DOI: 10.17746/1563-0110.2018.46.1.003-015

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Personal Ornament Production Technology in the Early Holocene Complexes of Western Central Asia: Insights from Obishir-5

The stratified site of Obishir-5 is one of the most important Final Pleistocene to Early Holocene sites in western Central Asia. In the Early Holocene component (10,700–8200 cal BP) of this site (layers 2 and 3), we discovered one of the oldest and largest assemblages of soft stone ornaments known from the region. It includes 5 items: three oval, sub-triangular, and sub-rectangular pendants, one "labret"-like ornament, and one ornament blank. All specimens come from stratified and well-dated contexts. As a result of the petrographic, experimental, use-wear, and technological analysis, we reconstructed the chaîne opératoire of these artifacts. To produce them, local raw materials (talcite and serpentinite) were from a source located 4.5 km away from the site. Small pebbles, shatters, and spalls split from nodules were used as blanks. The surface of the blank was first prepared using grinders and burins, then biconical drilling and polishing were used to finish the artifact. Our results point to an established tradition of personal ornament production from soft stone in western Central Asia during the Early Holocene. Comparison of these nonutilitarian artifacts with those from other Final Pleistocene to Early Holocene archaeological complexes across Central Asia, the Middle East, and the Near East suggests that personal ornament manufacture may be an important hallmark of social developments across a broad geographic region.

Keywords: *Central Asia, Mesolithic, experimental use-wear analysis, technological analysis, symbolic behavior, personal ornaments, pendants.*

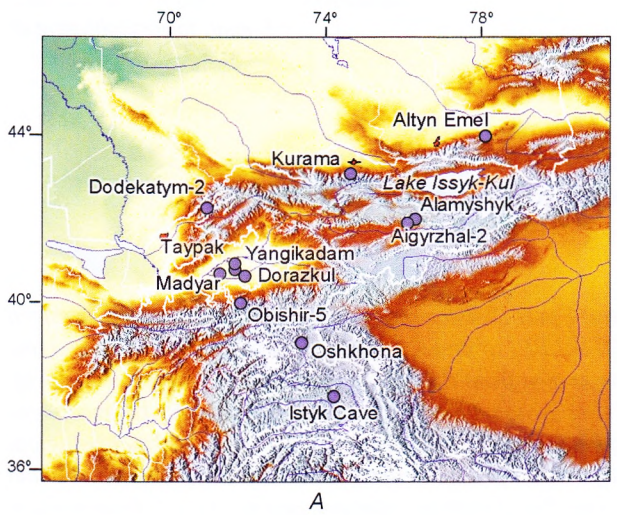
Archaeology, Ethnology & Anthropology of Eurasia 46/1 (2018) 3–15 E-mail: Eurasia@archaeology.nsc.ru

Introduction

Ornaments made from stone, bones, teeth, tusks, mollusk and egg shells are an important manifestation of symbolic behavior in prehistoric humans, and have been reflected in Central and Northern Asia since 50,000 cal BP (Derevianko, Rybin, 2003; Derevianko, Shunkov, Volkov, 2008; Lbova, 2011; Rybin, 2014; Shunkov et al., 2016; Slavinsky et al., 2017). Symbolic activities like ornament production imply creativity, as well as the everyday use of systems of symbolic communication by early humans (Vasiliev et al., 2007: 250). The development of symbolic behavior may have been closely related to processes such as storage and communication of cultural information and group identity (Barton, Clark, Cohen, 1994; Sher, Vishnyatsky, Blednova, 2004; Bar-Yosef, 2005; Lbova, 2011; Rigaud, D'Errico, Vanhaeren, 2015; Rigaud, Gutierrez-Zugasti, 2016).

Despite their important role in human cultural development, questions of cultural and chronological attribution, reconstruction of the chaîne opératoire, and the uses of ornaments from the Stone Age archaeological complexes in western Central Asia have only recently begun to attract significant scholarly interest. In previous years, many publications reported only the presence of ornaments and their material type at Early Holocene sites of this area (see, e.g., (Markov, 1966; Korobkova, 1989)). As a result, traditions of manufacture, selection of raw materials, and use of these items, as well as their complex social, cultural, and aesthetic functions, have gone unnoticed.

This article considers the production technology of stone ornaments from the Early Holocene archaeological assemblage of Obishir-5, located on the southern edge of the large Ferghana valley near Aidarkyen in modern Kyrgyzstan (Fig. 1, *A*). The lithic materials from the site, which dates to



