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A.A. Anoikin[1, 2], G.D. Pavlenok[1], V.M. Kharevich[1], N.A. Kulik[1], and Z.K. Taimagambetov[3]

[1]*Institute of Archaeology and Ethnography,*
Siberian Branch, Russian Academy of Sciences,
Pr. Akademika Lavrentieva 17, Novosibirsk, 630090, Russia
E-mail: anui1@yandex.ru; lukianovagalina@yandex.ru; mihalich84@mail.ru; kuliknatart@mail.ru
[2]*Novosibirsk State University,*
Pirogova 1, Novosibirsk, 630090, Russia
[3]*National Museum of the Republic of Kazakhstan,*
Pr. Tauelsizdik 54, Nur-Sultan, 010000, Kazakhstan
E-mail: zhaken.taimagambetov@gmail.com

Shulbinka Paleolithic Site, Eastern Kazakhstan, Revisited

This study revises the cultural and chronological attribution of the Shulbinka site, Eastern Kazakhstan, with reference to recent ideas of the Early Upper Paleolithic in northern Central Asia, including new sites dating to that stage (Tolbor-21, Ushbulak, etc.) and a representative series of absolute dates relevant to the site's chronology. We describe the discovery of the site and principal findings of excavations carried out more than 20 years ago, focusing on the comprehensive analysis of artifacts from Shulbinka, conducted in 2019. We demonstrate that the estimated age and the cultural attribution of the site disagree with earlier interpretations. Earlier claims about the presence of Levallois and Mousterian components in the primary reduction system appear poorly supported. The idea that artifacts from the site resemble those of the Early Upper Paleolithic is subjected to a critical inquiry. As it turns out, the closest parallels to this assemblage are found among the Final Upper Paleolithic industries of southern and central Siberia. Important traits include the combination of large cores for making flakes, blades with edge-faceted and wedge-shaped microcores, and the predominance of end-scrapers and chisel-like tools. Few parallels can be found with industries of different cultural and chronological periods. Based on these analyses, we conclude that the site of Shulbinka dates to the Final Paleolithic. The absence of Final Middle Paleolithic or Early Upper Paleolithic markers makes the site irrelevant to debates around the origin of the Upper Paleolithic in the region.

Keywords: *Central Asia, Kazakhstan, Middle Paleolithic, Upper Paleolithic, lithic industry, chronology.*

Introduction

For a long time, the territory of Kazakhstan (with the exception of its southern piedmont region) remained extremely poor in terms of the presence of stratified Paleolithic sites. The harsh continental and highly arid climate hinders the long-term accumulation of soft sediments in the region, which significantly reduces the likelihood of the preservation of archaeological materials *in situ*. In the southern part of Kazakhstan, several multilayered Late Pleistocene sites have been discovered (Maibulak, Chokan Valikhanov, etc.); although well-stratified sites with Upper Paleolithic assemblages are quite few in the central and northern part of the country (Taimagambetov, Ozhereliev, 2009). As compared to northern Kazakhstan, the Russian Altai contains many more stratified Paleolithic sites, including those dated to the MUP transition period. These provide valuable information on the evolution of lithic industries in the region (Denisova Cave, Kara-Bom, Ust-Karakol-1, etc.) (Derevianko, Petrin, Rybin, 2000; Prirodnaya sreda…, 2003; Shunkov, Kozlikin, Derevianko, 2020). Until recently, Shulbinka—located in the Middle Irtysh—was regarded as the only multilayered site in the eastern Kazakhstan (Petrin, Taimagambetov, 2000). However, since 2015, dozens of sites with Paleolithic artifacts collected from the surface, as well as the stratified Stone Age sites of Ushbulak and Karasai, have also been found in this region (Anoikin et al., 2019). The Ushbulak materials appear to date to various Upper Paleolithic periods, including the initial stage providing new insights into the origins of the Upper Paleolithic industries in this part of Central Asia (Ibid.). Among sites of this region, Shulbinka archaeological materials are of particular interest, because alongside with the Early Upper Paleolithic complex, a Middle Paleolithic component was also identified at the site. Shulbinka is located much further north, and closer to the Russian Altai, than Ushbulak, making it a connecting link between regions with Early Upper Paleolithic industries located at a distance of 600 km from one another. Shulbinka also appears to have been the westernmost point in the dispersal of these industries. Nonetheless, the cultural attribution and chronological estimates for this site have been repeatedly changed since the discovery of the site in 1981. The significance of this site necessitates revisitation of Shulbinka archaeological materials first described 20 years ago, in order to reanalyze these with the aid of modern techniques.

History of study

Shulbinka was discovered in 1981 by the Paleolithic Party of the Shulbinka Archaeological Expedition of the Institute of History, Archaeology and Ethnography of the Academy of Sciences of the Kazakh SSR; the excavations were headed by Z.K. Taimagambetov (1981).

The site was located on an estuarial promontory, on the right-side bank of the Shulbinka River (right tributary of the Irtysh), in the flood zone of the Shulbinka hydroelectric plant, Novoshulbinsky District of the Semipalatinsk Region (currently, Borodulikhinsky District of the Eastern Kazakhstan Region) (Fig. 1). The site was located on a 35–40-meter rocky ledge composed mainly of chert and covered by a 1 m thick layer of soft sediments (Fig. 2). During fieldwork in 1981–1983, the total excavation area reached 1000 m^2 and yielded about 5000 artifacts, including surface finds (Taimagambetov, Ozhereliev, 2009).

The composite stratigraphic column of the site is described as follows (from top to bottom) (Taimagambetov, 1981; Petrin, Taimagambetov, 2000):

1. Humic layer of light loam, with distinguishable sod. Thickness up to 0.6 m. The boundary contact with the underlying layer is uneven; it is established only through color differences.

2. Loose and light yellow loam, with isolated lenses of sand and pebbles. Thickness up to 0.4 m. The contact with the underlying layer is poorly defined.

3. Yellow, coarse-grained sand, with isolated lenses of pebbles. In some portions, the layer consists exclusively of pebbles. Thickness 0.15 m. This layer overlies the bedrock.

The layers stretch sub-horizontally, with the minimal inclination of 1–2° in the eastern and southern direction (towards the Shulbinka and Irtysh riverbeds). Layer 2 wedges out from the northwest to southeast, with the total thickness of the section decreasing in this direction. In the eastern part of the excavation, layer 1 mixes with sediments of layer 2; their total thickness is about 0.1 m.

Excavations were carried out using reference levels, 0.2 m in thickness. The sediments were not washed or sieved. Archaeological materials were recorded in layer 1 (cultural horizon (hereinafter, horizon) 1) and 2 (horizons 2 and 3); artifacts were also collected from all over the surface of the excavation site and beyond it.

In the course of preliminary analysis of the materials, all the artifacts were considered a single archaeological complex attributable to the Final Upper Paleolithic (13–12 ka BP). The age was assessed on the

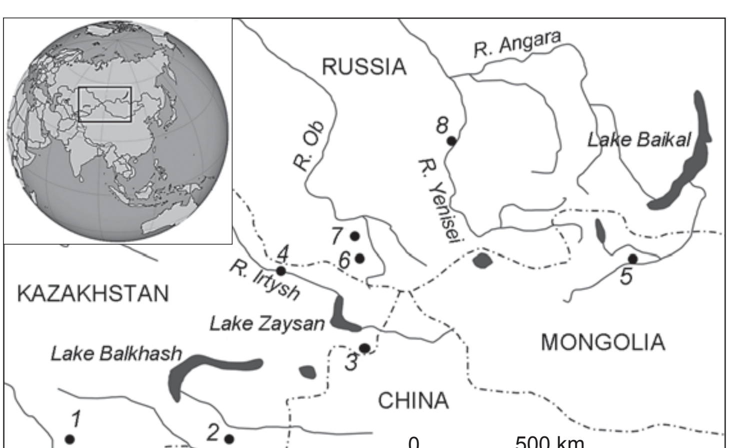

Fig. 1. Sites of the Upper Paleolithic-Mesolithic in Kazakhstan and contiguous regions.
1 – Chokan Valikhanov; *2* – Maybulak; *3* – Ushbulak; *4* – Shulbinka; *5* –Tolbor-4, -21; *6* – Kara-Bom; *7* – Ust-Karakol-1, Anui-2; *8* – Kokorevo-1.

