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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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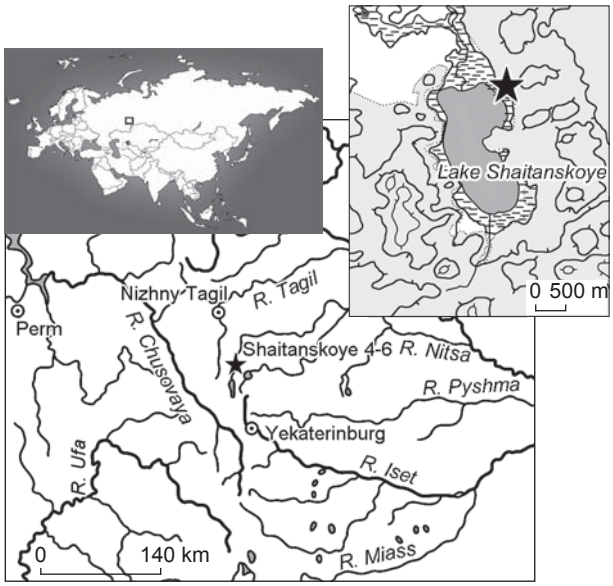

Fig. 1. The archaeological site of Shaitanskoye 4-6.

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 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.

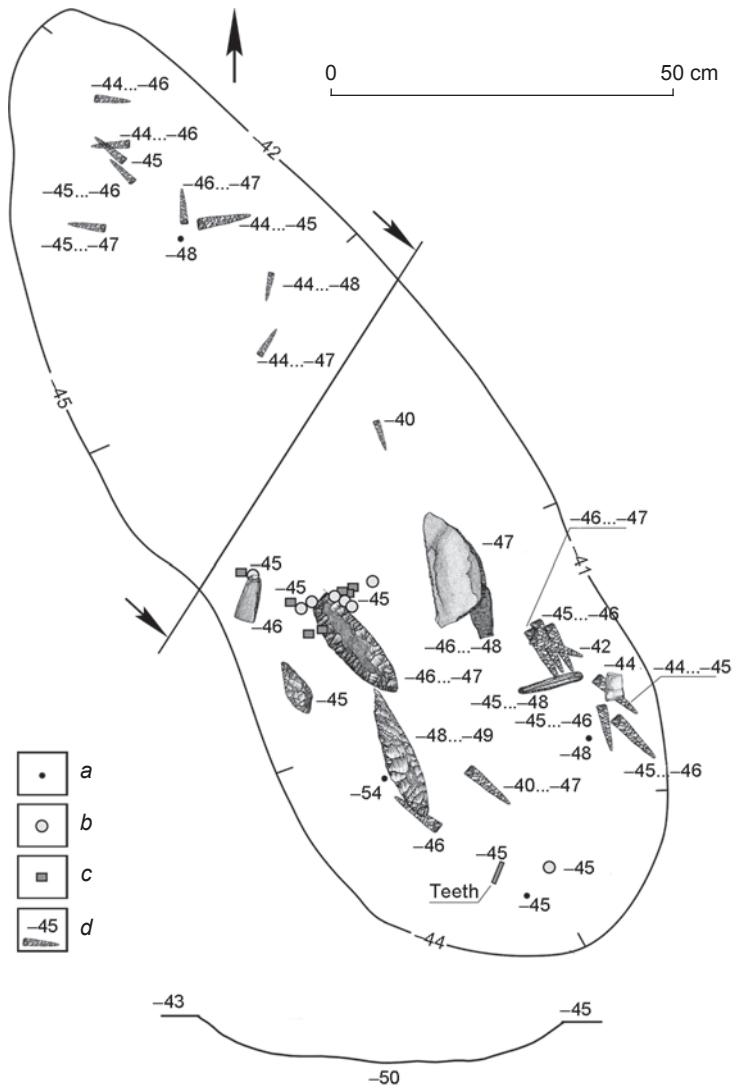

Fig. 2. Plan and section of the burial. The settlement of Shaitanskoye 4-6.
a – mark of the bottom of the grave-pit; *b* – bead; *c* – insert; *d* – artifact, depth of occurrence.