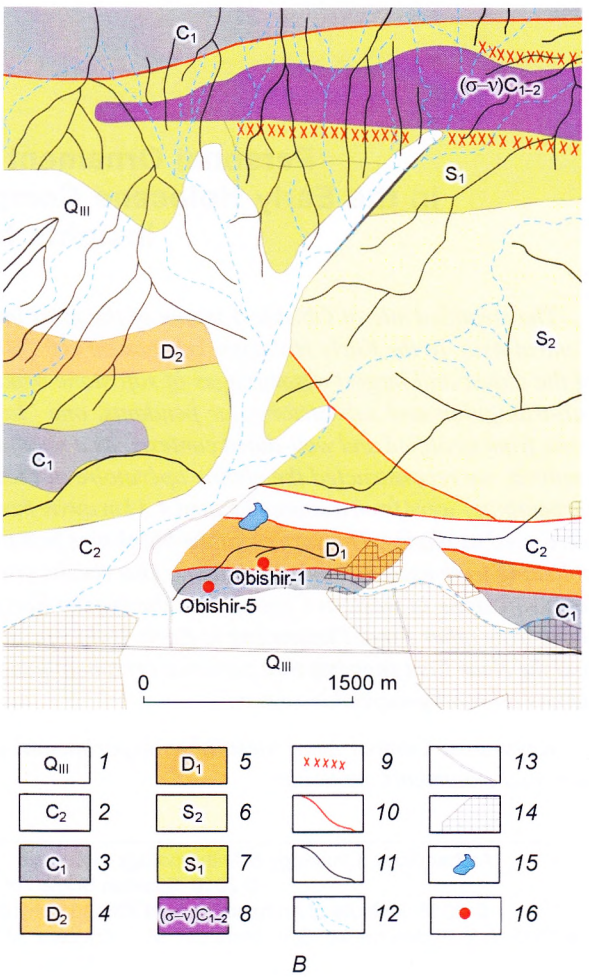


Fig. 1. Distribution of the Late Paleolithic to Epipaleolithic sites in western Central Asia (*A*) and possible sources of stone raw materials for the ornaments of Early Holocene assemblage from Obishir-5 (*B*).

1 – Upper Pleistocene deposits: loams, pebble stones, sands; *2*—Middle Carboniferous deposits: gritstones, shales, sandstones, limestones; *3* – Lower Carboniferous deposits: limestones, clay shales, siliceous concretions; *4* – Upper Devonian deposits: limestones; *5* – Lower Devonian deposits: shales, sandstones, limestones; *6* – Upper Silurian deposits: shales, limestones; *7* – Lower Silurian deposits: shales, sandstones, effusives, conglomerates, limestones; *8* – Lower and Middle Carboniferous igneous complex: peridotites, pyroxenites, serpentinites, gabbro; *9* – skarnified rocks; *10* – tectonic contact line; *11* – ridges; *12* – valleys of temporary watercourses; *13* – roads; *14* – urban or closed zones; *15* – lakes; *16* – site locations.

10,700–8300 cal BP, contain an impressive series of nonutilitarian products, including a morphologically diverse range of ornaments made from semiprecious stones. The ornament assemblage from Obishir-5 is one of the most abundant among such Mesolithic sites in this large region, and its occurrence in a well-dated stratigraphic sequence enables determination of the chronological and cultural significance of ornaments from Final Pleistocene and Early Holocene assemblages of western Central Asia.

Archaeological assemblages of Obishir-5

The site of Obishir-5 was discovered in 1965 by the expedition of the Institute of History and Archaeology of the Academy of Sciences of Uzbek Soviet Socialist Republic, led by U.I. Islamov. During the first stage of studying the site, which covered seven field seasons (1966–1971 and 1973), the excavations explored a land plot with the total area of 141 m^2. Islamov distinguished four stratigraphic layers in the northern wall of the 1973 trench, seven layers in the southern wall of the 1970 excavation, six layers in the western wall of the 1968–1971 and 1973 excavations, and five layers in the eastern wall of the 1968–1969 excavation. The uppermost layer consists of humic gray sandy loam, underlain by a gray sandy loam containing remains of an early-medieval settlement. The Early Holocene materials occurred in the lower part the deposit (layers 3–6). In the first stage of field studies of the site, about 7500 lithic artifacts were discovered.

The archaeological collection of materials from Early Mesolithic cultural horizons of Obishir-5 was analyzed by Islamov as a single assemblage. Debitage associated with primary reduction is represented by numerous products related to microblade removal. Tools recovered from Obishir included retouched bladelets and microblades, end-scrapers, segments, side-scrapers, choppers, and chopping-tools. Stone ornaments and bone items comprise a small portion of the total assemblage. On the basis of comparison with the assemblages from Tutkaul (horizon 2a) and Oshkhona (Tajikistan), the Early Holocene industry of Obishir-5 was ascribed to the 9th–8th millennium BC (Islamov, 1980).

Excavations at the Obishir-5 site were resumed in 2015 to be conducted by a joint Russian-Kyrgyzstan archaeological expedition. The purpose of field work was to clarify the stratigraphy, obtain samples for absolute dating, verify and clarify the paleoecological context of the site's use, and apply new archaeological and science-based methods (Shnaider et al., 2017). In 2015–2016, researchers working at the site excavated an area of 8 m^2 adjoining the 1968–1969 excavation area (Fig. 2, *A*).

The excavations clarified the site's stratigraphy, revealing six stratigraphic layers (Fig. 2, *B*).

Layer 0 contains vegetation and topsoil.

Layer 1 is composed of loams ranging from light-gray to gray-brown color and contains archaeological materials pertaining to the Early Middle Ages.

Layers 2 and 3 consists of loams ranging from light-brown to dark-brown, of colluvial origin. The layers contain lithic artifacts.

Layer 4 is composed of loess-like loams ranging from cream to yellowish-brown, with limestone debris.

Layer 5 can be considered as typical loess, which was formed during the last glacial maximum. These deposits contained lithic artifacts.

Taking into account the stratigraphic scheme of excavation section by Islamov and according to his stratigraphic description of the western wall of the 1968–1969 excavation area, correlations can be drawn between new and previous stratigraphic designations: layer 0 of the new excavation and layer 1 of 1968–1969 excavation, layer 1 and layer 2, layer 2 and layers 3, 4, layer 3 and layer 5, layers 4, 5 and layer 6.