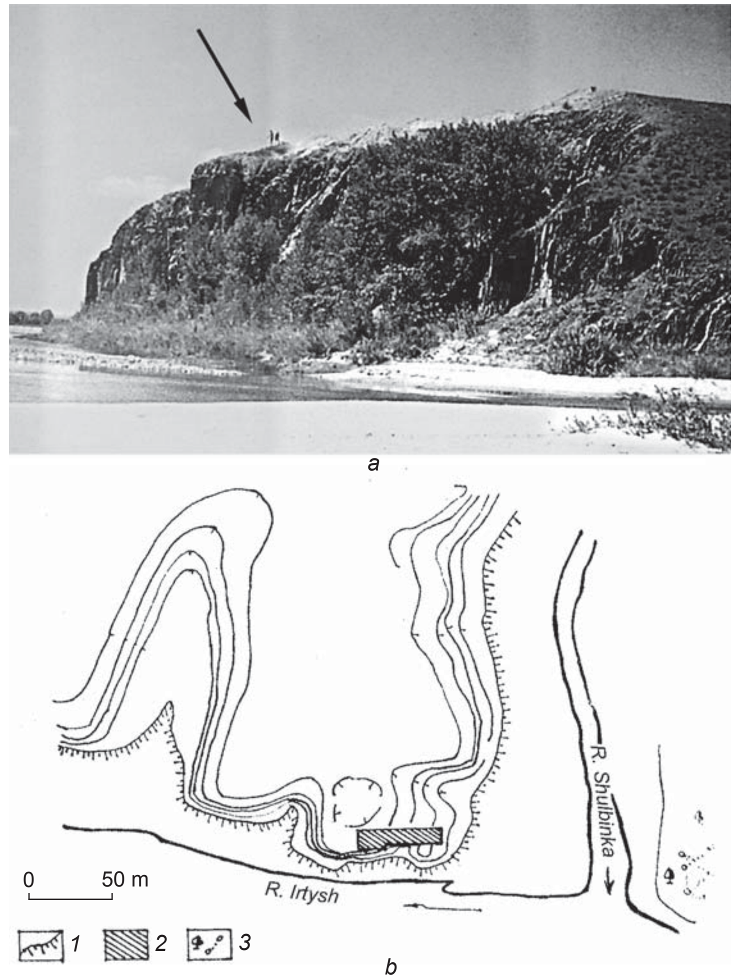

Fig. 2. Eastern view on the site of Shulbinka (*a*), and plan of the site (*b*) (after (Petrin, Taimagambetov, 2000)).
1 – precipice; *2* – excavation area; *3* – wood and bushes.

basis of geomorphological position of the site, its stratigraphy, and the types of tools identified. Possible minor admixture of the Early Holocene (Neolithic) materials was recorded to be associated with layer 1 (upper portion). A burial without grave goods was also located in the sand lens immediately under the sod, at the edge of the rocky ledge (Taimagambetov, 1981).

Later, Taimagambetov, the excavator of the site, hypothesized the presence of two mixed, non-contemporaneous lithic complexes attributable to the initial and terminal Upper Paleolithic, and showing parallels with the materials from contemporaneous sites in southern Siberia (Srostki site, Kokorevo I, and Tolbaga) (Taimagambetov, 1983, 1987).

The most detailed analysis of the Shulbinka lithic industry was provided in the monograph by V.T. Petrin and Z.K. Taimagambetov (2000). The authors argued that Shulbinka served as a repeatedly visited short-term camp-workshop where the entire sequence of operations took place. On the basis of the features of lithic inventory, the scholars identified three intermixed assemblages, dating to the terminal Middle Paleolithic (Mousterian), Early Upper Paleolithic, and Early Holocene. The authors of the monograph noted that the proposed classification of the lithic collection by technical-typological features was "somewhat conventional" (Ibid.: 30). The complexes were distinguished by the presence of core-like shapes and typologically distinct tools. However, the main assemblage of artifacts (flakes and blades, including technical ones; production waste; and "multi-purpose" tool types) was not subjected to analysis.

The Middle Paleolithic complex at Shulbinka included all the cores classified as Levallois (mostly blade cores); along with points, and the majority of side-scrapers made on flakes. Small amount of large and broad blades were also included in this grouping.

The Early Upper Paleolithic complex included parallel blade cores and the tools of the Upper Paleolithic types: end-scrapers, chisel-like tools, and a few burins and borers. Heavily retouched side-scrapers on blades and heavily retouched blades were also included into this group.

Finally, the Early Holocene complex consisted of edge-faceted cores for production of small blades and microblades, microblades and tools made on them, and micro end-scrapers.

The common set of raw materials used in all the established complexes and their industrial continuity were noted (Ibid.).

The proposed interpretation of the Shulbinka archaeological complexes was widely popular in the scientific literature; all the subsequent researchers of the Shulbinka materials adhered to this interpretation (Taimagambetov, Ozhereliev, 2009; Morimoto et al., 2019).

Results of 2019 research

In October 2019, the authors of this paper made an attempt to revise the existing interpretations on the basis of attribute analysis of the entire collection of artifacts from the site. Unfortunately, after filling the Shulbinka reservoir in 1989, the site is today under water. Today, the only available source of information about Shulbinka is the collection of artifacts recovered in 1981–1983 and the field reports on the excavations (Taimagambetov, 1981). Scarce anthropological and faunal remains, together with other organic materials from the initial excavations, are missing. The lithic assemblage is kept at the Paleolithic Museum of Kazakhstan of the Al-Farabi Kazakh National University (Alma-Ata). The collection consists of 3337 items, which is 81 % of the total number of artifacts referred to in the monograph by Petrin and Taimagambetov (2000). During the period of collection storage, some catalogue numbers on artifacts disappeared.

It was impossible to correlate the non-catalogued artifacts with a particular cultural horizon; therefore, all the unidentifiable items, mainly small artifacts (including tools and cores) not exceeding 3 cm, were attributed as likely surface finds. In 2019, the collection was subjected to comprehensive analysis.

Petrographic analysis

About 70 % of the total number of cores and ~35 % of spalls from Shulbinka retain residual pebble cortex. This cortex reveals the alluvial origin of the lithic raw material. The petrographic composition of the pebbles is therefore determined by the composition of alluvium from numerous tributaries joining the Irtysh downstream the city of Ust-Kamenogorsk, forming the drainage system of the vast territory of Rudny Altai, Kalba-Narym, and Chara zones (Geologiya SSSR…, 1967: 213–234).

Despite the great variety of pebble types at the raw material site al-Q_1, the rocks for tool manufacture appear to have been selected according to significant petrographic features, including high hardness (H = 6-6.5-7 in Mohs' scale) and fine-grained or cryptocrystalline structure with massive texture. For stone knapping, mostly siliceous and highly siliceous sedimentary rocks were used: these included siliceous mudstones, cherts, and chalcenolites. Artifacts made of these rocks compose over 70 % of the collection. Porphyritic effusive rocks and quartz varieties, including chalcedony and rock crystal, are less common.

In sum, only local, specially selected raw materials obtained in the Early Quaternary alluvium of the Irtysh and its tributaries were used in artifact production.

Study of archaeological materials

Cultural horizon 3. In 2019, the total archaeological collection from this component contained 752 items (44.5 % of the number indicated in the Petrin's and Taimagambetov's monograph (2000)), including 73 cores and 215 tools (Table 1). The primary reduction assemblage from this layer is dominated by flat-parallel unidirectional flaking (~45 % of the total number of cores) (Fig. 3, *5*). There also cores showing bidirectional knapping, aimed at blade production (Fig. 3, *4*), radial knapping for flake production; small edge-faceted cores for making blades; and microcores for making bladelets and microblades (Fig. 4, *4*; 5). A few orthogonal and sub-prismatic cores were also identified. The collection contains a large number of core-like fragments (Table 2).

The category of spalls is dominated by primary and secondary flakes (over 50 % of the total number of technical spalls), as well as natural cortex removals. Among rejuvenation and modification-related spalls (ridge- and half-ridge flakes, plunging flakes, rejuvenations of platform and flaking arch), the proportion of elongated artifacts is about 50 % (see Table 1).

The spalls assemblage includes blades, bladelets, and flakes (see Table 1). The majority of elongated removals show longitudinal parallel flaking pattern on the dorsal face (Table 3). Evidence for preparation of the flaking surface was recorded on 65 % of laminar spalls, representing both reverse (~60 %) and direct (~30 %) reduction. More than a half of the identifiable striking platforms are smooth; the proportions of the punctiform and dihedral platforms are almost equal (Table 4).

The flakes mostly exhibit longitudinal or longitudinal-transversal faceting and smooth, or, more rarely, natural and dihedral striking platforms (see Table 3, 4). Signs of the flaking surface preparation through direct and reverse reduction were recorded on less than a half of the spalls.

The share of informal tools (blades and flakes with irregular retouch) is about 1/3 of the total number. The category of typologically distinct tools is dominated by end-scrapers (Table 5). These are end-scrapers made on flakes, including thumbnail ones (Fig. 6, *5*) and those with traces of treatment along the perimeter (Fig. 6, *8*). End-scrapers made on blades are few (Fig. 6, *13*). Chisel-like tools and side-scrapers are represented by roughly equal shares. Chisel-like tools are mainly small, flat, and sub-rectangular; with one or two (opposite) cutting edges (see Fig. 6, *3*). Side-scrapers are mostly single-edged longitudinal, more rarely double-edged (see Fig. 5, *4*).

The layer also yielded bifacial tools (see Fig. 5, *2*), pebble tools—side-scrapers (see Fig. 5, *7*), planing tools (see Fig. 5, *6*), as well as similar unifacial tools. Pointed forms are rare; these include retouched convergent lamellar blanks (see Fig. 5, *3*). Burins are also scarce (see Fig. 6, *15*), with all of them being angle varieties. Spurs, notches, and knives (see Fig. 5, *5*) are also not numerous.

