a lime cavern, which emerged in a deep crack. The skeleton was found on the cave floor near the entrance, by the wall. Traces of a campfire were detected nearby, while an assemblage of bear, wolf, and fox bones were found in the depth of the cave (Rusanov, 1976: 127). Some bones were later determined by G.G. Boeskorov as belonging to the brown bear *Ursus arctos* L. and domestic dog *Canis familiaris* L.

The original study of the skeleton was carried out by criminal investigation officers and, by their request, by B.S. Rusanov, a geologist. Later, the cave and skeleton were examined by archaeologists Y.A. Mochanov and S.A. Fedoseeva, who recognized the remains as modern. The study of the skeleton was ceased, and it was transferred to the Geological Museum of the Yakutian Branch of the USSR Academy of Sciences (now Geological Museum of the Diamond and Precious Metal Geology Institute (GM DPMGI) of the SB RAS). However, some of the bones were kept by Rusanov for radiocarbon dating, which was carried out in 1970s. The remains were dated to 9800 years BP; thus, it became the most ancient human skeleton not only from Yakutia but from the whole Eastern Siberia at the time. Unfortunately, those results were only presented in a popular science publication (Ibid.: 128) and were not noticed by researchers.

In 2017, a fragment of the Khatystyr skull, together with some other human and animal samples from the GM DPMGI collection, was transferred to the Institute of Accelerator Analysis Ltd. (Japan) for accelerator mass spectrometry radiocarbon dating, which revealed a date of 9010 ± 30 BP (Table 1). The calibrated calendar interval of the date fits into a relatively narrow chronological period from 8291 to 8206 BC (94.4 %), with a range of ±2σ (95.4 %) 8291–8022 BC (OxCal 4.4). Four additional radiocarbon dates were obtained in the same laboratory for the animal bones found in the cave (Table 1): they all fall into the "calendar" interval between 10.2 and 9.5 ka BP, which corresponds to the early period of the Sumnagin Mesolithic culture, dated to 9400–5900 BP (10,700–6800 cal BP) (Istoriya Yakutii, 2020: 478). These results have confirmed the ancient age of the Khatystyr skeleton and the relevance of a further study.

Material and methods

The Khatystyr individual was determined as male based on the depth of the greater sciatic notch and the overall shape of the pelvic bone. The probable age-at-death of the individual was 35–45 years, judging by the features of the pelvic auricular surface, pubic

Fig. 1. Location of the burial near the Khatystyr village.

symphysis, cranial suture obliteration, and attrition of mandibular teeth.

The cranial remains include damaged bones of the cranial vault and mandible (Fig. 2). The poor preservation of the skull (absence of the base and facial skeleton) has limited the number of cranial measurements to only 10 variables (Table 2). The measurements were taken according to the standard protocol by R. Martin, modified by V.P. Alekseev and G.F. Debets (1964). Eight of those dimensions were then employed in intergroup comparisons carried out via several statistical methods. The first stage of the analysis was a canonical discriminant analysis aimed at the reconstruction of the main trends of the population dynamics in Siberia and the Far East, and the position of the Khatystyr individual in respect to these trends. Then, Euclidean distances between the skull from Khatystyr and the reference samples were calculated using the averaged values of several top canonical vectors (CV) of the analysis. The matrix of the Euclidean distances was clustered using the generalized k-means algorithm in the Generalized EM and k-Means Clustering Analysis module (Generalized EM…, (s.a.)). The use of CV coordinates in the cluster analysis instead of the raw variable values was important to achieve two aims. First, the ratio of both intra- and intergroup variability was accounted for when classifying the groups. Second, the influence of random fluctuations of the values of the cranial dimensions on the results was minimized via the exclusion of the minor CVs (mainly dependent on stochastic variation) from the calculations.

Table 1. **Radiocarbon dates for the human skull and animal bones from Khatystyr Cave**

Lab code	Material of the specimen	$\delta^{13}C$, ‰ (mass.)	$\delta^{15}N$, ‰ (mass.)	$\delta^{13}C$, ‰ (AMS)	Data with correction $\delta^{13}C$	
					^{14}C-date, BP	% of modern collagene
IAAA-170069	Human skull	–20.0	11.3	23.00 ± 0.17	9010 ± 30	32.58 ± 0.14
IAAA-183037	Brown bear femur	–18.3	6.12	17.79 ± 0.19	8560 ± 30	34.43 ± 0.15
IAAA-183038	Brown bear humerus	–18.7	5.83	18.30 ± 0.18	8660 ± 30	34.03 ± 0.14
IAAA-183039	Dog skull	–20.4	8.37	20.73 ± 0.18	8980 ± 30	32.68 ± 0.14
IAAA-183040	Dog femur	–19.6	7.73	18.75 ± 0.16	8790 ± 30	33.46 ± 0.14

Fig. 2. Human skull and mandible from Khatystyr.