Based on Accelerator Mass Spectrometry (AMS) radiocarbon dates on charcoal, Layer 1 dates to 1650 ± 20 BP (PLD-31751) (1607–1524 BP), Layer 2.3 to 7405 ± 25 BP (PLD- 31752) (8316–8178 BP), and Layer 2.4 to 9410 ± 30 BP (PLD-31753) (10,719–10,569 BP)*.

Collections of artifacts from layers 2 and 3 (about 2200 pieces in all) show considerable techno-

*Radiocarbon dates have been obtained during the study under the Project "Formation of Nomadic Societies in Ancient Eurasia" (led by K. Onuma (Kokushikan University, Tokyo, Japan)). The dates were calibrated by means of the OxCal v.4.3 software, using the confidence interval of 95.4 % (Reimer et al., 2013).

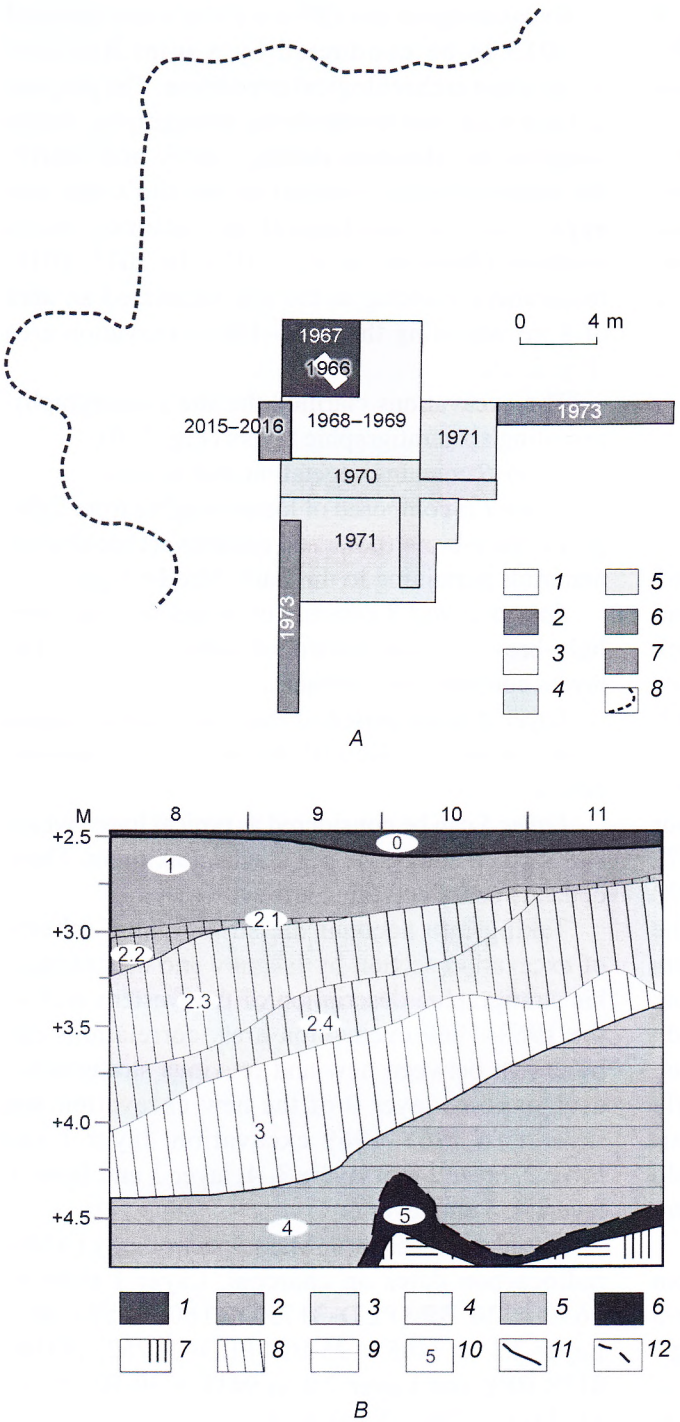


Fig. 2. Plan of excavation areas (*A*) and stratigraphy of deposits (*B*) at Obishir-5 site.

A: *1* – 1966 probe trench; *2* – 1967 excavation; *3* – 1968–1969 excavation; *4* – 1970 excavation; *5* – 1971 excavation; *6* – 1973 trench; *7* – 2015–2016 excavation; *8* – internal boundary of the grotto; *B*: *1* – vegetation and topsoil layer (lithological layer 0); *2* – gray loams (lithological layer 1); *3* – silt loams (lithological layer 2); *4* – light loams (lithological layer 3); *5* – loess-like deposits (lithological layer 4); *6* – dense loams (lithological layer 5); *7* – bedrock exposure; *8* – deposits formed as a result of colluvial activity; *9* – deposits *in situ*; *10* – numbers of layers in study; *11* – boundaries of layers (sharp, erosion); *12* – blurred boundaries.

typological similarity. Primary reduction materials from this assemblage point to the use of prismatic and narrow-faced cores to obtain bladelets and microblades by the pressure detachment technique (Fig. 3, *16*, *17–20*, *22*). The toolkit contains microblades with ventral retouch (Fig. 3, *10*, *11*), borers (Fig. 3, *2–4*), notched tools on bladelets (Fig. 3, *6*), microscrapers (Fig. 3, *13*), microchisel-like tools (Fig. 3, *12*), single burins (Fig. 3, *5*), backed bladelets (Fig. 3, *7*, *9*), and trapezoids (Fig. 3, *3*). Lithic industries of layers 4 and 5 show resemblance to each other in their basic techno-typological features. The toolkit is dominated by bladelets with a dorsal and blunting retouch (Fig. 3, *8*), and by end-scrapers (Fig. 3, *14*, *15*).