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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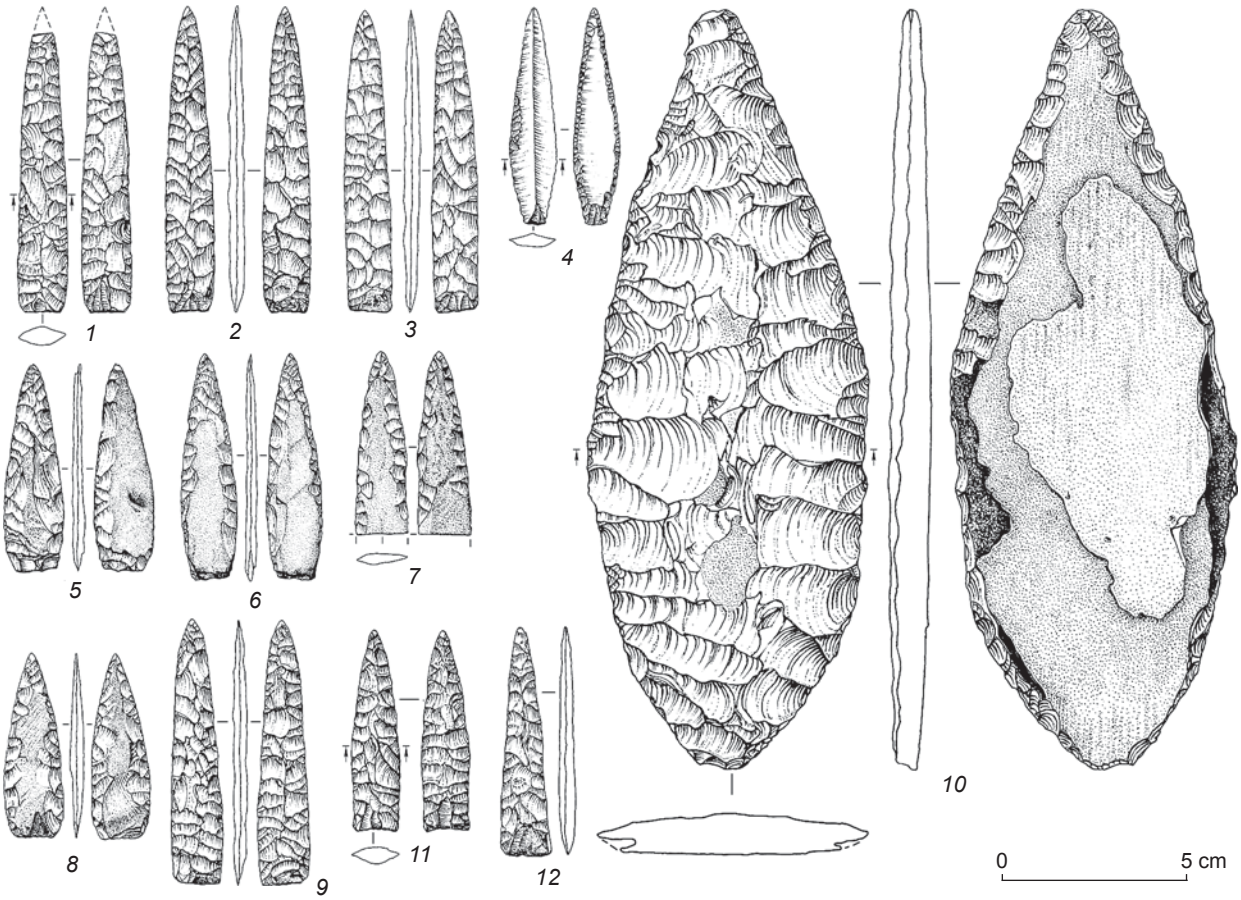

Fig. 3. Lithic tools from the burial. The settlement of Shaitanskoye 4-6.
1–9, *11*, *12* – arrowheads; *10* – knife.