Table 2. **Craniometric variables of the skull from Khatystyr and reference samples**

Sample	1. Cranial length	9. Minimum frontal breadth	SubNB : 9. Frontal bone subtense (transverse)	10. Maximum frontal breadth	29. Frontal chord	SubNB : 29. Frontal bone subtense (sagittal)	26. Frontal arc	30. Parietal chord	27. Parietal arc	12. Occipital width	Source
Khatystyr	185	88	15.5	113	110	22.5	123	112	125	114	Present study
Glazkovo culture (Fofanovo, Educhanka, Makarovo, Obkhoi)	189.6 (5)	90.04 (5)	14.44 (5)	118.4 (5)	115.12 (5)	24.58 (6)	126.6 (5)	111.2 (5)	122.6 (5)	…	Authors' unpublished data
Serovo culture (Verkholensky, Manzurka, Khunzhir-Olkhon)	186.5 (12)	93.8 (12)	18 (12)	119.67 (12)	110.625 (12)	25.08 (12)	124.83 (12)	113.27 (12)	125.33 (12)	…	"
Boismana culture (Boismana-2)	179.5 (2)	91 (2)	…	110 (1)	114.75 (2)	21.95 (2)	126 (2)	103 (2)	116.5 (2)	109.5 (2)	(Popov, Chikisheva, Shpakova, 1997)
Yankovskaya culture (Cherepakha-13)	177.5 (2)	93 (2)	…	116 (2)	111.85 (2)	24.85 (2)	126 (2)	107.25 (2)	118.5 (2)	108 (2)	(Gromov, Zubova, Moiseyev, 2017)
Old Koryak culture (Cape Bratyev)	177.17 (6)	95.67 (6)	…	119.2 (5)	111.33 (6)	25.55 (6)	130.33 (6)	107.2 (6)	120.83 (6)	111.33 (6)	(Moiseyev et al., 2021)
Ymyyakhtakh culture (Diring-Yuryakh)	187.2 (5)	99.4 (5)	20.3 (4)	122 (5)	121.4 (5)	27.86 (5)	137.2 (5)	99.3 (5)	106.8 (5)	120.2 (5)	(Gokhman, Tomtosova, 1992) and the authors' unpublished data
Susuya culture (Susuya)	185.5 (2)	92 (2)	…	110 (2)	112.4 (2)	23.65 (2)	125 (2)	108.5 (2)	122.25 (2)	…	Authors' unpublished data
Okhotsk culture (Moyoro, Khamanaka, Omisaki, Rebun, Shari-Utoro)	184.175 (39)	93.82 (39)	…	116.24 (39)	114.04 (39)	25.87 (40)	128.93 (39)	109.68(39)	123.23(39)	…	"
Mohe (Shapka, Troitsky)	183.92 (12)	91.46 (11)	16.44 (11)	116.4 (5)	114.22 (11)	23.44 (10)	128.45 (11)	106.62 (12)	120.25 (12)	…	(Chikisheva, Nesterov, 2000) and the authors' unpublished data
Jōmon (composite sample from 15 cemeteries on the Hokkaido Island)	179.38 (25)	96.44 (25)	…	116.7 (22)	106.55 (25)	23.54 (25)	123.77 (25)	116.12 (25)	130.54 (25)	…	Authors' unpublished data
Epi-Jōmon (Usu-Moshi, Rebun, Onkoromanai)	184.4 (5)	99.26 (5)	…	119.4 (5)	105.82 (5)	26 (5)	125.4 (5)	113.8 (5)	126 (5)	…	"
Old Bering Sea culture (Uelen)	187.82 (17)	96.67 (17)	…	113.92 (17)	113.5 (17)	26.08 (15)	129.25 (17)	111.56 (17)	125.125 (17)	…	(Debets, 1975)
Neolithic of the Baraba forest-steppe (Protoka, Vengerovo-2)	182.125 (8)	93.51 (8)	…	116.38 (8)	107.9 (8)	21.5 (8)	121.38 (8)	110.29(8)	124.25 (8)	…	(Chikisheva, 2012; Zubova, Pozdnyakov, Chikisheva, 2013)
Neolithic – Chalcolithic of the Altai (Solontsy-5, Vaskovo-4)	188.75 (4)	94.9 (4)	…	120 (4)	116.28 (4)	23.78 (4)	126.25 (4)	111 (4)	118.25 (4)	…	(Chikisheva, 2012)

All the analyses were carried out in Statistica for Windows v. 8.0. Individual measurements of the skulls from 14 male samples from Siberia, the Russian Far East, and Japanese Archipelago were employed as reference (Table 2). As values of some variables were missing in the original publications, necessary additional measurements were obtained when possible.

Results

Morphological description of the skull. The poor preservation of the specimen precludes a complete craniologic description of the skull. The skull vault is relatively long: maximum length is on the borderline between medium and large values (Alekseev, Debets, 1964: Tab. 6). The frontal bone is convex, very narrow at the narrowest point, and narrow at the coronal suture. The temporal bones are of medium length and moderately curved in the sagittal plane.

Canonical discriminant analysis. The first two CVs account for 66 % of the total variance (Table 3). The first CV differentiates the samples with long frontal arches and chords but short temporal arches and chords (negative values of the vector) from groups displaying an opposite combination (positive values). The sample from Diring-Yuryakh occupies the negative "pole", while the area of positive values is occupied by the ancient groups of the Japanese Archipelago. Notably, Diring-Yuryakh, unlike the Japanese samples, displays an isolated position. The Khatystyr skull is found close to zero of CV I (Fig. 3).

The second CV (18 % of the total variance) is mainly associated with minimum width of the frontal bone. The Diring-Yuryakh sample exhibits the widest (positive extremity), and the Khatystyr individual the narrowest (negative) frontal bone. The latter is similar to the individuals of the Glazkovo and Serovo cultures of Cis-Baikal, as well as to the Neolithic population of the Baraba forest-steppe. Similarly to CV I, the Diring-Yuryakh sample occupy an outlying position: the gap between it and the closest group, Old Koryak, is 27 % of the total range of CV II values.

The Khatystyr specimen, displaying an extremely narrow frontal bone, created one of the poles of CV II; thus, an important question arose of how much the morphological trend described by the vector depended on the unusual features of this single individual. In order to assess this, an additional analysis omitting Khatystyr was performed. The results presented in Table 3 show that the proportion of the total variance described by the first three top vectors, as well as the correlations between the raw measurements and CVs, have changed only slightly, and minimum frontal breadth remains the "leading" variable for CV II. Thus, even if the extremely small width of the frontal bone is an individual feature of the Khatystyr skull, this fact does not substantially affect the intergroup correlations between the cranial metric variables.