The materials from layers 2 and 3 of Obishir-5 demonstrate similarity to the Final Pleistocene and Early Holocene assemblages of Northern and Central Tian Shan (Alamyshyk, Aigyrzhal-2, Altyn Emel) and Pamirs (Oshkhona, Istyk Cave, horizon 1–2) (Abdykanova et al., 2015; Shnaider, Abdykanova, Krivoshapkin, 2015; Shnaider et al., 2016). Materials from layers 4 and 5 have parallels in the industries of the Upper Paleolithic sites of Northern and Western Tian Shan (Dodekatym-2, layers 4–2; Kurama) (Kolobova et al., 2013; Chargynov, 2015). These comparisons, in conjunction with associated radiocarbon dates, suggest that Obishir contains two non-contemporaneous and technologically different assemblages dating to the Final Pleistocene and the Early Holocene.

Study materials

There are five artifacts interpreted as stone ornaments in the archaeological collection of the Early Holocene assemblage (layers 2 and 3) of Obishir-5 (Fig. 3, *24–28*). Three nonutilitarian items were found during 1966–1973 excavations (Islamov, 1980: 71–72). According to the stratigraphic sequence proposed by Islamov, these artifacts occurred in the first cultural horizon Currently, the storage location of these items is unknown,

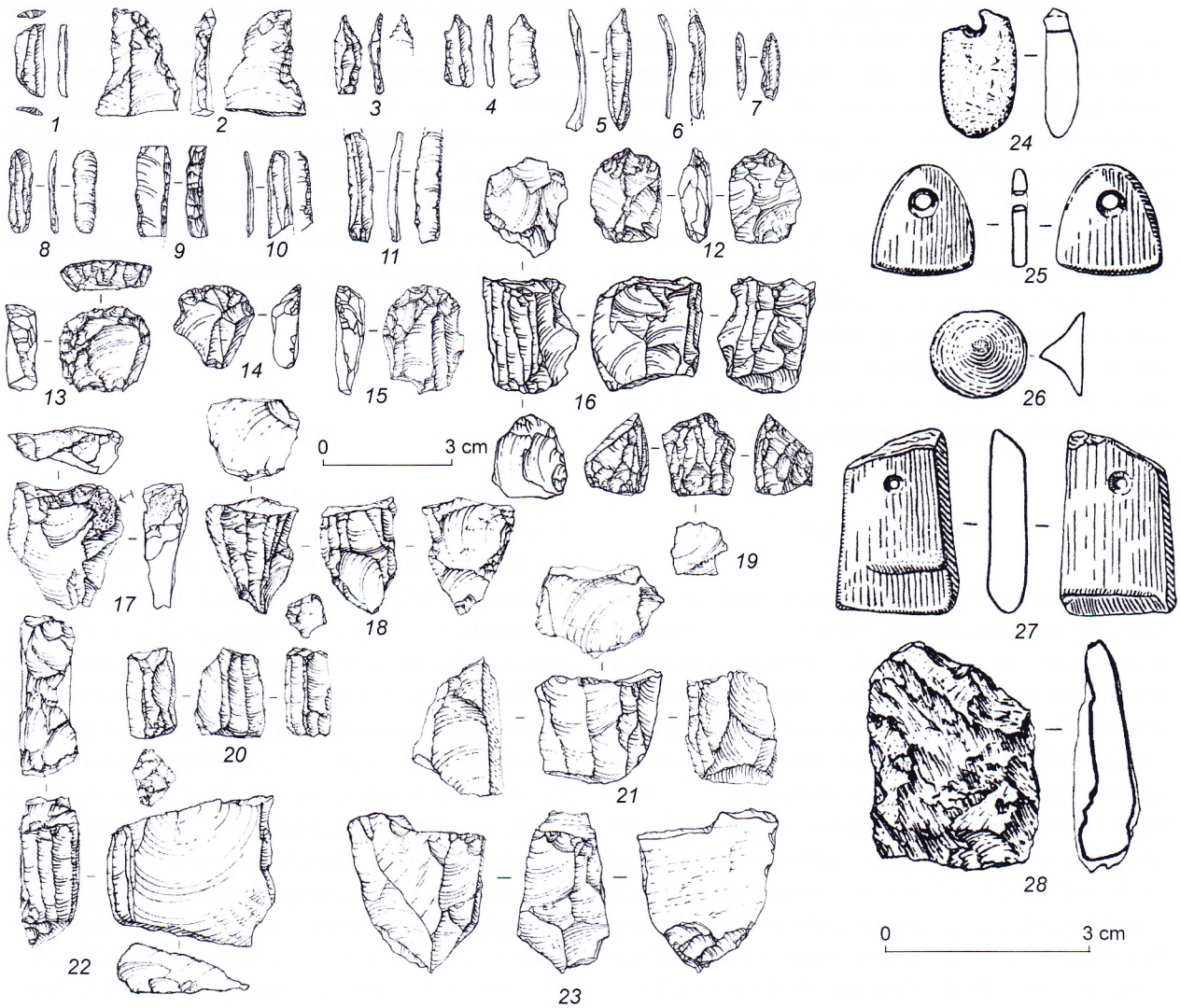


Fig. 3. Lithic industry (*1–23*) and personal ornaments (*24–28*) of the Early Holocene assemblage from Obishir-5.

but Islamov provided the following published descriptions and illustrations.