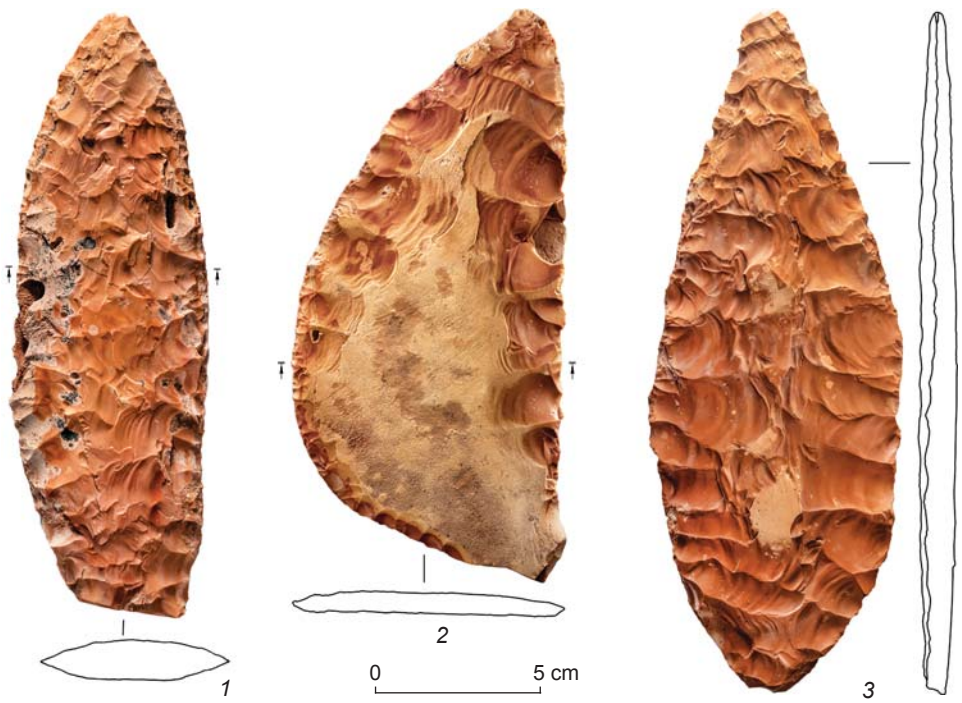

Fig. 4. Stone knives from the burial. The settlement of Shaitanskoye 4-6.