The analysis was repeated after the exclusion of the two clearly outlying groups, i.e. Diring-Yuryakh and the series from Japanese Archipelago. The distribution of the groups residing in the morphospace of the first two CVs broadly corresponds to their geographic localization (Fig. 4). The only Arctic sample from Uelen is separated from the others by extremely high positive values of CV I. The gap between the Uelen to the closest group of the Okhotsk culture constitutes

Table 3. **Correlation coefficients between the original craniometric variables and the top three canonincal vectors**

Variable	With Khatystyr			Without Khatystyr		
	CV I	CV II	CV III	CV I	CV II	CV III
1. Cranial length	**–0.394**	–0.177	**0.490**	**–0.393**	–0.186	**–0.499**
9. Minimum frontal breadth	0.227	**0.643**	–0.020	0.222	**0.597**	0.034
10. Maximum frontal breadth	–0.087	0.048	**–0.318**	–0.091	–0.029	0.314
SubNB : 29. Frontal bone subtense (sagittal)	–0.322	**0.421**	**0.434**	–0.330	**0.383**	**–0.429**
29. Frontal chord	**–0.820**	0.158	0.163	**–0.822**	0.139	–0.161
26. Frontal arc	**–0.436**	**0.445**	0.091	–0.441	**0.428**	–0.080
30. Parietal chord	**0.665**	–0.240	0.252	**0.666**	–0.252	–0.260
27. Parietal arc	**0.711**	–0.235	0.281	**0.713**	–0.235	–0.287
Total variance explained, %	48.0	17.9	14.8	49.0	16.6	15.1

Note. The coefficients significant at $p < 0.05$ are given in bold.

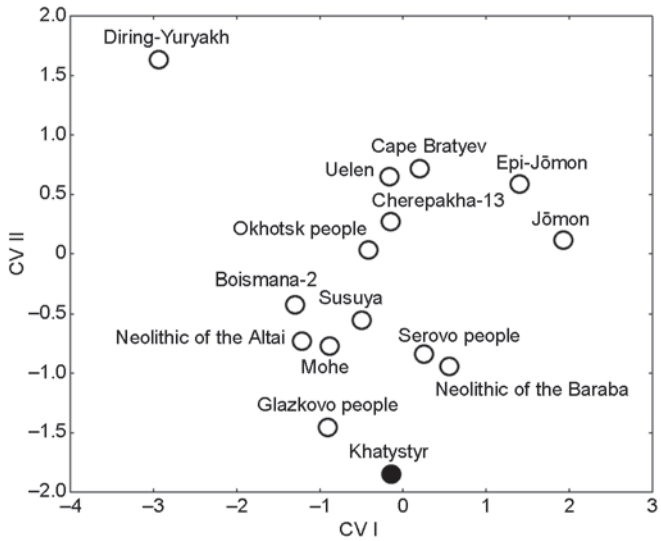

Fig. 3. Canonical discriminant analysis of the skull from Khatystyr and 14 reference samples (CV I and CV II).

39 % of the total variability of CV I. The negative pole of the vector is determined by the Neolithic populations of the Baraba forest-steppe, Altai foothills, and Khatystyr. These specimens display convex frontal bones, small values of the minimum frontal breadth, but large values of maximum frontal breadth (Table 4).

The positive extreme of CV II is occupied by the Boismana-2 sample, alongside with the mainland groups of the Russian Far East: Mohe, Old Koryak, and Yankovskaya cultures. These samples exhibit a combination of a large cranial length and sagittally elongated temporal bones. The opposite combination is observed in Cis-Baikal groups of the Serovo and Glazkovo cultures at the negative pole of the vector.

As compared to the previous analysis, the skull from Khatystyr demonstrates even closer similarity to the populations of the Baraba forest-steppe, Altai, and Cis-Baikal in the morphospace of the first two CVs (Fig. 4).

Euclidean matrix and cluster analysis. A matrix of Euclidean distances between the Khatystyr individual and reference groups was calculated using the sample means of the top three

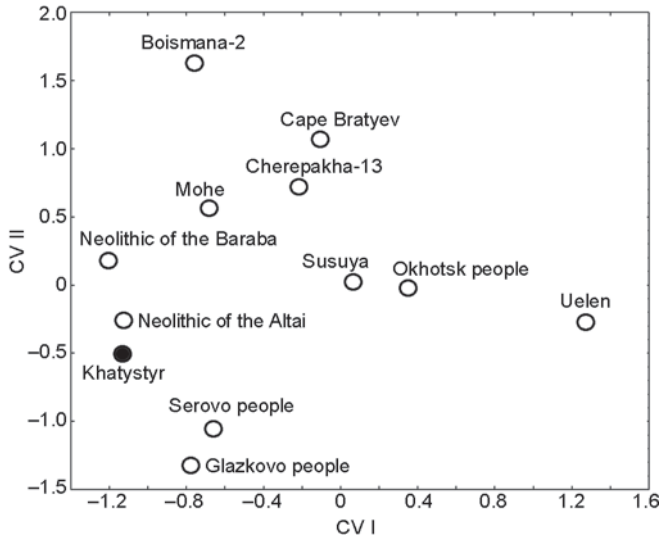

Fig. 4. Canonical discriminant analysis of the skull from Khatystyr and 11 reference samples (CV I and CV II).