Cultural horizon 2. The archaeological collection from this layer contained 681 items when revisited for analysis (85.6 % of the number indicated in the Petrin's and Taimagambetov's monograph (2000)), including 21 cores and 103 tools. The primary reduction strategy appears to have been based on the same techniques as

Table 1. **Composition of Shulbinka lithic industries**

Category/group	Horizon 3		Horizon 2		Horizon 1		Surface collection		Total	
	spec.	%	spec.	%	spec.	%	spec.	%	spec.	%
Pebbles	3	*0.4*	6	*0.9*	–	–	8	*0.5*	17	*0.5*
Split pebbles	53	*7.0*	13	*1.9*	12	*4.9*	25	*1.5*	103	*3.1*
Core-like artifacts:	126	*16.8*	40	*5.9*	24	*9.7*	33	*2.0*	223	*6.7*
cores	73	*9.7*	30	*4.4*	24	*9.7*	19	*1.1*	146	*4.4*
core-like fragments	53	*7.0*	10	*1.5*	–	–	14	*0.8*	77	*2.3*
Technical spalls:	156	*20.7*	154	*22.6*	50	*20.2*	183	*11.0*	543	*16.3*
primary	31	*4.1*	40	*5.9*	6	*2.4*	18	*1.1*	95	*2.8*
secondary	53	*7.0*	72	*10.6*	7	*2.8*	42	*2.5*	174	*5.2*
rejuvenations of the flaking arch	4	*0.5*	2	*0.3*	1	*0.4*	–	–	7	0.2
rejuvenations of the flaking surface	1	*0.1*	4	*0.6*	–	–	–	–	5	*0.1*
ridge	3	*0.4*	–	–	3	*1.2*	6	*0.4*	12	*0.4*
half-ridge	16	*2.1*	8	*1.2*	6	*2.4*	22	*1.3*	52	*1.6*
natural marginal	23	*3.1*	12	*1.8*	18	*7.3*	52	*3.1*	105	*3.1*
marginal	10	*1.3*	11	*1.6*	7	*2.8*	42	*2.5*	70	*2.1*
rejuvenations of the striking platform	13	*1.7*	3	*0.4*	1	*0.4*	1	*0.1*	18	*0.5*
plunging	2	*0.3*	2	*0.3*	1	*0.4*	–	–	5	*0.1*
Blades (width, mm):	81	*10.8*	84	*12.3*	17	*6.9*	71	*4.3*	253	*7.6*
40–59	17	*2.3*	3	*0.4*	–	–	2	*0.1*	22	*0.7*
20–39	51	*6.8*	63	*9.3*	10	*4.0*	32	*1.9*	156	*4.7*
12–19	13	*1.7*	18	*2.6*	7	*2.8*	37	*2.2*	75	*2.2*
Bladelets	1	*0.1*	5	*0.7*	3	*1.2*	28	*1.7*	37	*1.1*
Microblades	–	–	3	*0.4*	–	–	5	*0.3*	8	*0.2*
Laminar flakes (length, mm):	38	*5.1*	28	*4.1*	20	*8.1*	117	*7.1*	203	*6.1*
large (≥ 50)	24	*3.2*	13	*1.9*	5	*2.0*	14	*0.8*	56	*1.7*
medium-sized (30–49)	10	*1.3*	14	*2.1*	10	*4.0*	54	*3.3*	88	*2.6*
small (≤ 29)	4	*0.5*	1	*0.1*	5	*2.0*	49	*3.0*	59	*1.8*
Flakes (mm):	183	*24.3*	192	*28.2*	61	*24.7*	600	*36.2*	1 036	*31.0*
large (≥ 50)	64	*8.5*	38	*5.6*	9	*3.6*	19	*1.1*	130	*3.9*
medium-sized (30–49)	96	*12.8*	103	*15.1*	28	*11.3*	110	*6.6*	337	10.1
small (≤ 29)	23	*3.1*	51	*7.5*	24	*9.7*	471	*28.4*	569	*17.1*
Shatters, fragments	111	*14.8*	150	*22.0*	60	*24.3*	587	*35.4*	908	*27.2*
Chips	–	–	4	*0.6*	–	–	–	–	4	*0.1*
Total	752	100	681	100	247	100	1657	100	3 337	100

those identified in horizon 3 (see Fig. 3, *2*, *3*). The most significant differences are the absence of bipolar cores for making laminar blanks in this component, and the high proportion of edge-faceted cores for making blades and microcores (see Table 2; Fig. 4, *1*).

Types and proportions of technical spalls basically coincide with those established for horizon 3 (see Table 1).

The spall assemblage includes microblades, which are absent in the underlying horizon (see Table 1). Elongated spalls show parallel longitudinal and bidirectional faceting of dorsal surface (see Table 3). In terms of the flaking surface preparation, the collections of the two horizons are similar. The striking platforms are mainly smooth, more rarely dihedral (see Table 4).

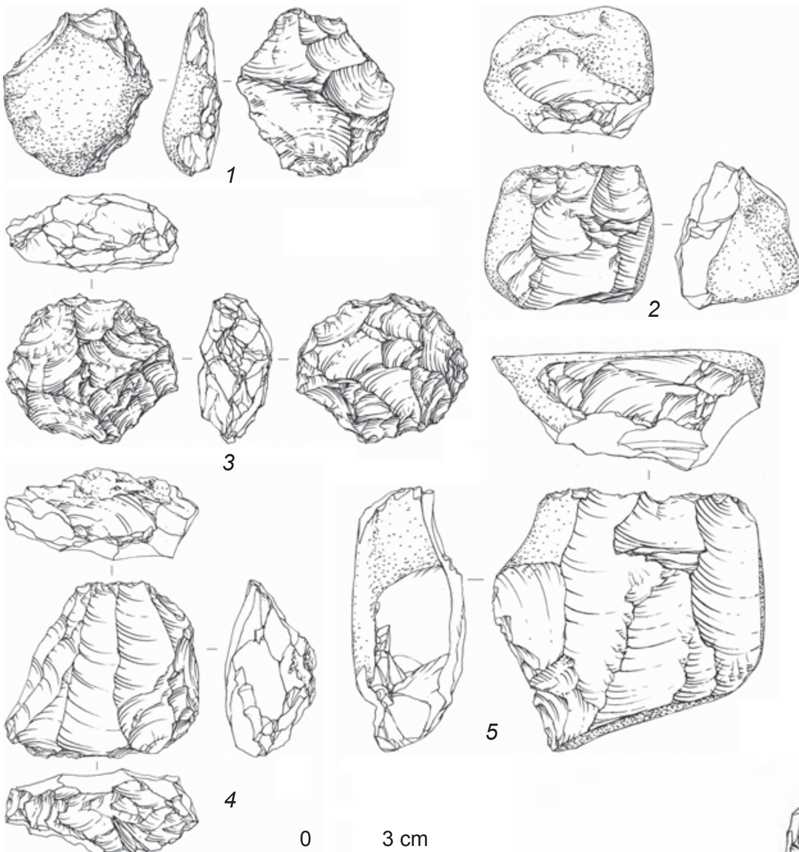

Fig. 3. Cores for making large spalls from Shulbinka cultural horizons 1 (*1*), 2 (*2*, *3*), and 3 (*4*, *5*).

The flakes from this layer show mainly longitudinal or longitudinal-transversal faceting and smooth striking platforms (see Table 3, 4). Flaking surface preparation was executed in the same way as during the accumulation of horizon 3.

The proportion of informal tools in the tool kit is about 1/3. The category of typologically distinct tools is dominated by end-scrapers (see Fig. 6, *6*, *10*), represented by the same types as in the collection from horizon 3 (see Table 5). The proportion of chisel-like tools (see Fig. 6, *12*) and side-scrapers, including two convergent forms, increases in horizon 2. Chisel-like tools in horizon 2 are more diverse than in horizon 3; some tools show four cutting edges in this layer.

The collection includes a small fragment of a biface (see Fig. 6, *1*). Among pebble tools, the portion represented by side-scrapers (see Fig. 5, *1*, *7*, *8*) is higher than in horizon 3. Burins (see Fig. 6, *9*) are diverse but few, similarly to horizon 3. Other forms, such as points (see Fig. 6, *11*), spurs (see Fig. 6, *14*), and notches are quite scarce and similar to the collection from horizon 3.