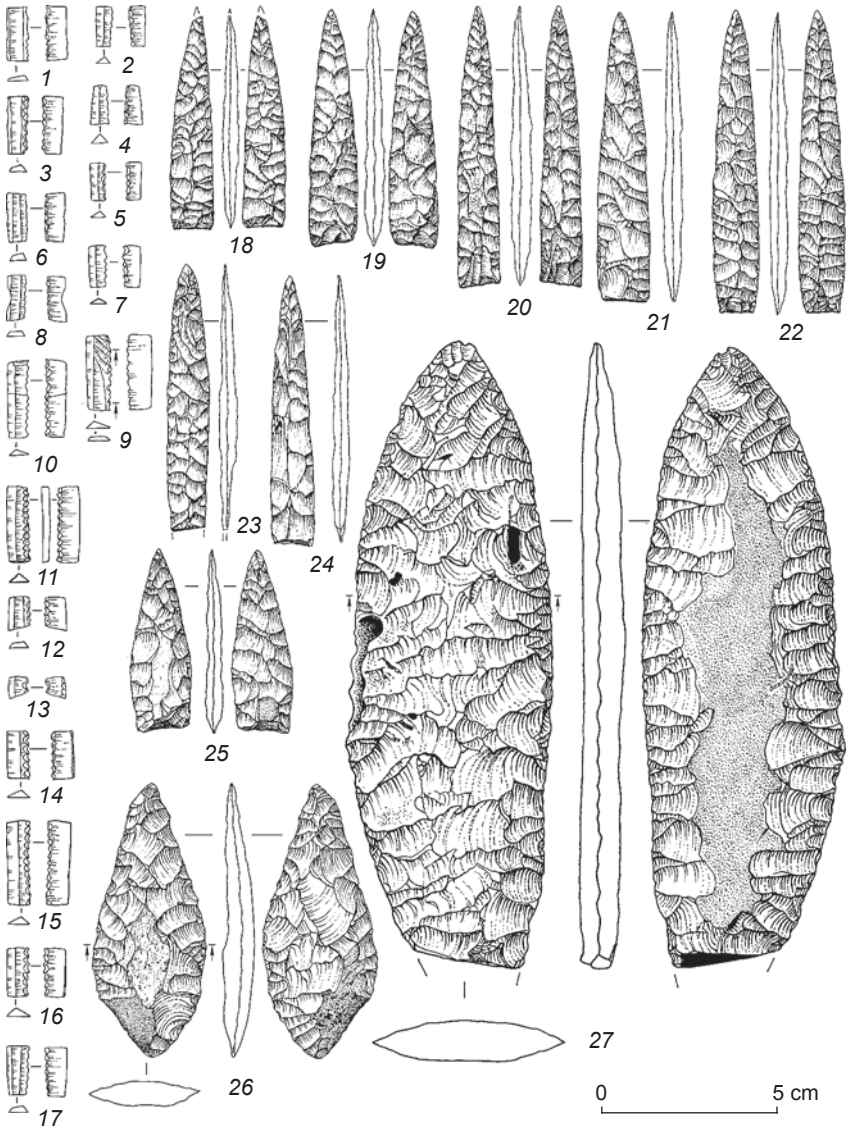

Fig. 5. Lithic tools from the burial. The settlement of Shaitanskoye 4-6.
1–17 – inserts; *18–25* – arrowheads; *26* – projectile head; *27* – knife.