Table 4. **Correlation coefficients between the original craniometric variables and the top three canonical vectors: the samples from Diring-Yuryakh and the Japanese Archipelago excluded**

Variable	CVI	CVII	CVIII
1. Cranial length	0.084	**0.748**	–0.355
9. Minimum frontal breadth	**0.421**	0.043	**0.311**
10. Maximum frontal breadth	**–0.320**	**0.305**	0.100
SubNB : 29. Subtense of the frontal bone (sagittal)	0.522	0.261	–0.134
29. Frontal chord	0.170	0.067	**–0.751**
26. Frontal arc	**0.326**	–0.149	–0.210
30. Parietal chord	0.013	**0.571**	**0.338**
27. Parietal arc	0.113	**0.326**	**0.417**
Total variance explained, %	0.370	0.226	0.157

Note. The coefficients significant at $p < 0.05$ are given in bold.

Table 5. **Euclidean distance matrix between Khatystyr and the reference samples**

Sample	Khatystyr	Glazkovo culture	Serovo culture	Mohe	Boismana culture	Okhotsk culture	Old Koryak culture	Old Bering Sea culture	Neolithic of the Baraba forest-steppe	Neolithic of the Altai	Susuya culture
Khatystyr	–										
Glazkovo culture	1.12	–									
Serovo culture	0.88	1.29	–								
Mohe	1.17	1.89	2.02	–							
Boismana culture	2.35	2.99	3.19	1.18	–						
Okhotsk culture	1.27	1.78	1.64	1.28	2.17	–					
Old Koryak culture	1.8	2.84	2.15	1.59	2.11	1.54	–				
Old Bering Sea culture	2.19	2.46	2.21	2.32	3.04	1.06	2.12	–			
Neolithic of the Baraba forest-steppe	1.06	2.14	1.36	1.53	2.46	1.83	1.32	2.66	–		
Neolithic of the Altai	1.2	1.05	1.91	1.24	2.14	1.82	2.66	2.76	2.08	–	
Susuya culture	1.11	1.64	1.65	0.99	1.94	0.32	1.56	1.36	1.73	1.54	–
Yankovskaya culture	1.29	2.22	1.88	0.87	1.62	0.96	0.79	1.84	1.29	1.94	0.86

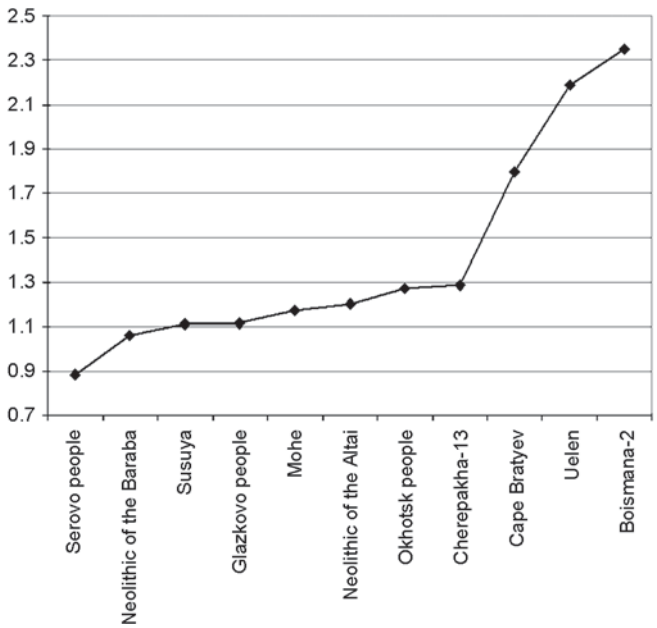

Fig. 5. Euclidean distances between the skull from Khatystyr and reference samples.

CVs (77 % of the total variance) (Table 5). The Cis-Baikal Serovo sample is the closest to Khatystyr, while a number of West and East Siberian, as well as some Far Eastern groups, displays a moderate similarity to the skull under study (Fig. 5). The only samples demonstrating a strong difference from Khatystyr are the Old Koryak, Uelen, and Boismana-2. This possibly suggests that the area inhabited by human groups related to the Khatystyr population might have been quite broad in the past: from the Baraba forest-steppe in the west to Sakhalin in the east. Some morphological features of those ancient groups might have survived to an extent in this area until the medieval times, despite later gene flow. The relevance of the intergroup Euclidean distances is tentatively confirmed by the fact that the samples of the Susuya and Okhotsk cultures from Hokkaido (considered as stages of the same ethnocultural group) display the smallest distance (Deryugin, 2008: 59).

The generalized k-means algorithm was employed for clustering the matrix of Euclidean distances. This algorithm groups the objects under analysis according to the minimal sum of distances between the objects and respective clusters (k). The whole set of raw data is separated into k clusters iteratively until an optimal grouping is achieved. The generalized approach of this algorithm is special in terms of searching of the optimal number of clusters via a v-fold cross validation, while in the conventional k-means technique the optimal number is set by the user voluntary. In our analysis, v=10.