A volumetric pendant made from black marble-like rock (Fig. 3, *25*). Its dimensions are 16 × 16 × × 2 mm. It is a sub-triangular item with a biconical drilled hole in the upper portion. The item was thoroughly treated by grinding and polishing on both sides and shows signs of attrition on its surface.

A volumetric pendant made from river pebble (Fig. 3, *27*). Its dimensions are 30 × 19 × 6 mm. It is a sub-rectangular item with a biconical drilled hole in the proximal portion. The major part of the item contains preserved remains of natural cortex partially covered by abrasion marks. Signs of transverse deformation can be traced on the upper end of the pendant.

An artifact in the form of a button with a projecting point in the middle (Fig. 3, *26*). Its dimensions are 28 × 28 × 14 mm. This item, round in shape, is made from white-green siliceous rock. Its surface was thoroughly treated by grinding. Taking into account archaeological and ethnographic analogs, this item was interpreted by the excavator as a labret-like ornament (Ibid.: Pl. XII, *7*).

During new excavations at Obishir, we discovered a pendant and an ornament blank, along with another likely pendant. The artifacts were recovered from stratigraphic layer 2 (2015–2016 excavation) (Shnaider et al., 2016: 196).

A volumetric pendant made from greenish-yellow talcite (Fig. 3, *24*; 4, *1*). Its dimensions are 18.9 × × 10.9 × 4.5 mm. The item is oval shaped in plan

view, with well-rounded edges, and plano-convex in profile; a cylindrical hole (2.2 mm in diameter) is drilled near its upper edge. Traces of a transverse break can be observed near the hole, in the proximal portion of the pendant. The surface is thoroughly mirror-like smoothed on the front and back sides and along the edges.

A pendant blank made from dark-green serpentinite (Fig. 3, *28*; 4, *1*). Its dimensions are 31.8 × 24.0 × 9.0 mm. It is a sub-rectangular artifact with a unilateral convex profile. Signs of grinding can be visually identified in the central part. The edges are not treated, and the major part of back surface shows remains of pebble cortex.

Study methods

Using experimental technological and use-wear study, we reconstructed the manufacture and use of stone ornaments at Obishir-5, following a protocol developed for studying the Upper Paleolithic artwork in Northern Asia (Fedorchenko, 2014, 2015; Shunkov et al., 2016). Study of use-wear and treatment traces were conducted by means of MBS-10 stereoscopic microscope under ×7.5–100 magnification and Olympus BHM metallographic microscope under ×40–500 magnification, equipped with differential interference contrast (DIC) lenses. Photofixation of marks at macrolevel was carried out using the Canon EOS 7D digital SLR camera, EF-S 60 mm f/2.8 Macro USM lens, and a tripod mount with manual focus adjustment, and at microlevel using the Olympus BHM photo camera and optical system. High-quality photographs of the artifact surfaces were obtained using the program Helicon Focus.

To characterize and interpret traces of manufacture and use, we conducted original experiments using appropriate raw materials. The experimental research program included modeling the techniques of knapping raw nodules of soft stones, grinding blanks on coarse- and fine-grained abrasive stones, perforating blanks with the use of drills having points prepared by retouched as well as untreated working edges, and polishing blank-surfaces with leather (Fig. 5). During experiments, more than 20 pendants were manufactured from talc and talcum peach found at the Shabrovo deposit (Middle Urals). In terms of their chemical composition and basic petrophysical characteristics, talc and talcum peach are similar to the material from which the Obishir-5 ornaments were made (Geologicheskiy slovar, 1978: 295). The results of experimental works are fully consistent with the final shapes of the archaeological ornaments under study (Fig. 5, *4*).

Finally, we studied the mineral composition of stone raw materials delivered to the site, by means of visual diagnostics using the MBS-10 microscope, and investigated possible sources for the origin of this stone.

Results

The comprehensive study of stone pendants from Obishir-5 has allowed us to reconstruct the methods for their manufacture. The initial stage of ornament production included selection and delivery of stone materials to the site. Petrographic analysis has revealed that stone ornaments discovered during the 2015–2016 excavations were made from talcite and serpentinite. These materials belong to the group of so-called "soft" stones. Serpentinite, from which the pendant blank from the 2016 collection was made, is a dense dark green rock. This material has a laminar splintery fracture pattern, silky luster, dark green color, and slipping surface, typical of serpentinites. Its hardness according to the Mohs scale is 2.5–3 (Geologicheskiy slovar, 1978: 211). The pendant is manufactured from talcite, dense fine-scaly talc with the inclusion of dark-colored mineral particles, giving the otherwise white mineral a slight greenish tint. The hardness according to the Mohs scale is 1 (Ibid.: 295).