Cultural horizon 1. The archaeological collection contained 247 items during reanalysis (72.9 % of the number indicated in the Petrin's and Taimagambetov's monograph (2000)), including 23 cores and 48 tools. The primary reduction strategy for this level was based on the same techniques as those identified in horizons 2 and 3 (see Fig. 3, *1*; 4, *2*, *3*). The main difference is that horizon 1 did not yield edge-

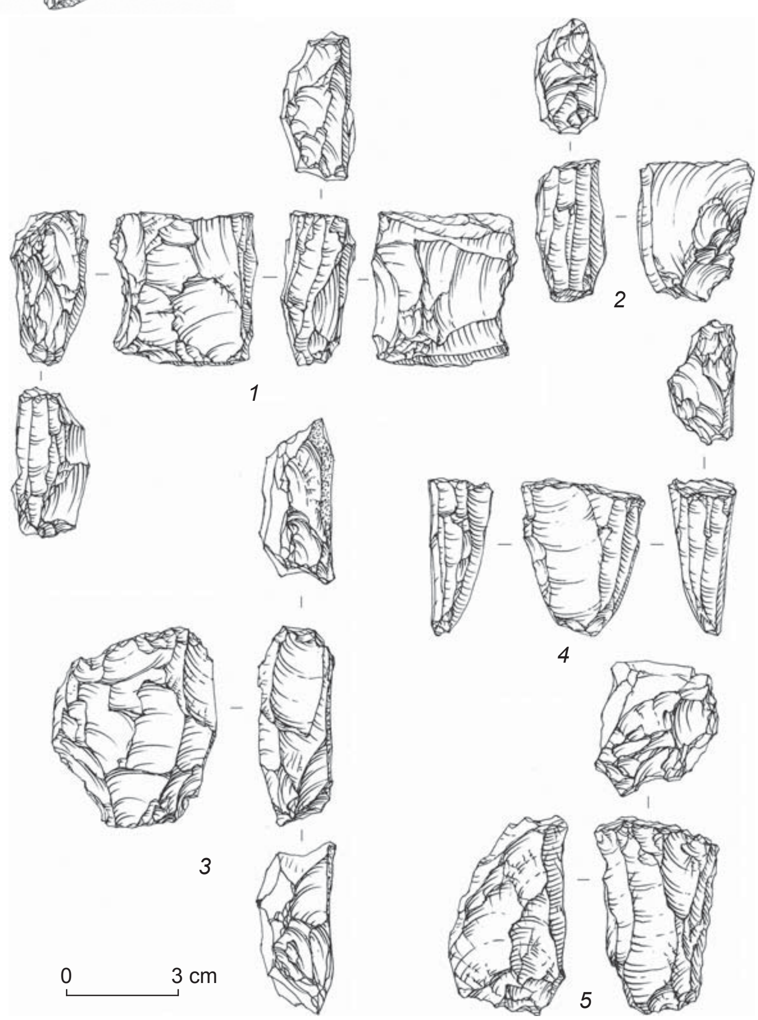

Fig. 4. Cores for making bladelets and microblades from Shulbinka cultural horizons 2 (*1*), 1 (*2*, *3*), and 3 (*4*, *5*).

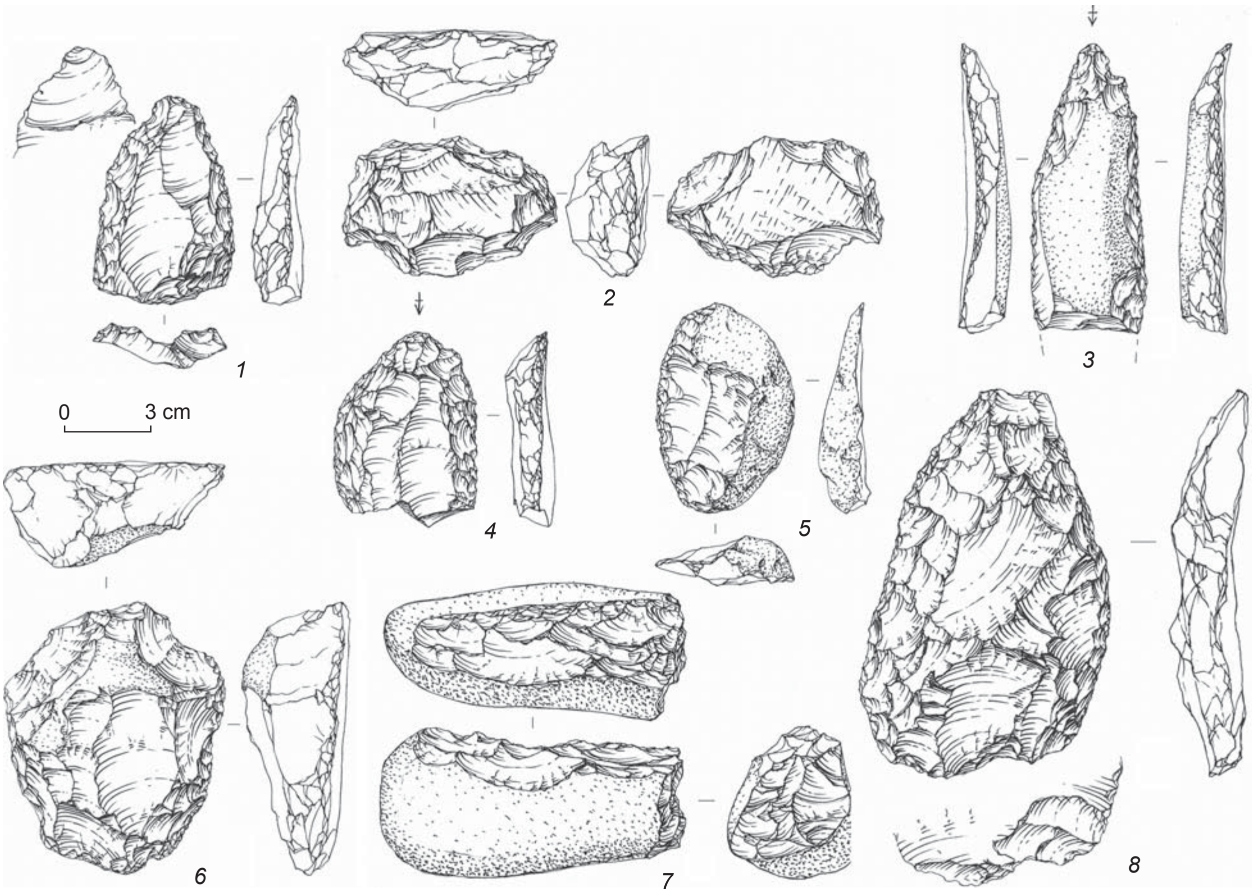

Fig. 5. Tools from Shulbinka cultural horizons 2 (*1*, *7*, *8*) and 3 (*2–6*).

Table 2. **Core-like forms in Shulbinka lithic industries**

Core type	Horizon 3	Horizon 2	Horizon 1	Surface collection	Total	
	spec.	spec.	spec.	spec.	spec.	%
1	2	3	4	5	6	7
Flat-parallel	45	14	12	3	74	57.8
Including:						
Unidirectional:	32	9	10	3	54	42.2
single-platform with one flaking surface for making flakes	15	3	6	3	27	21.1
single-platform with one flaking surface for making blades and flakes	14	2	4	–	20	15.6
single-platform with one flaking surface for making bladelets	–	3	–	–	3	2.3
single-platform with two flaking surfaces for making flakes	2	1	–	–	3	2.3
single-platform with three flaking surfaces for making blades	1	–	–	–	1	0.8
Bidirectional flaking:	9	4	1	–	14	10.9
double-platform with one flaking surface for making flakes	–	2	1	–	3	2.3

Table 2 (end)

1	2	3	4	5	6	7
double-platform with one flaking surface for making blades	8	–	–	–	8	6.3
double-platform with two flaking surfaces for making flakes	–	1	–	–	1	0.8
double-platform with two flaking surfaces for making blades	1	1	–	–	2	1.6
Orthogonal:	4	1	1	–	6	4.7
double-platform with one flaking surface for making flakes	3	–	–	–	3	2.3
double-platform with two flaking surfaces for making flakes	–	1	1	–	2	1.6
triple-platform with one flaking surface for making flakes	1	–	–	–	1	0.8
Radial:	9	4	4	2	19	14.8
single-platform	7	3	2	1	13	10.2
double-platform	2	1	–	–	3	2.3
exhausted	–	–	2	1	3	2.3
Edge-faceted:	3	3	–	5	11	8.6
single-platform with one flaking surface for making blades	2	1	–	1	4	3.1
single-platform with one flaking surface for making bladelets	–	–	–	2	2	1.6
double-platform with one flaking surface for making bladelets	–	2	–	1	3	2.3
combination, single-platform with two flaking surfaces for making bladelets	1	–	–	1	2	1.6
Sub-prismatic:	1	–	–	–	1	0.8
single-platform with one flaking surface for making blades	1	–	–	–	1	0.8
Microcores	7	7	5	4	23	18.0
Including:						
Edge-faceted:	6	7	4	1	18	14.1
single-platform with one flaking surface for making microblades	2	6	3	–	11	8.6
single-platform with two flaking surfaces for making microblades	1	–	1	–	2	1.6
double-platform with one flaking surface for making microblades	2	–	–	–	2	1.6
double-platform with two flaking surfaces for making microblades	–	1	–	1	2	1.6
combination, single-platform with two flaking surfaces for making microblades	1	–	–	–	1	0.8
Prismatic:	–	–	1	–	1	0.8
single-platform with one flaking surface for making microblades	–	–	1	–	1	0.8
Exhausted, for making microblades	1	–	–	3	4	3.1
Amorphous	8	2	3	5	18	–
Core-like fragments	53	10	–	14	77	–
Total	126	40	24	33	223	100

Table 3. **Distribution of blank spalls by patterns of dorsal faceting in Shulbinka lithic industries, spec.**