The cluster analysis has shown that three clusters are optimal for the present set of samples. The first

Table 6. **Results of the cluster analysis**

Sample	Number of cluster	CV I	CV II	CV III	Distance to the center of the cluster
Mohe	1	–0.76	–0.58	–0.50	0.35
Boismana culture	1	–0.83	–1.62	–1.06	0.67
Okhotsk culture	1	0.35	–0.05	–0.13	0.23
Old Koryak culture	1	–0.14	–1.12	0.86	0.53
Old Bering Sea culture	1	1.36	0.16	0.07	0.61
Susuya culture	1	0.08	–0.10	–0.29	0.19
Yankovskaya culture	1	–0.23	–0.76	0.17	0.18
Glazkovo culture	2	–0.74	1.31	–0.47	0.21
Neolithic of the Altai	2	–1.16	0.49	–0.99	0.21
Khatystyr	3	–0.81	0.39	0.15	0.23
Serovo culture	3	–0.57	0.99	0.76	0.24
Neolithic of the Baraba forest-steppe	3	–1.12	–0.24	0.95	0.29

of the clusters, the most numerous, included all the groups from the Far East; the second the Glazkovo and Altai foothills Neolithic samples; the third Khatystyr, the Serovo and Neolithic Baraba populations (Table 6). According to the distribution of the sample mean values of the top three CVs (Fig. 6), the first cluster is the most distinct— it displays difference from the others in all the three CVs. The samples belonging to the second and third clusters are separated mainly by the values of CV III.

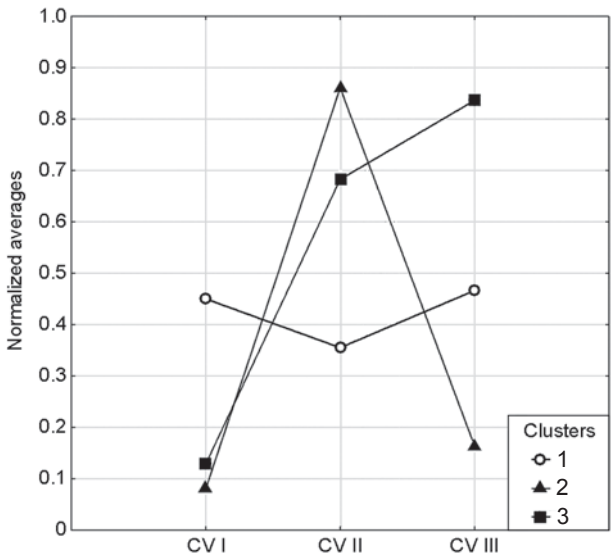

Fig. 6. Comparison of the results of the cluster and canonical discriminant analysis.

Discussion

Reconstructing the population history of the early stages of the peopling of Northeastern Siberia and the Russian Far East by the methods of classic anthropology is a complicated task. A few discoveries of human remains of a Pleistocene or Early Holocene age have been made in Yakutia in the last two decades, but in all the cases only single bones of the postcranial skeleton, cranial fragments, or isolated teeth were found. This makes a direct comparison of those specimens by a unified morphometric protocol impossible.

In Yakutia, the following skeletal individuals were excavated besides Khatystyr: a deciduous tooth from Khaiyrgas Cave (Zubova, Stepanov, Kuzmin, 2016), two teeth from the Yana site, a fragmented female skull from Duvanny Yar, and a sample of bone specimens from the Zhokhova site (Pitulko et al., 2015; Pitulko, Pavlova, 2015; Sikora et al., 2019). The burial from Matta stands apart. It was originally dated to the times of the Ymyyakhtakh culture (Zubova et al., 2017), but the date was later proved incorrect, and more recent studies employing accelerator mass spectrometry (AMS) have shown that the burial is one of the oldest in the region: 6328 ± 81 BP (uncalibrated); 7267 ± ± 91 BP (calibrated). The confidence interval for these dates (1δ) is 7175–7358 BP, calendar age of the burial is 5317 ± 91 BC (NSKA-1663, calibrated in CalPal). These estimates are supported by another study of the Matta burial: 5940 ± 30 BP (Beta-422229) (Kılınç et al., 2021). Overall, these place the burial to the borderline between the Mesolithic (Sumnagin culture) and Early Neolithic (Syalakh culture) of Yakutia.

The dynamics of the main trends of the population history of the region has recently been mainly analyzed by means of paleogenetics, which are not limited by poor preservation of skeletal specimens (Sikora et al., 2019; Yu et al., 2020; Kılınç et al., 2021). The genetic studies have detected three waves of migration in the northern part of Siberia. The first was the emergence of the Ancient North Siberians (ANS). This component is associated with the Upper Paleolithic specimens from Yana (Yana 1 and 2), and the sub-adult from Malta 1 (Sikora et al., 2019: 184). The genetic profile of this ancient lineage is more related to the West Eurasian Upper Paleolithic hunter-gatherers rather than to East Asian populations.

The second large-scale event of the population history of Northern Siberia is dated to the 25–10 ka BP, and, according to genetic data, was associated with a replacement of ANS by populations of a different origin called Ancient Paleo-Siberians (APS). The gene pool of the latter is composed of roughly 75 % of the East Asian component, and 25 % of the Malta 1 genetic cluster. Ancient Paleo-Siberians are represented by the specimens from Kolyma 1 (Duvanny Yar) and Ust-Kyakhta 3 from the Western Trans-Baikal region (Yu et al., 2020: 1235; Pavlenok, Zubova, 2019). These individuals display clear genetic affinities with the modern native groups of the extreme northeast Asia—Koryak, Itelmen, and Chukchi. Finally, the third large migration, which began some 10 ka BP, was associated with the spread of the Neo-Siberians (NS), the ancestors of most modern ethnic groups of Eastern Siberia.

On the basis of the results of our analysis of the cranial metric data, we tried to determine the position of the Khatystyr individual in respect to these three migration waves. The specimens from Zhokhova and Duvanny Yar (Kolyma 1) are chronologically the closest to Khatystyr. But the latter has shown no prominent similarity to either Old Koryak or Uelen sample in any of the statistical analyses. Otherwise, these samples are the least morphologically similar to Khatystyr, and it is thus unlikely that this individual was closely related to the second migration wave.