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

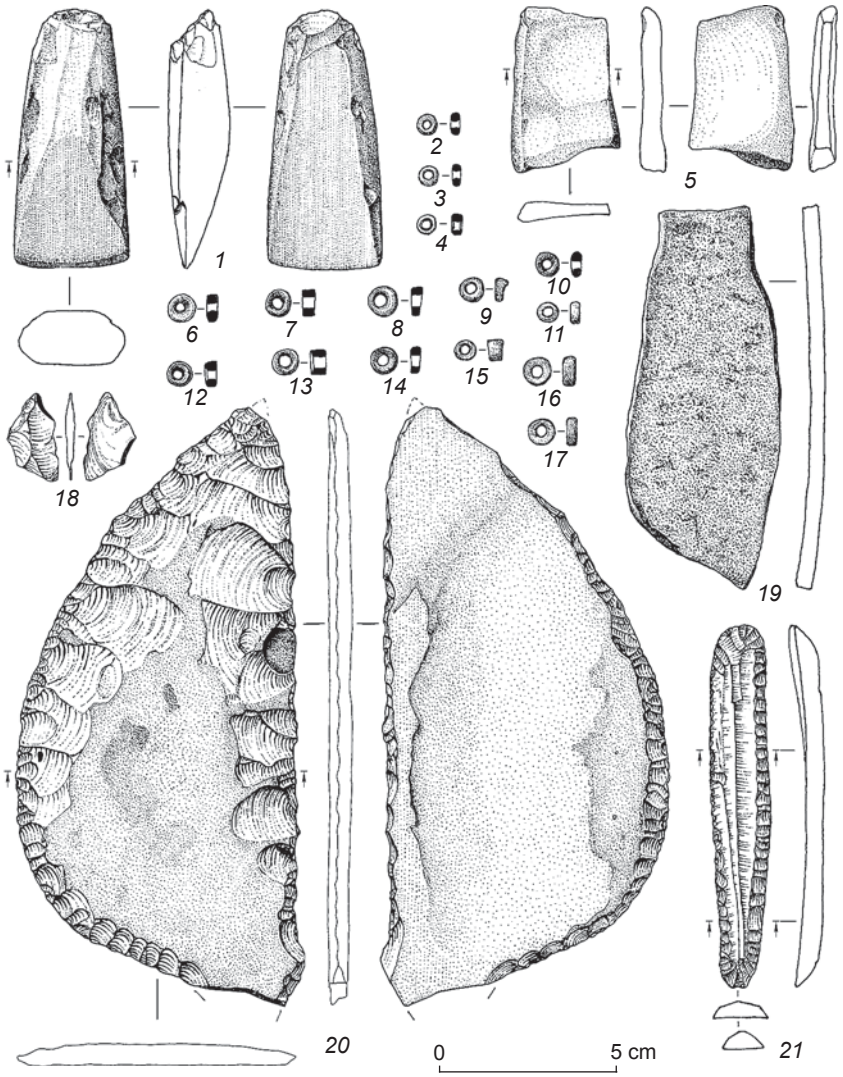

Fig. 6. Lithic tools from the burial. The settlement of Shaitanskoye 4-6.
1 – adze; *2–4*, *6–17* – beads; *5*, *19* – plates; *18* – flake (from cultural layer); *20* – knife; *21* – tool on blade.

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,

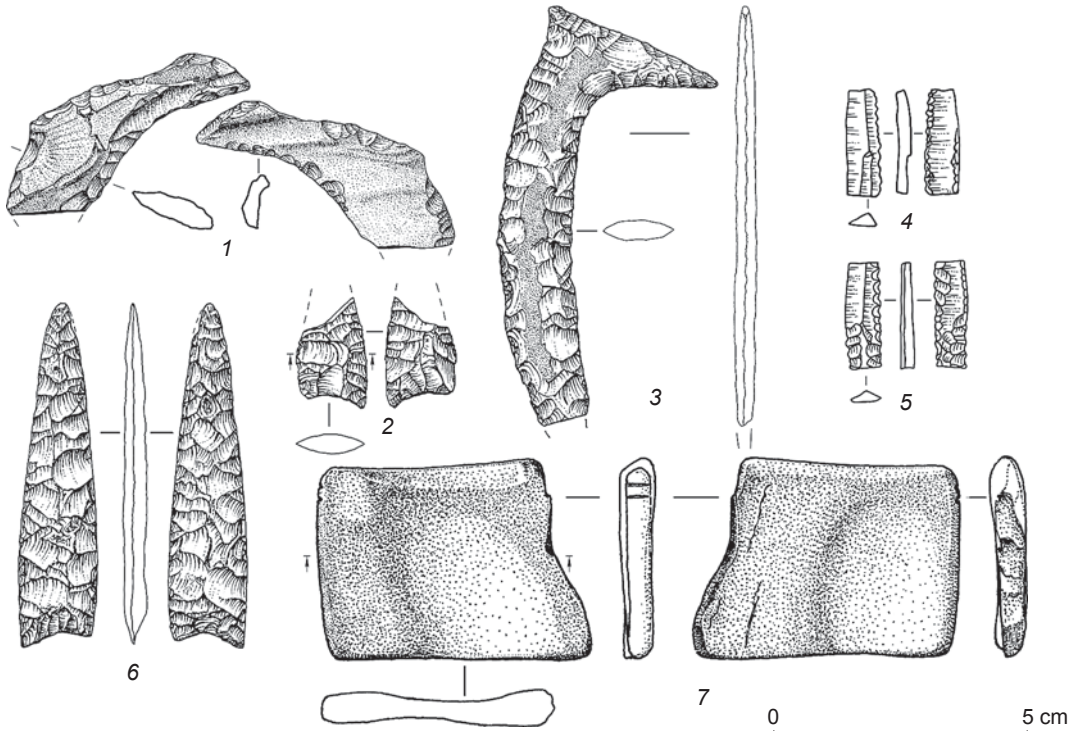

Fig. 7. Lithic tools from the cultural layer of the Shaitanskoye 4-6 settlement.

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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