Faceting pattern	Cultural horizon												Surface collection				Sub-total				Total	
	3				2				1													
	Blades	Laminar flakes	Technical spalls	Flakes	Blades	Laminar flakes	Technical spalls	Flakes	Blades	Laminar flakes	Technical spalls	Flakes	Blades	Laminar flakes	Technical spalls	Flakes	Blades	Laminar flakes	Technical spalls	Flakes	spec.	%
Natural	–	–	41	–	–	–	44	–	1	–	6	–	1	1	18	1	2	1	109	1	*113*	*5,4*
Smooth	–	–	–	12	–	–	2	12	–	–	–	1	–	–	–	8	–	–	2	33	*35*	*1,7*
Parallel and sub-parallel unidirectional	70	31	56	99	73	18	68	95	12	8	25	28	92	85	91	153	247	142	240	375	*1004*	*48,3*
Parallel and sub-parallel bidirectional	10	6	5	9	18	6	3	7	4	4	4	6	9	13	13	18	41	29	25	40	*135*	*6,5*
Longitudinal-transversal	2	1	42	45	1	1	28	53	3	8	10	15	2	6	42	50	8	16	122	163	*309*	*14,9*
Transversal	–	–	9	5	–	–	4	8	–	–	3	3	–	–	10	13	–	–	26	29	*55*	*2,6*
Irregular	–	–	3	13	–	3	5	17	–	–	2	8	–	12	9	357	–	15	19	395	429	20,6
Total	82	38	156	183	92	28	154	192	20	20	50	61	104	117	183	600	298	203	543	1036	*2080*	*100*

Table 4. **Distribution of blank spalls by patterns of striking platforms preparation in Shulbinka lithic industries, spec.**

Preparation pattern	Cultural horizon												Surface collection				Sub-total				Total	
	3				2				1													
	Blades	Laminar flakes	Technical spalls	Flakes	Blades	Laminar flakes	Technical spalls	Flakes	Blades	Laminar flakes	Technical spalls	Flakes	Blades	Laminar flakes	Technical spalls	Flakes	Blades	Laminar flakes	Technical spalls	Flakes	spec.	%
Natural	3	–	19	11	1	–	15	13	–	–	8	4	–	4	10	13	4	4	52	41	*101*	*9.4*
Smooth	24	10	60	61	28	11	53	74	2	6	17	27	12	21	64	101	66	48	194	263	*571*	*53.2*
Dihedral	10	2	9	13	19	1	9	16	1	3	5	8	11	25	36	79	41	31	59	116	*247*	*23.0*
Faceted	–	1	2	1	–	–	2	–	–	–	–	–	–	–	–	–	–	1	4	1	*6*	*0.6*
Linear/punctiform	8	2	6	6	3	4	7	17	2	1	2	2	8	18	22	41	21	25	37	66	*149*	*13.9*
Total	55	17	105	105	70	17	95	136	6	13	37	49	42	93	168	313	173	140	405	603	*1074*	*100*

Table 5. **Tool types in Shulbinka lithic industries**

Tool type	Cultural horizon						Surface collection		Total	
	3		2		1					
	spec.	%	spec.	%	spec.	%	spec.	%	spec.	%
1	2	3	4	5	6	7	8	9	10	11
Side-scrapers:	23	16.7	14	17.9	2	6.1	9	7.6	*48*	*13.1*
single	17	12.3	7	9.0	1	3.0	5	4.2	*30*	*8.2*
transverse	1	0.7	–	–	–	–	–	–	*1*	*0.3*
diagonal	–	–	1	1.3	–	–	–	–	*1*	*0.3*
double	3	2.2	4	5.1	–	–	–	–	*7*	1.9
double longitudinal-transverse	1	0.7	–	–	–	–	–	–	*1*	*0.3*
convergent	–	–	2	2.6	–	–	3	2.5	*5*	*1.4*
triple	–	–	–	–	1	3.0	1	0.8	*2*	*0.5*
retouched along the perimeter	1	0.7	–	–	–	–	–	–	*1*	*0.3*
End-scrapers:	58	42.0	23	29.5	11	33.3	57	48.3	*149*	*40.6*
end-scrapers on blades	2	1.4	1	1.3	–	–	1	0.8	*4*	*1.1*
end-scrapers on laminar flakes	7	5.1	1	1.3	1	3.0	13	11.0	*22*	*6.0*
end-scrapers on flakes	42	30.4	16	20.5	5	15.2	20	16.9	*83*	*22.6*
end-scrapers on laminar flakes with retouched long sides	–	–	–	–	–	–	9	7.6	*9*	*2.5*
end-scrapers on flakes with retouched long sides	–	–	–	–	–	–	2	1.7	*2*	*0.5*
thumbnail	4	2.9	–	–	–	–	–	–	4	1.1
flake scrapers on laminar flakes	2	1.4	–	–	–	–	1	0.8	*3*	*0.8*
flake scrapers on flakes	–	–	3	3.8	2	6.1	2	1.7	*7*	*1.9*
double end-scrapers on laminar flakes	–	–	–	–	–	–	2	1.7	*2*	*0.5*
double flake scrapers on flakes	–	–	1	1.3	–	–	–	–	*1*	*0.3*
angle on flakes	–	–	–	–	3	9.1	–	–	*3*	*0.8*
retouched along 3/4 of the perimeter, on laminar flakes	–	–	–	–	–	–	2	1.7	*2*	*0.5*
retouched along 3/4 of the perimeter, on flakes	–	–	1	1.3	–	–	3	2.5	*4*	*1.1*
retouched along the perimeter	1	0.7	–	–	–	–	2	1.7	*3*	*0.8*
Points:	2	1.4	1	1.3	1	3.0	2	1.6	*6*	1.6
retouched along the perimeter	1	0.7	1	1.3	1	3.0	1	0.8	*4*	*1.1*
with alternate retouch	1	0.7	–	–	–	–	1	0.8	*2*	*0.5*
Pointed blades with heavy retouch	2	1.4	–	–	–	–	–	–	*2*	*0.5*
Blades with heavy retouch	3	2.2	4	5.1	1	3.0	2	1.7	*10*	*2.7*
Laminar flakes with heavy retouch	–	–	–	–	–	–	4	3.4	*4*	*1.1*
Burins:	4	2.9	4	5.1	2	6.1	–	–	*10*	*2.7*
angle	4	2.9	2	2.6	1	3.0	–	–	*7*	*1.9*
dihedral	–	–	1	1.3	1	3.0	–	–	*2*	*0.5*
flat	–	–	1	1.3	–	–	–	–	*1*	*0.3*
Chisel-like tools:	26	18.8	16	20.5	10	30.3	28	23.7	*80*	*21.8*
single-edged	20	14.5	8	10.3	7	21.2	8	6.8	43	11.7
double-edged	6	4.3	6	7.7	3	9.1	19	16.1	*34*	*9.3*
triple-edged	–	–	1	1.3	–	–	1	0.8	*2*	*0.5*
four-edged	–	–	1	1.3	–	–	–	–	*1*	*0.3*

Table 5 (end)

1	2	3	4	5	6	7	8	9	10	11
Knives with retouched cutting edge	5	3.6	3	3.8	1	3.0	7	5.9	*16*	*4.4*
Bifacial artifacts:	3	2.2	2	2.6	1	3.0	1	0.8	*7*	*1.9*
bifaces	–	–	1	1.3	–	–	–	–	*1*	*0.3*
biface blanks	–	–	–	–	–	–	1	0.8	*1*	*0.3*
with bifacial treatment	3	2.2	1	1.3	1	3.0	–	–	*5*	*1.4*
Unifaces	2	1.4	–	–	1	3.0	–	–	*3*	0.8
Spurs	3	2.2	4	5.1	1	3.0	–	–	*8*	*2.2*
Notches with retouched encoche	1	0.7	–	–	–	–	4	3.4	*5*	*1.4*
Combination tools:	2	1.4	–	–	1	3.0	4	3.4	*7*	*1.9*
end-scraper + side-scraper	2	1.4	–	–	–	–	1	0.8	*3*	*0.8*
end-scraper + chisel-like tool	–	–	–	–	1	3.0	3	2.5	*4*	*1.1*
Pebble tools:	4	2.9	7	9.0	1	3.0	–	–	*12*	*3.3*
side-scrapers	2	1.5	3	3.8	–	–	–	–	*5*	*1.4*
scraper-like tools	1	0.7	2	2.6	–	–	–	-	*3*	*0.8*
planing tools	1	0.7	2	2.6	1	3.0	–	–	*4*	*1.1*
Retouched spalls:	76	–	22	–	12	–	41	–	*151*	–
pointed blades with retouch	–	–	1	–	–	–	1	–	*2*	–
blades with retouch	18	–	7	–	–	–	1	–	*26*	–
laminar flakes with retouch	7	–	1	–	1	–	2	–	*11*	–
flakes with retouch	18	–	4	–	1	–	1	–	*24*	–
shatters and fragments with retouch	4	–	–	–	–	–	2	–	*6*	–
blades with irregular retouch	18	–	6	–	1	–	4	–	*29*	–
laminar flakes with irregular retouch	–	–	–	–	–	–	8	–	*8*	–
flakes with irregular retouch	11	–	3	–	5	–	11	–	*30*	–
shatters and fragments with irregular retouch	–	–	–	–	4	–	11	–	*15*	–
Tool fragments	–	–	3	–	2	–	13	–	*18*	–
Hammerstones	1	–	–	–	–	–	3	–	*4*	–
Total	215	100 (from 138)*	103	100 (from 78)*	47	100 (from 33)*	175	100 (from 118)*	*540*	100 (from 367)*

* In parentheses, the number of tools without unidentifiable forms (retouched shatters and tool fragments) assumed as 100 % is provided.

faceted cores for making blades and core-like fragments (see Table 2).