The Khatystyr individual is highly similar to the Neolithic population of the Baraba forest-steppe, which, in turn, was closely related to the East European hunters-gatherers, according to some previous studies (Chikisheva, Pozdnyakov, 2021). The component of European origin was absent in the third migration wave, while the East Eurasian complexes were predominant. Thus, the genetic components associated with the third wave could not dominate in either the Khatystyr individual or population of Baraba. As such, it can be concluded that Khatystyr belonged to a population where individuals of the first, i.e. the most ancient, wave of peopling of Northern Siberia were prevalent. The main difficulty in determining the status of this individual is the poor preservation and incompleteness of the skull, which precludes measuring some cranial metric characteristics important for the differentiation between European and Asian groups that, according to genetic data, took part in the formation of the ancient population of the region.

Conclusions

Our analysis of the cranial metrics of the skull from Khatystyr suggests that the individual could belong to a population where individuals related to the first wave of peopling of North Asia were prevalent. The skull is most similar morphologically to the samples of the Cis-Baikal Serovo culture and Neolithic Baraba forest-steppe: the groups related to the Upper Paleolithic population of Western Siberia, according to odontological data (Zubova, Chikisheva, 2015).

Some less clear signals point towards the possible persistence of the "Khatystyr-related" anthropological component (assimilated by the later migration waves) in other Siberian regions, including as far east as in Sakhalin. Notably, this component was virtually absent in the Neolithic population of Primorye, as well as in the samples of the Old Koryak и Old Bering Sea cultures.

The pronounced difference between Khatystyr and the skulls of the Late Neolithic Ymyyakhtakh culture from Yakutia suggests a population discontinuity between the Early and Middle Holocene population of the region. The cranial sample from Diring-Yuryakh likely represents an isolated group without close morphological affinities. Based on the cranial characteristics used in our analyses, it is not similar not only to Khatystyr and related populations (these are, in fact, the most distinct from Diring-Yuryakh) but also to any of the reference samples.

Despite the limitations of the present metric analysis, our results are similar to those obtained in the genetic studies. For instance, both cranial metric and genetic data have shown the separation of the populations of the Russian Far East into a single cluster, and a similarity between the samples of the Altai Neolithic and Cis-Baikal Glazkovo culture (Wang et al., 2023).

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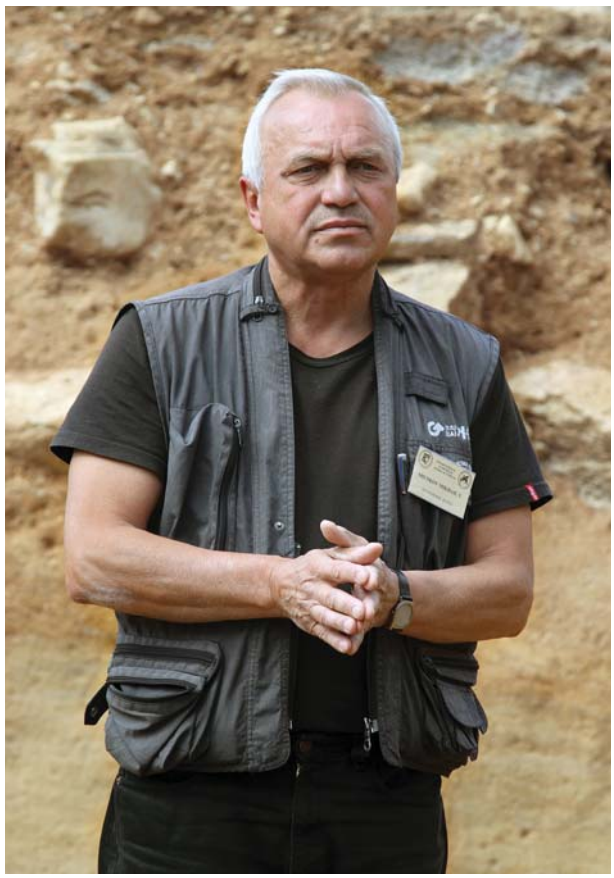
Mikhail Vasilyevich Shunkov is 70

In May 2023, Mikhail Vasilyevich Shunkov, an esteemed researcher of the ancient history of North and Central Asia, celebrated his 70th birthday. He is a Doctor of Historical Sciences, a Corresponding Member of the Russian Academy of Sciences, the Head of the Stone Age Archaeology Department at the Institute of Archaeology and Ethnography of the Siberian Branch of the Russian Academy of Sciences, and a Professor of the Department of Archaeology and Ethnography at the Institute for the Humanities of the Novosibirsk State University. Throughout his career, he has focused his scientific efforts on the fundamental topics of early human settlement in Northern Eurasia, including the origins and progression of ancient cultural traditions, chronostratigraphy and correlation of Paleolithic cultures, Pleistocene paleogeography, human paleoecology, and reconstruction of the climatic and environmental conditions of ancient human habitation.



M.V. Shunkov came of a family of teachers of higher education and long-term citizens of Irkutsk in Siberia. His father Vasiliy Maksimovich Shunkov, a veteran of the Great Patriotic War, holder of many military awards, a lawyer by education, dealt with the economics of agricultural production; he was one of the founders of the Siberian school of hunting science. Mother Nadezhda Vladimirovna Shunkova graduated from the famous Moscow Institute of Philosophy, Literature and History. For many years, she taught foreign literature at the Philological Department of the Irkutsk State University. Their hospitable house was a meeting place for famous Irkutsk scientists and writers; the writer V.G. Rasputin and playwright A.V. Vampilov were students and friends of Nadezhda Shunkova. The family members rated broad education, creativity, diligence, and self-exactingness very high. Elder brother Boris graduated with honors from Gerasimov Institute for Cinematography and was a well-known screenwriter, director and cameraman of documentary films, one of the most prominent representatives of Siberian documentary filmmaking, a laureate of prestigious European film festivals.