During exploratory routes along the Zarkar Gorge and the foot of the Katyrang-Bashi Ridge, 4.5 km away from the Obishir-5 site, we discovered bedrock exposures of ultramafic rocks, formed by typical ophiolite sequence of gabbros, amphibolites, and serpentinites, associated with deep water clastic sediments and cherts (see Fig. 1, *B*). In terms of petrography, serpentinite from this deposit is very close to the materials that were used by the site inhabitants in the Early Holocene. The area around the Katyrang-Bashi Ridge foot is heavily spotted with scours, formed by ephemeral streams. These channels move stone materials, including debris of serpentinite and surrounding rocks. Water transports these materials as far as the Zarkar Gorge, located

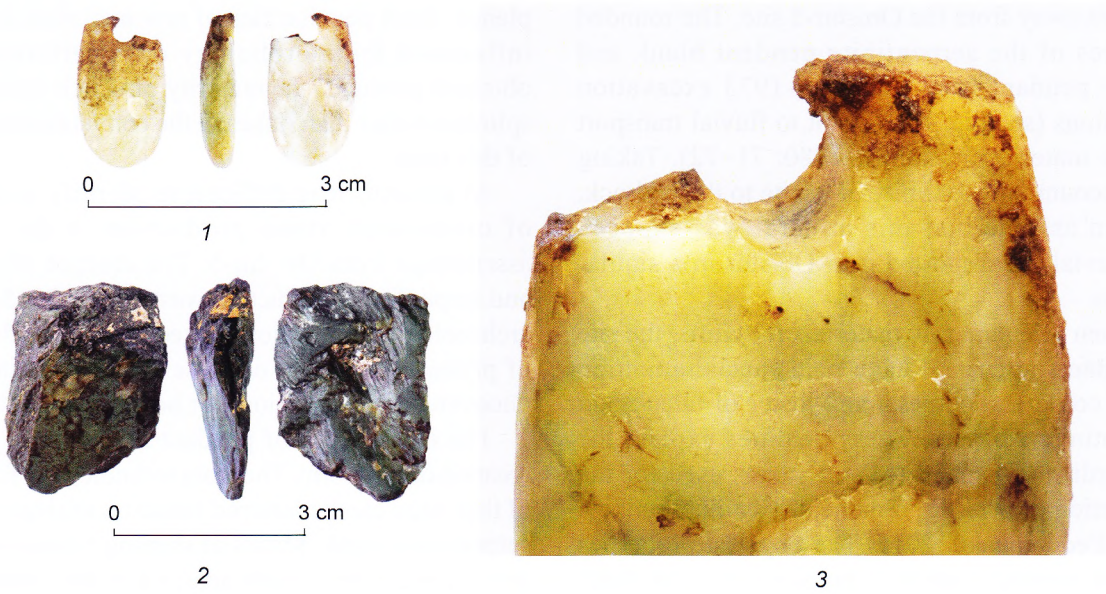


Fig. 4. Stone ornaments from Obishir-5 (2016 collection).
1 – talcite pendant; *2* – serpentinite pendant blank; *3* – fragment of talcite ornament with traces of drilling.