The types and composition of technical spalls are similar to those in the collection of horizon 2 (see Table 1).

The pattern of dorsal faceting, techniques of ledge rejuvenation, and the frequency of their use in lamellar spall working in horizon 1 coincides neatly with those observed in the underlying horizons (see Table 3). The number of identifiable striking platforms does not constitute a representative sample, however.

The materials from horizon 1 are similar to those from horizon 3 in terms of the pattern of dorsal faceting and striking platform preparation, and to those from horizon 2 in terms of flaking surface preparation (see Table 3, 4).

The proportion of informal tools in the tool kit is ~30 %. The typologically distinct tools from this layer include end-scrapers (see Fig. 6, *2*) and chisel-like tools (see Fig. 6, *4*); these are represented by the same types as in horizons 3 and 2 (see Table 5). As compared to the underlying horizons, horizon 1 yielded far fewer side-scrapers and pebble tools, and far more unifaces. Other forms (burins (see Fig. 6, *7*), spurs, and others), are similar to those from collections of horizons 2 and 3.

Surface finds. The collection of surface finds includes 1657 artifacts (129 % of the number indicated in the Petrin's and Taimagambetov's monograph (2000)), and includes 19 cores and 175 tools (see Table 1). The primary reduction process observed in these artifacts is similar to

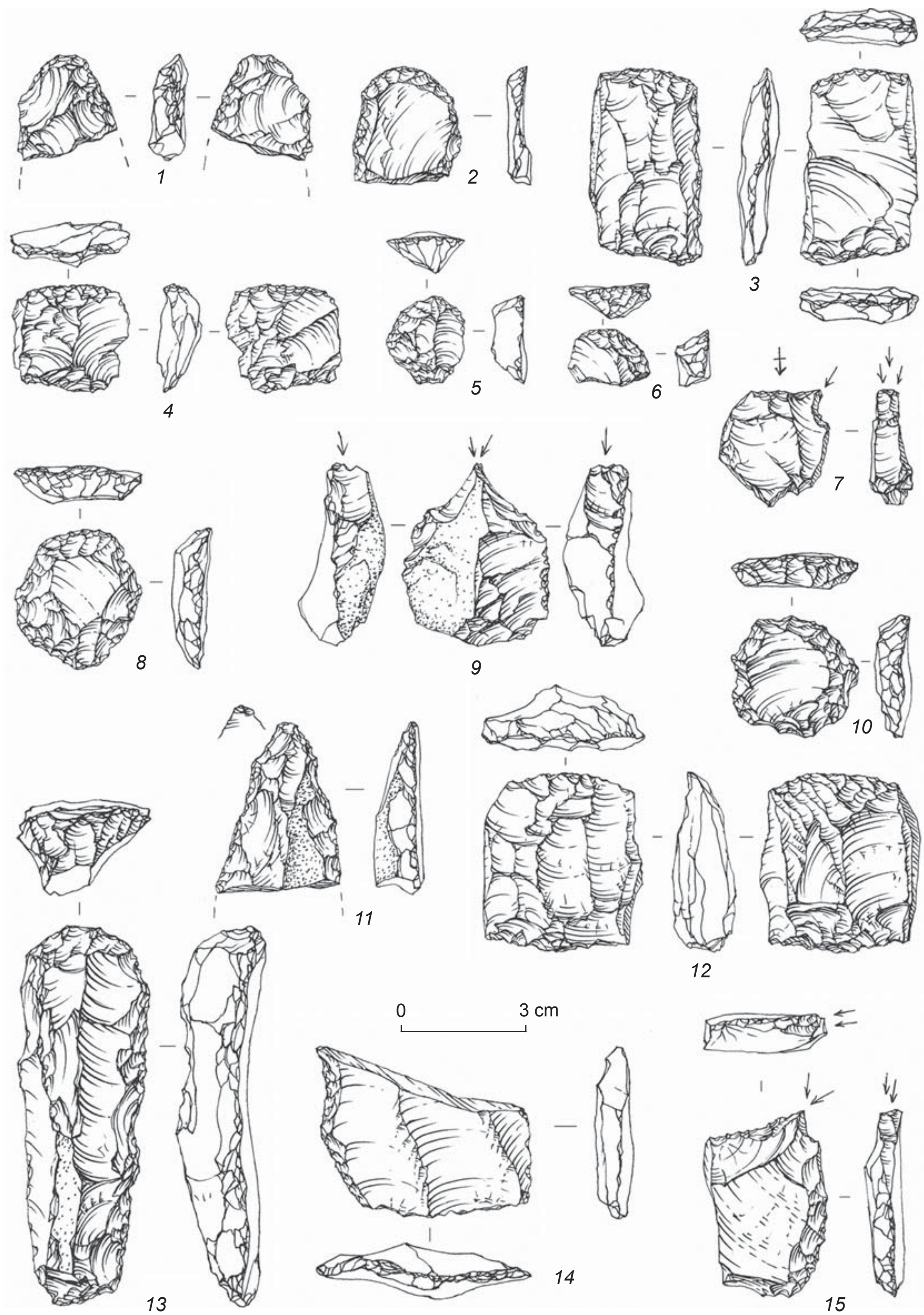

Fig. 6. Tools from Shulbinka cultural horizons 2 (*1*, *6*, *9–12*, *14*), 1 (*2*, *4*, *7*), and 3 (*3*, *5*, *8*, *13*, *15*).

those recovered from the stratified complexes; however, 2/3 of the collection consists of small edge-faceted cores for making blades, and microcores for making bladelets and microblades; while 1/3 of the collection consists of radial and single-platform parallel cores (see Table 2).

Spalls are of the same types as in the collections of horizons 2 and 3, but they are half as frequent in this portion of the assemblage (see Table 1).

The spall assemblage includes blades, bladelets, microblades, and flakes (see Table 1). The dorsal faceting of laminar spalls observed here is the same as in the collection of horizon 3 (see Table 3). The identifiable striking platforms include approximately equal shares of smooth, punctiform, and dihedral platforms (see Table 4). Approximately half of laminar spalls show signs of preparation of flaking surfaces through direct and reverse reduction.

The flakes show mainly longitudinal or longitudinal-transversal faceting and smooth, dihedral, or punctiform striking platforms (see Table 3, 4). Flaking surface preparation, observed on more than half of the flakes, was carried out mostly through direct reduction.

The proportion of informal tools in the tool kit is ~30 %. The typologically distinct tool category is dominated by end-scrapers of the same types as in the collections of other horizons, and by chisel-like tools with two cutting edges (see Table 5). The number of side-scrapers in the assemblage is small: those that we did identify are mostly longitudinal single-edged and convergent. Knives with retouched edges are represented by a small series of artifacts.

Analysis of the obtained results

The main discrepancies between the results of studies conducted in 2019 and earlier work pertain to the analysis of cores. In this category, we have identified numerous radial cores, but no Levallois cores (cf.: (Petrin, Taimagambetov, 2000: Fig. 7, *2*; 10, *2*, *3*)) (see Fig. 3, *1–3*). In earlier analysis, a large number of Levallois cores for blades production were identified in the assemblage, probably owing to the broad interpretation of the term "Levallois" (which attributed all flat cores with signs of preparation, made for serial production of blanks of a special type and shape, to this technique). Our reanalysis shows that such cores were in fact subjected to minor preparation, specifically during the shaping of striking platforms and flaking surfaces. Cores of this type were often used for obtaining blanks of various sizes. The collection does not contain spalls that can be interpreted as final or technical products of the Levallois technique. One noteworthy feature of the assemblage is the small proportion of sophisticated striking platforms, among which faceted platforms are rare. Radial cores show centripetal faceting of working surfaces and can be regarded as the flake Levallois forms (see Fig. 3, *1–3*). However, the central convexity of their flaking surfaces is not high and does not suggest that they were used for removing a single target spall. Circular flaking on these artifacts was not preparatory, but systematic, resulting in series of large target spalls. The collection includes some cores with two flaking faces (see Fig. 3, *4*), which were utilized in the same way. This would be impossible if the Levallois technique was used, because the Levallois technique implies flaking of only one surface to get the target blanks.

The technical-typological analysis of the collection has shown almost complete uniformity between artifacts from all the horizons, and those from the surface. Comparison of metrical features of core-like artifacts (n=349) from various horizons also fails to show significant distinctions. A particularly indicative consideration is the even distribution over the horizons of products differing in width (Fig. 7). The homogeneity of the archaeological materials from all horizons is further supported by the distribution of spalls of different types over horizons (n=1210, without technical spalls and debitage) (Fig. 8). The parameters of various spall types across the four assemblages are very close, often identical.