From his childhood, Mikhail was fond of ancient history and having graduated from school in 1971, he entered the History Department of the Irkutsk State University. In his student years, he took an active part in the study of key Paleolithic sites in the north of Baikal Siberia under the guidance of an original scientist and a tireless field researcher M.P. Aksenov. Mikhail Shunkov graduated from university in 1976, after which he spent two years as a junior researcher at the Laboratory of History, Archaeology, and Ethnography of Siberia at the Tomsk State University. He then pursued graduate studies at the Leningrad Branch of the Institute of Archaeology of the USSR Academy of Sciences, where he was mentored by the esteemed Professor V.P. Lyubin, a patriarch of Russian Paleolithology. Mikhail Shunkov gained invaluable experience in field research and analytical studies in field laboratories during internships with the Caucasian and Kostenkovskaya Paleolithic expeditions.

In 1987, the young and talented archaeologist was invited by Academician A.P. Derevianko and offered a position at the Institute of History, Philology and Philosophy of the Siberian Branch of the USSR Academy of Sciences. The decision to move to Akademgorodok in Novosibirsk determined the Mikhail's future destiny. Having started as a researcher, he was proposed

the position of senior researcher after defending his Ph.D. thesis entitled "Mousterian Sites in Intermountain Basins of the Central Altai" (under V.P. Lyubin's supervision) in 1990. In 2001, having defended his doctoral dissertation under the title "Archaeology and Paleogeography of the Paleolithic of the Northwestern Altai", M.V. Shunkov took up a position of the Chief Researcher and Deputy Director for scientific work; in 2015, he was elected to the position of Director of the Institute of Archaeology and Ethnography of the Siberian Branch of the Russian Academy of Sciences and served in this capacity until he reached the age limit set for heads of academic institutions.

Mikhail Shunkov gained his first experience in scientific and organizational activities when he led the Middle Yenisei Archaeological team in 1987–1988. Thereafter, he headed the Altai Archaeological Team, engaged in multidisciplinary studies of multi-layered Paleolithic sites in the northwest of the Altai Mountains. Since 1990, Mikhail Shunkov has been in charge of one of the largest archaeological research stations in Russia, "Denisova Cave" in the Altai. He took an active part in the construction of Denisova station "from the first peg". For more than 30 years, near the station, interdisciplinary studies have been carried out focusing on the Siberian Paleolithic sites that provide the most abundant information on archaeology and paleogeography of the area. The Denisova station host major scientific events of the Siberian Branch of the Russian Academy of Sciences, including international symposia with leading Russian and foreign scholars. The high level of organization and hospitality at large-scale international scientific forums at Denisova station is a great merit of the hero of the anniversary.

Mikhail Shunkov focused his efforts on the interdisciplinary studies of multilayered Paleolithic sites in the Altai. In 1990, Mikhail published a monograph describing the Mousterian sites in the Central Altai, which was the first comprehensive publication on the Middle Paleolithic of Southern Siberia. Based on the profound amount of analytical data on the Mousterian sites of the Central Altai and their comparison with the materials of the Altai cave sites, the author identified main trends in the development of the Middle Paleolithic cultural traditions in the Altai. He proposed the following division: lithic industries of the open-air site of Tyumechin-1, the caves of Ust-Kan, Okladnikov and Denisova belonged to the Mousterian of various types depending on the proportion of the Levallois and Mousterian components in the toolkit. In contrast, the lithic assemblage of Tyumechin-2 was specific; it was attributed to the denticulate Mousterian facies, which had no parallels in the Altai Paleolithic.

Using multidisciplinary approach, M.V. Shunkov proposed an original concept of interrelation between prehistoric culture and the paleoenvironment in Southern Siberia. The main provisions of this concept are presented in the fundamental issue "Paleoenvironment and Paleolithic Human Occupation of Gorny Altai", which was published in 2003. The book summarizes the results of many years of interdisciplinary studies at the reference Paleolithic sites in the Altai Mountains—Denisova Cave, Ust-Karakol, and Anuy-2. It was the first attempt to trace the development of Paleolithic cultural traditions and the evolution of the paleoenvironment in the North and Central Asia during a wide chronological range, from the Middle to Upper Pleistocene. Based on the comprehensive analyses of Paleolithic materials, their geological position in the sequence of Pleistocene deposits, biostratigraphy and geochronology data, M. Shunkov provided a detailed description of the main cultural trends in the Middle and Upper Paleolithic, identified the areas of their distribution, developed a regional periodization and chronology of the most ancient cultural and historical events, defined certain patterns in the development of the prehistoric culture and interactions between the early humans and nature, and considered the process of the initial human settlement in the Altai in the general context of the ancient history of North and Central Asia.

Over 20 years, M.V. Shunkov has carried out studies at the oldest archaeological site in Siberia—the multilayered Early Paleolithic site of Karama, near Denisova Cave. At this site, several horizons of human habitation with an archaic pebble industry were recorded in association with the Early Pleistocene deposits date to 600–800 thousand years ago, which indicate the habitation of the Altai by *Homo erectus* populations most likely arriving with the first migration wave from Africa. The derived analytical data suggest that the process of the initial peopling of the Altai took place under favorable, relatively warm environmental and climatic conditions. At that time, birch and pine forests, with the admixture of dark coniferous and broad-leaved species exotic for the modern flora of the Altai, prevailed near Karama.