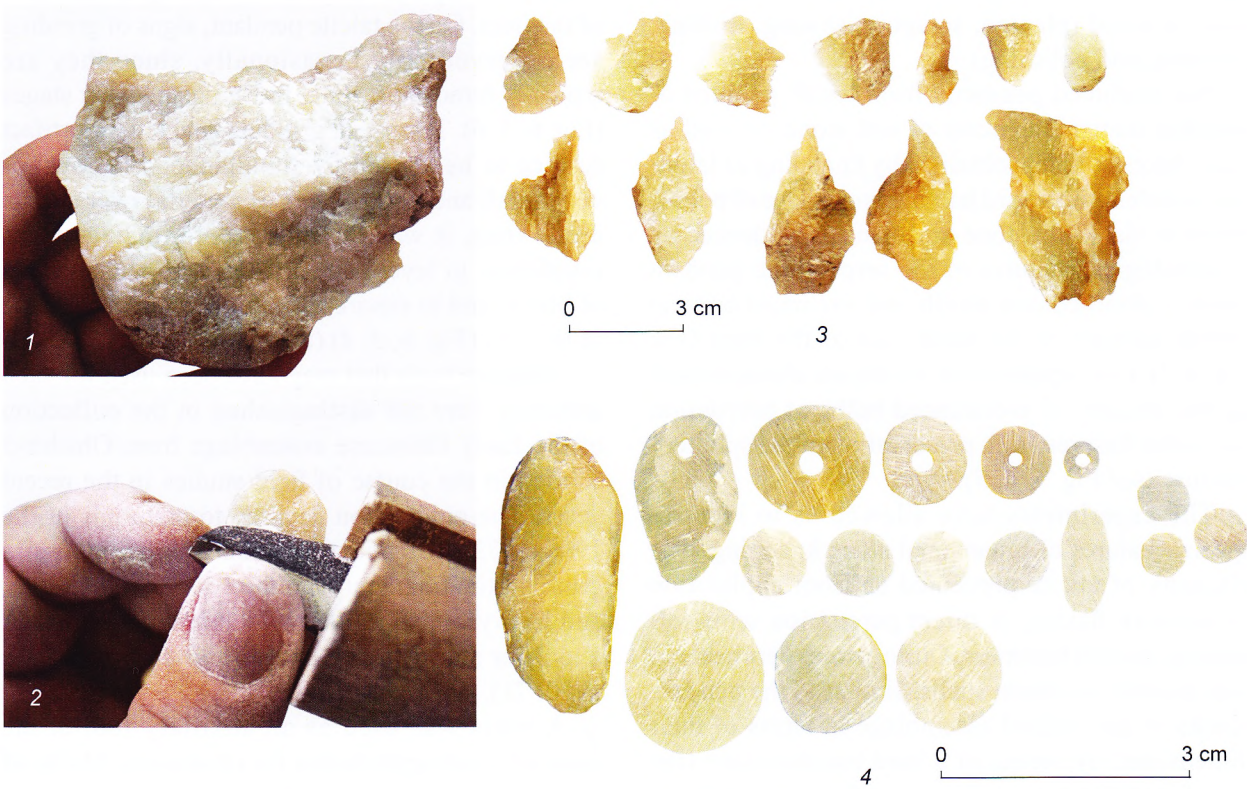


Fig. 5. The findings of experiments in manufacture of stone ornaments.
1 – talcum peach spall surface obtained by knapping; *2* – fragment of a pendant blank in the course of treatment by a flinty burin; *3* – talcum peach spalls obtained by direct percussion with a hard hammerstone; *4* – replicas of stone pendants and their blanks.

ca 2 km away from the Obishir-5 site. The rounded surfaces of the serpentinite pendant blank and of one pendant from the 1966–1973 excavation collections (see Fig. 4, *2*) point to fluvial transport of raw materials (Islamov, 1980: 71–72). Taking into account the proximity of talcite to the bedrock, we can assume that this mineral was exposed and fluvially transported near Obishir in a similar fashion.

When selecting raw materials for crafts, the site inhabitants appear to have paid special attention to the color, smoothness, and luster of talcite and serpentinite surfaces. These qualities explain the extraordinary demand for soft stones used for the production of personal ornaments (Kulik, Shunkov, 2011; Fedorchenko, 2015).The physical properties of said minerals made it possible to treat them using a wide range of potential production methods, including different techniques for knapping of stone materials (by direct or indirect percussion with stone/organic hammer) and techniques of manufacture from organic materials such as bone, horn or wood (planing, scraping, sawing, drilling, grinding, and polishing).

We produced pendants from small pebbles or rounded shatter fragments of soft stone, as well as from flakes/splinters obtained by knapping of larger raw nodules with a hard hammerstone. Use of pebble flakes as blanks for stone ornaments is evidenced by morphological features of the serpentinite pendant blank: a plano-convex profile and a remnant cortical pebble surface on the back side of the item (see Fig. 4, *2*). Our experimental blanks are characterized by the absence of pronounced bulbs of percussion and radial fissures, with preservation of the splintery fracture (see Fig. 5, *1*, *3*).

The experiments have allowed us to identify special features of ornamental stone knapping. The viscosity of talcite prevented us from application of pressure flaking or direct percussion with soft mineral or horn hammers. During the experiments, it was possible to obtain spalls, similar to the pendant blanks of the studied assemblage in terms of their dimensions, by means of a hard hammerstone (the use of a soft hammer and pressure flaking techniques proved to be inefficient). Flakiness and high cleavage of serpentinite determined the specifics of its knapping. Judging by morphology of the serpentinite pendant blank, this artifact could have been produced by flaking along the natural cleavage planes. Such peculiarities of raw materials directly influenced the morphology of experimentally-obtained products, the majority of which resembled splinters rather than flakes in the conventional sense of this term.

At present, it is difficult to identify evidence of ornamental stone production in the lithic assemblage from Obishir-5. The absence of talcite and serpentinite production waste in the 2015–2016 archaeological collection indirectly suggests the idea of primary reduction of these rocks in a site area uncovered by excavations, or beyond its limits.

The initial stage of pendant manufacture is the creation of a preform. The main technological features of this stage can be inferred based on analysis of the serpentinite blank. Marks of shaping treatment by a stone abrader have been detected in the protruding areas of convex (dorsal) surface of the artifact (Fig. 6, *1*, *2*). At ×40–100 magnification, it can be seen that the marks of grinding have the appearance of parallel rows of long, thin scratches located diagonal and perpendicular to the longitudinal axis of the item. On the talcite pendant, signs of grinding are observed only occasionally, since they are typically removed by later finishing and wear stages (Fig. 6, *5*, *6*). The use of grinding enabled the artifact surface to be treated by simultaneous removal of very small and equal layers of material over a large area. Thus, it was possible to eliminate surface roughness, to level and smooth edges and surfaces of blank, and to ensure the regular geometric shape of an item (Fig. 6, *3*, *4*) (Semenov, 1968: 75).

Abrasive tools that may have been used for such grinding were not distinguished in the collection of the Early Holocene assemblage from Obishir-5 formed in the course of field studies in the recent years. The publication devoted to materials of the 1966–1973 excavations contains a description of a grinding-tile fragment with three longitudinal flutes and heavy polish marks, which was identified as a tool for straightening arrows and darts (Islamov, 1980: 71).