A significant proportion of artifacts with missing catalogue numbers most likely originated within horizon 3, because the number of the available artifacts in this group during reanalysis was considerably smaller than in the 2000 records (Petrin, Taimagambetov, 2000). With this in mind, and taking into account that catalogue numbers usually didn't survive on the smallest items, the collection of horizon 3 may include more microcores, small tools, small spalls, and microblades than originally calculated. In this case, the proportions of these categories in the collections of all the discussed horizons would be almost identical. In our viewpoint, the Shulbinka site should be understood as a single culture-chronological Upper Paleolithic complex, possibly with minor inclusions of the Early Holocene (Neolithic) artifacts coming from the roof of the humic layer, or from areas of Pleistocene deposits; for instance, in the burial zone (see (Taimagambetov, 1981)).

Analysis of stratigraphy and planigraphy of the site also provides nothing to contradict this interpretation (Ibid.; Petrin, Taimagambetov, 2000). The general description of the site profile suggests that most of archaeological finds attributed to layer 1 were deposited near the bottom or in the lenses of light yellow loam corresponding to the sediments of layer 2 ("there is a small interlayer of yellow loam (in layer 1), where lithic artifacts are concentrated in grid Д-К/32-41" (Petrin, Taimagambetov, 2000: 5)). This absence of a clear boundary between layers 1 and 2 and analysis of spatial distribution of the artifacts over the horizons supports the idea of a single cultural horizon. Indeed, when plans of the horizons are superimposed, it can be seen that the accumulations of finds at one level correspond to gaps at the other; in particular, the artifacts are concentrated in the household zone around the hearth in horizon 2. The only place where the artifacts of horizon 3 overlap those in other horizons, is the central zone of western section of the excavation area, which is characterized by the greatest thickness of culture-bearing deposits (Fig. 9).

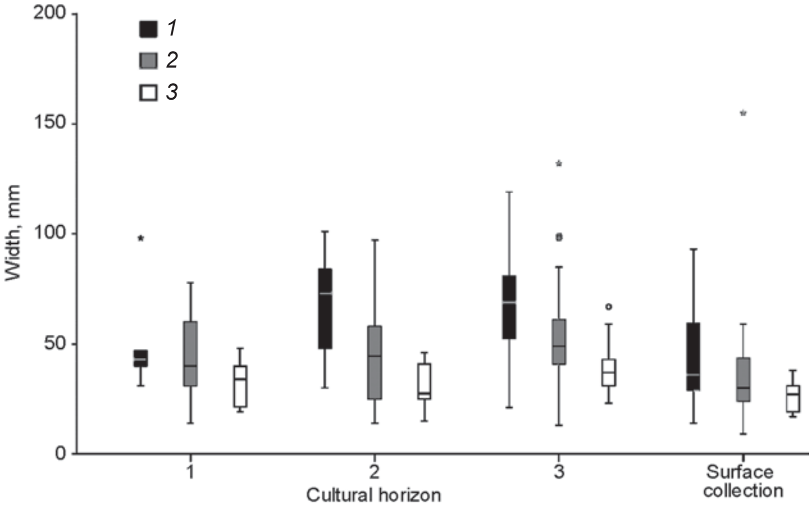

Fig. 7. Width distribution of the core-like artifacts from various horizons and surface collection at Shulbinka.
1 – split pebble; *2* – core; *3* – core-like fragment.

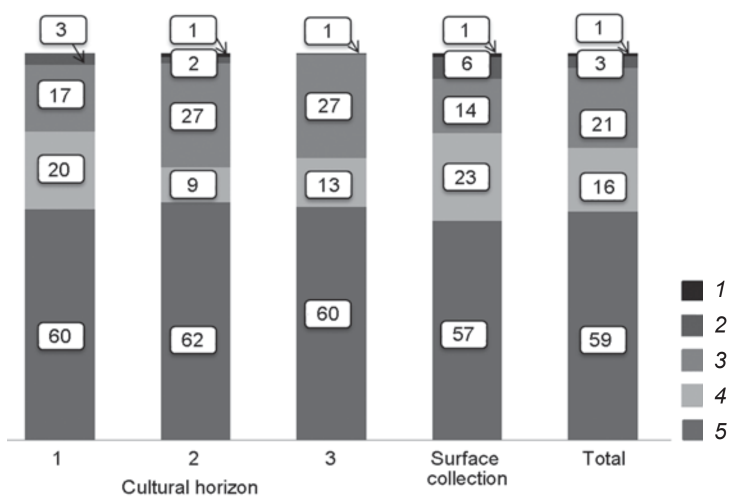

Fig. 8. Percentages of blank spalls from various horizons and surface collection at Shulbinka.
1 – microblade; *2* – bladelet; *3* – blade; *4* – laminar flake; *5* – flake.

Arguments for an early age for some portion of the Shulbinka collection were also based on the geological features of the site. For example, Petrin and Taimagambetov (2000) argued that layer 3 was formed along with the sediments of the Irtysh terrace III, while the yellow loam (layer 2) was accumulated during the Ror Formation of the late MIS 4. Correlation of the sediments of layer 2 to the Novoshulbinka formation (MIS 3) was regarded as less likely, mainly because of the high position of the site over the Irtysh water level; since "the Novoshulbinka formation is associated with the second terrace above the flood plain" (Ibid.: 5). This argumentation raises a number of questions, however. First, the site was discovered on the rock ledge rather than on the terrace; the height of this ledge was not determined by the activity of the river, and cannot be directly related to its terrace levels. Second, in the Irtysh valley near the site, the deposits of the Ror Formation, which are represented by meters of thick strata, were revealed only to the east of the Shulbinka riverbed (Matsuy et al., 1973). At Shulbinka, local geology was formed by the sediments of another genesis—pebble-loamy-sandy of the Tentek Formation in some areas (MIS 2), and young aeolian sands QIII–IV (over vast areas) (Ibid.).

Thus, the assignment of Shulbinka's archaeological materials to MIS 2 does not contradict the local geological situation. Palynological data also provide evidence of the severity of the climate close to LGM during the period of site formation. According to the published data, the ecological conditions during the accumulation of layer 2 corresponded to modern steppe vegetation, but in a poorer form (Taimagambetov, 1987).

The issue of the mixed character of the assemblage, which was argued in early publications, is debatable. In our viewpoint, the archaeological materials represent a homogenous complex, which does not contain any items belonging to other culture-chronological periods. Though the artifacts may had undergone post-depositional displacement; still they relate a single, possibly prolonged, period of occupation. The artifacts' surfaces are undamaged and show no features of deflation, which can be regarded as an indirect proof that the artifacts were not redeposited. The presence of features of anthropogenic origin at the site, such as burials, pavements, fire places, and household pits (Taimagambetov, 1981, 1983, 1987), also indicates that the sediments were not fundamentally altered.

Discussion

The absence of a clear Middle Paleolithic component in the materials of the site under consideration makes it necessary to search for its parallels in Upper Paleolithic industries. The multilayered and well-stratified Upper Paleolithic site of Ushbulak is the nearest site to Shulbinka (Anoikin et al., 2019). However, direct comparison of the industries of these sites can hardly be considered reliable, since they differ both functionally, and in terms of raw materials; though, the used raw materials shows similar "consumer" characteristics (hardness, toughness, etc.). At Shulbinka, tools on river pebbles were produced and utilized. The artifacts from Ushbulak layers 6 and 7—attributable to the Early Upper Paleolithic—suggest that the site was a workshop where blades were detached from large stones (Ibid.). Both archaeological assemblages were focused on production and use of blades as tool blanks. However, the proportion of artifacts typical for laminar reduction in the Ushbulak lithic industry is very high (about 80 % of tools were fashioned on blanks and laminar spalls). In contrast, the relevant proportion at Shulbinka does not exceed 40 %. The shares of various types of cores for production of blades and flakes were approximately equal. Ushbulak layers 6 and 7 yielded cores with over 90 % bearing scars of blade detachments, while the proportion of such cores at Shulbinka does not exceed 50 %. There are also a number of technological differences in the materials of these sites. Bidirectional detachment of laminar blanks, a technique that was widespread in the Central Asian Early Upper Paleolithic industries (Derevianko et al., 2007; Anoikin et al., 2019), including at Ushbulak, was performed much less frequently at Shulbinka. Technological differences are also revealed by differences in core typology and spall faceting (Ushbulak layers 6 and 7 yielded ~40 % of blades with a bidirectional flaking pattern, the relevant share at Shulbinka is ~15 %). A key feature of Early Upper Paleolithic blade production, flaking surface preparation through pecking (Slavinsky et al., 2017), is not present in the Shulbinka lithic industry. Tool types found at both sites, such as end-scrapers on blades, heavily retouched blades, burins, etc., occur in many other Upper Paleolithic complexes. Moreover, the Shulbinka collection does not contain implements that are considered markers of the Early Paleolithic of southern Siberia and Central Asia: such tools include those with basal thinning of ventral surfaces, beveled points, core-burins, and others (Rybin, 2014).