In recent years, M.V. Shunkov has focused his scientific activity on the development of the hypothesis on the origins of culture of the anatomically modern humans. The research culminated in the discovery of a new form of fossil hominin, which was named the Denisovan, after the place of discovery. The analysis of the sequenced genome of representatives of the new group of ancient hominins revealed the sisterly affinity to Neanderthals, i.e. at first, the ancestral branch diverged from the evolutionary tree common with the anatomically modern humans; later, the Denisovan branch diverged from the Neanderthals. According to the available analytical data, during the Upper Pleistocene, along with anatomically modern humans, Eurasia was populated by at least two more hominin groups: Neanderthals in the west and Denisovans in the east. Comprehensive studies of archaeological materials from Denisova

Cave testify to the autochthonous development of the Paleolithic traditions during ca 300 thousand years, and the development of the Upper Paleolithic culture on the local Middle Paleolithic basis, which implies not only cultural, but also genetic continuity of the prehistoric population of the Altai.

M.V. Shunkov also carries out active field research in other regions of Eurasia. Since 2008, he has been the head of the Montenegrin team studying Paleolithic caves in the eastern part of the Adriatic. Interdisciplinary studies of lithology and stratigraphy of the Pleistocene deposits, as well as Paleolithic layers in the rockshelters of Bioče and Malishina Stena, and in Trlica Cave, produced the data on the evolution of the Middle and Upper Paleolithic industries and a new assessment of the origin and development of the most ancient cultural traditions in southeastern Europe.

In 2015–2019, Mikhail Shunkov headed reconnaissance works in the northeast of Kazakhstan, during which dozens of Paleolithic sites illustrating various chronological periods were discovered, including Kurchum—one of the oldest Early Paleolithic sites in the region, and Ushbulak—a unique multi-layered Early Upper Paleolithic site in the Shilikta Valley.

Results of extensive field and analytical studies by M.V. Shunkov are presented in 14 monographs and more than 600 articles, including 13 papers published in the world's leading scientific journals *Nature* and *Science*. Mikhail Shunkov was the editor-in-chief, author and co-author of the chapters on the Paleolithic in the *History of Siberia*; his contribution in the preparation of volume 1, published in 2022, was significant. He is an active popularizer of knowledge about the ancient past of mankind through publications in the journals *Science First Hand*, *Scientific American*, and in numerous interviews and comments for federal and regional media.

Mikhail Shunkov devotes much time to the management of projects of the Russian Foundation for Humanities, the Russian Foundation for Basic Research, the Russian Science Foundation, and the Presidium of the Russian Academy of Sciences. For many years, M.V. Shunkov was a member of the Expert Council of the Russian Foundation for Humanities and the Russian Foundation for Basic Research in history, archaeology, and ethnography. M.V. Shunkov is the Head of the Department of Stone Age Archaeology at the Institute of Archaeology and Ethnography of the Siberian Branch of the Russian Academy of Sciences, a member of the Academic and Dissertation Councils of the Institute, and the Joint Academic Council for Humanities of the Siberian Branch of the Russian Academy of Sciences. He is a member of the editorial board of the journal *Archaeology, Ethnology and Anthropology of Eurasia*, the editorial boards of the journals *Theory and Practice of Archaeological Research*, *Archaeology of the Eurasian Steppes*, and *Universum Humanitarium*. Mikhail Shunkov is actively involved in organizing scientific events at the international and all-Russian level, including activities on the revival and holding of the All-Russian Archaeological Congresses.

M.V. Shunkov is a Corresponding Member of the Russian Academy of Sciences, a Corresponding Member of the German Archaeological Institute, a laureate of the Academician V.P. Alekseev and Academician T.I. Alekseeva Prize for scientific contribution to anthropology and archaeology on the issues of interdisciplinary research.

Along with research and organizational activities, Mikhail Shunkov is engaged in teaching in higher professional education. Since 1976, he has been constantly supervising the archaeological field practice of students of historical faculties of the Tomsk State University, Astafiev State Pedagogical University in Krasnoyarsk, and the Institute for the Humanities of the Novosibirsk State University (NSU). Mikhail Shunkov is the author of the course of lectures "Human Paleoecology", which he delivers at NSU Institute for the Humanities. Under the guidance of Mikhail Shunkov, thousands of schoolchildren from towns and villages of the Altai Territory underwent field practice at Denisova Cave. Young people enjoyed warm friendly atmosphere and the attention of the leader; they got personal interest and respect for the past; subsequently, many of former schoolchildren started to engage in history and archaeology. Mikhail Shunkov serves as a Scientific Advisor to applicants for the degree of Candidate and Doctor of Sciences; more than ten specialists have successfully defended their dissertations under his scientific supervision.

Currently, Mikhail Shunkov is full of creative forces and aspirations. We wish the hero of the anniversary fruitful scientific activities, new wonderful discoveries, and inexhaustible creative energy in the implementation of all his ideas!

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A.I. Krivoshapkin, and M.B. Kozlikin

AN RT – Academy of Sciences of the Republic of Tatarstan

AN SSSR – USSR Academy of Sciences

CKF VMF – Central Map Reproduction Plant of the Russian Navy (St. Petersburg)

DVO RAN – Far Eastern Branch of the Russian Academy of Sciences

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)

IIAE DVO RAN – Institute of History, Archaeology and Ethnography of the Peoples of the Far East, Far Eastern Branch, Russian Academy of Sciences (Vladivostok)

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

RIC NGU – Editorial and Publishing Center, Novosibirsk State University (Novosibirsk)

SAIPI – Siberian Association of Prehistoric Art Researchers

UrO RAN – Ural Branch of the Russian Academy of Sciences

VSOIRGO – East Siberian Department of the Imperial Russian Geographical Society

ZSOIRGO – West Siberian Department of the Imperial Russian Geographical Society

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