The Upper Paleolithic industries are well represented in the contiguous to Eastern Kazakhstan regions of the Russian Altai (Kara-Bom, Ust-Karakol-1, etc.) (Derevianko et al., 1998; Derevianko, Shunkov, 2005; Prirodnaya sreda…, 2003). The Shulbinka artifacts show certain parallels to the Early Upper Paleolithic industry of Kara-Bom (Upper Paleolithic assemblages 1 and 2), as well as to the finds from Ushbulak layers 6 and 7 (Derevianko, Petrin, Rybin, 2000). The parallels have been noted in the tool kits of Shulbinka and Ust-Karakol-1 layers 8–11 (Prirodnaya sreda…, 2003). This similarity can be explained by the similarity of raw materials used at each site, and the focus of their primary reduction systems towards the production of blades. Moreover, Ust-Karakol-1 layer 9 yielded microcores, including wedge-

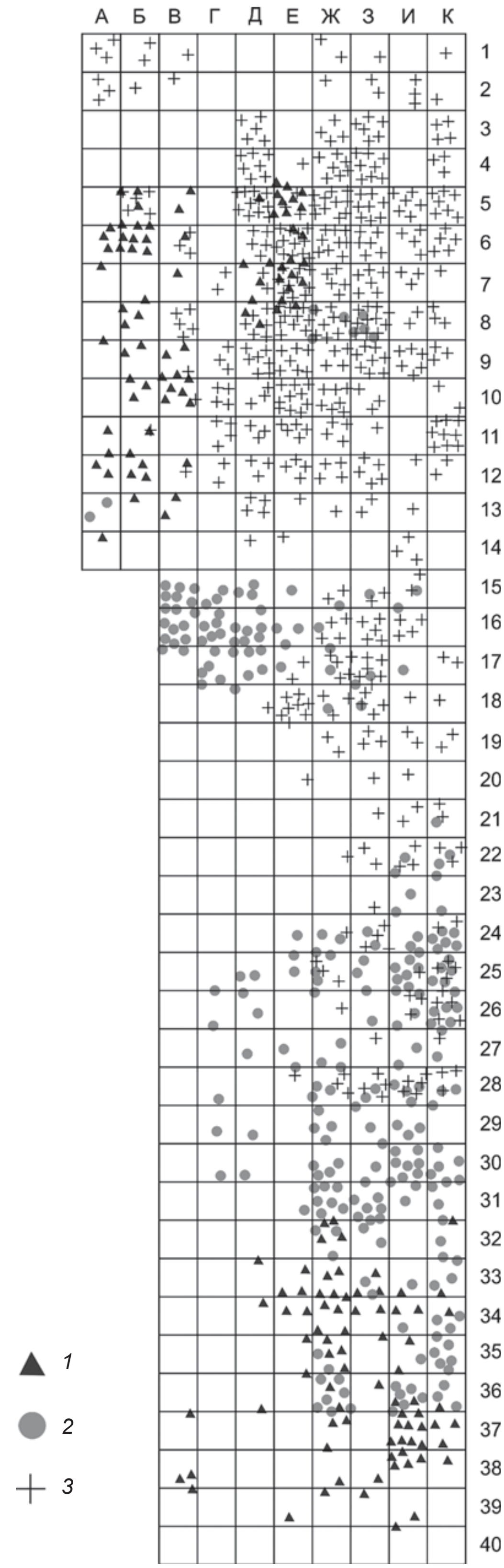

Fig. 9. Spatial distribution of artifacts within Shulbinka cultural horizons 1 (*1*), 2 (*2*), and 3 (*3*).

shaped microcores, that appear archaic when compared to similar Shulbinka artifacts. These microcores show sub-triangular flaking surface convex in plan and in profile view, which is typical of the early "keeled" varieties; wedge and crests are weakly expressed or absent; and microblade blanks removed from such cores are often curved in profile view. The Ust-Karakol-1 microcores are quite different from the classic wedge-shaped cores of the Final Paleolithic (Abramova, 1986). In addition, Ust-Karakol-1 layers 8–11 yielded certain artifacts that can be regarded as the typological and technological markers of the Early Upper Paleolithic (Rybin, 2014), which were absent at Shulbinka.

Common culture features are revealed when comparing archaeological materials from Shulbinka with the Middle Upper Paleolithic complexes of the Altai (Anui-2). For instance, primary reduction strategy at Anui-2 and Shulbinka is utilized cores for making large blades and microcores, including wedge-shaped varieties (Prirodnaya sreda…, 2003) At the same time, significant differences can be seen in the proportions of the main core types and in the tool kit compositions of these assemblages. Middle Upper Paleolithic sites of southern and Western Siberia were characterized by the use of small blades as the main blanks in tool production (Lisitsyn, 2000); but this was not the case in the Shulbinka industry.

The Final Paleolithic industries of southern Siberia show the closest parallels to the Shulbinka collection. Use of large cores for making blades, and small cores for making microblades with regular faceting patterns, in the primary reduction system is typical of many lithic industries associated with the Kokorevo archaeological culture, practiced in southern Siberia 14–10 ka BP (Abramova, 1979; Lisitsyn, 2000; Kharevich, Akimova, Vashkov, 2017). In terms of the technique for flaking surface preparation in blades, the Shulbinka collection is also closer to the Kokorevo assemblages than to the Early Upper Paleolithic industries. Considerable similarity between Shulbinka and Kokorevo sites was also evident in the tool kits at each site, which both contain plenty of end-scrapers on flakes and blades, various side-scrapers on flakes, and pebble tools, such as planing tools, choppers, and unifacial side-scrapers. Both complexes also include heavily retouched blades, burins, and points. Apparently, the lithic industries from the classic Kokorevo sites (Kokorevo I, IV, Novoselovo VII) and from Shulbinka are not identical, however. For instance, the Shulbinka microindustry is dominated by edge-faceted cores, while the Kokorevo complexes mostly reveal wedge-shaped microcores and numerous laminar tool-blanks. It can be stated that the similarities between the complexes under consideration are related not to cultural unity, but to their common stage within the Paleolithic sequence, which makes it possible to attribute the Shulbinka materials to the Final Upper Paleolithic.

This conclusion is further supported through comparison of the Shulbinka materials with the younger Early Holocene complexes of Kazakhstan, which formerly were attributed to the Mesolithic (Kungurov, 2008; Merts, 2008; Zaibert, Potemkina, 1981). The specific features of these industries include the small size of artifacts—cores (edge-faceted, wedge-shaped, prismatic, and cone-shaped), target spalls (microblades), and tools made on microblades, including geometric microliths.

The proportion of microlithic artifacts at Shulbinka is comparatively small, perhaps because the excavated soil was not subjected to screening. Cores for production of microblades are most typical artifacts in the microindustry; such cores were recovered in approximately same quantities from all the horizons (see Table 2). The proportion of microblades in the assemblage is very small (see Table 1); tools made on microblades are absent; tools on blades are few (an end-scraper and a chisel-like tool).

In the considered part of Central Asia, as the researchers suggest, there were two types of Mesolithic industries: those with and those without geometric microliths (Shnaider, 2015; Kungurov, 2008; Merts, 2008; Okladnikov, 1966). The former group is larger and includes the sites of the turn of the Pleistocene-Holocene in Western and Central Kazakhstan (Shiderty-3 and others), Turkmenistan (Dam-Dam-Chashme-2 and others), Tajikistan (Tutkaul, Obi-Kiik, Istyk Cave (horizons 3–4), and others), and Mongolia (Chikhen-Agui). Such industries are characterized by well-developed micro-flaking, mainly of the volumetric and edge-faceted cores, and presence of geometric microliths in the tool kit (Alisher kyzy et al., 2020; Merts, 2008; Shnaider et al., 2020; Derevianko et al., 2008: 9–10). The latter group includes the sites of Ubagan, Yavlenkovskaya, Vinogradovskaya, Karasai, and the Telmanovskaya group of sites in Northern and Eastern Kazakhstan (Zaibert, Potemkina, 1981). Their assemblages also show the developed micro-flaking of the prismatic and edge-faceted cores, but the removed spalls were not modified into geometric microliths.

Comparisons with these assemblages suggest that the Shulbinka materials do not match the characteristics of the Mesolithic industries in Central Asia. For instance, microblades, which are the basis of the Mesolithic complexes, are poorly represented on the site under study. Among blank spalls, the percentage of small laminar forms at Shulbinka is small, and the tool kits do not contain tools made on microblades.

Conclusions

Reanalysis of the Shulbinka collections provides new insights into our understanding of this site. The initial arguments linking the site with the Final Paleolithic proposed by Z.K. Taimagambetov seem reasonable today, an assertion supported by both the typological composition of the lithic artifacts and their stratigraphic position. Owing to the absence of components of the Final Middle and Early Upper Paleolithic, the materials of the site appear to be irrelevant to ongoing debates about the origin of the Upper Paleolithic in the region. At present, this question remains open; however, the available data suggest that Upper Paleolithic culture penetrated into the region from the Altai Mountains. The Shulbinka archaeological materials fit well within the regional context of the Final Upper Paleolithic, and expand our understanding of the development of lithic industries in northern Central Asia in the Late Pleistocene.

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