A burin was used as an auxiliary tool at the stage of creating preforms for ornaments. Marks of planing using a burin (prolonged irregular twisting grooves) are evident on one face on the distal portion of the talcite pendant. Experimental results show that burin spalls are highly efficient at removing the pebble cortex remnants and leveling the side edges of blanks (Fedorchenko, 2016). Among the materials

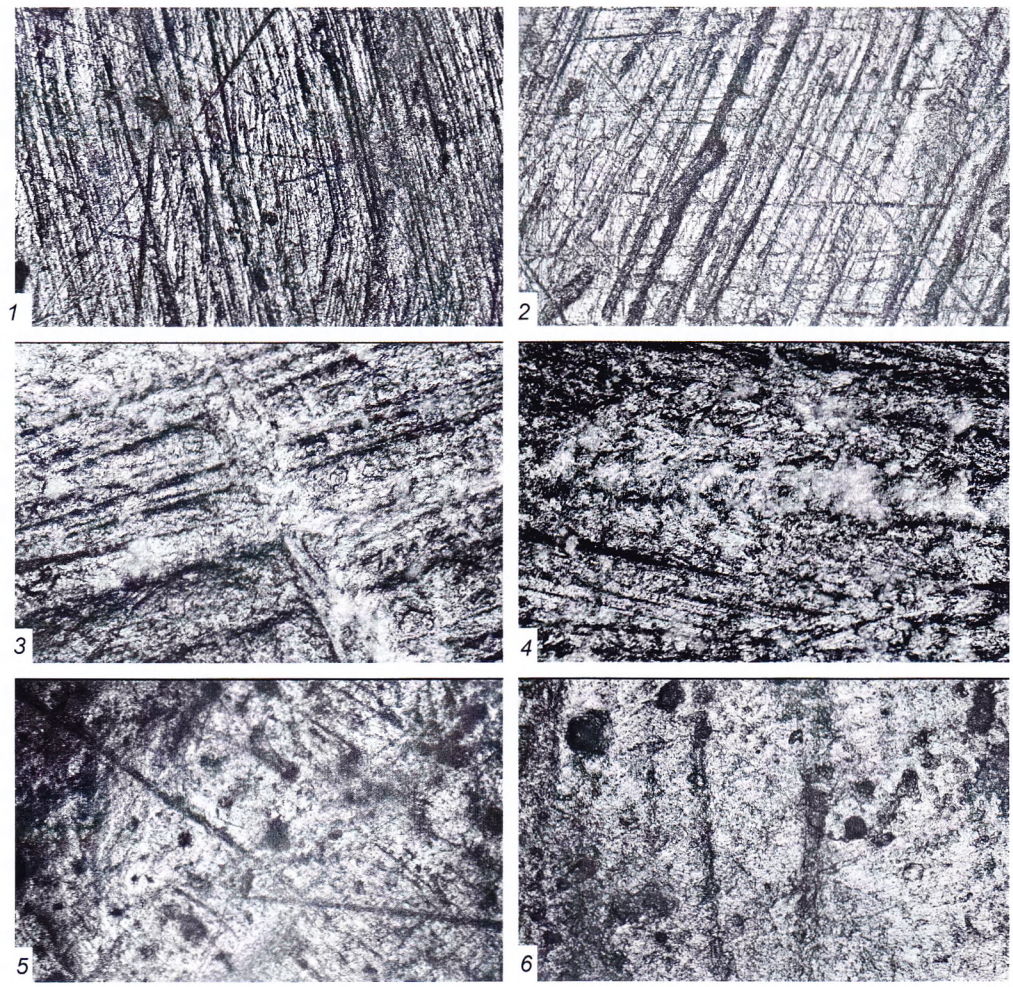


Fig. 6. Marks of wear and treatment on the surfaces of stone ornaments from Obishir-5 (Olympus BHM, DIC. Processing in Helicon Focus).
1 – grinding marks on the serpentinite pendant, ×40; *2* – grinding marks on the blank of serpentinite pendant, ×100; *3*, *4* – grinding marks on the replica of talcum peach pendant, ×100; *5* – grinding, polishing, and wear marks on the talcite pendant, ×40; *6* – grinding, polishing, and wear marks on the talcite pendant, ×100.

of the Early Holocene assemblage from the site under study, a series of "typologically unimpressive" items with burin spalls (side-burins) was described earlier (Islamov, 1980: 66–67). The collection of the 2015–2016 excavations includes one dihedral asymmetric burin (see Fig. 3, *5*) (Shnaider et al., 2016: 196–197).

The next stage of ornament production is drilling a hole in prepared preforms. The talcite pendant under study has a hole, cylindrical in profile. Concentric grooves caused by drilling inside the pendant are visible though poorly preserved (see Fig. 4, *3*). Special features of morphology and sizes of perforation marks allow a conclusion to be drawn about the use of a drill with a rather long and narrow working portion, about 5–7 mm long and 2 mm in diameter. At the initial stage of drilling, a tool with similar morphometric features was used to produce a through a hole in the form of a truncated cone on one side of the item. Then, the produced hole was drilled out from the opposite side to give the channel a regular cylindrical shape.

So far, no tools that were reliably used to perforate soft stones have been identified among the artifacts at Obishir-5. Analysis of archaeological and experimental data (Semenov, 1953; Francis, 1982; Semenov, Korobkova, 1983: 33–36; Altinbilek et al., 2001; Gurova et al., 2013) makes it possible to predict the morphology of such stone-drilling tools among the borers and points: bladelets with ends marked by one-side or double-side retouch (Islamov, 1980: 68, 74). Preliminary use-wear analysis has not

identified any traces of drilling in stone on the Early Holocene industry borers found at the site.

During the final stage of manufacture, both surfaces of the pendant edge appear to have been polished, probably, with crafted leather. Polishing produced the tactile and visually satisfying even, smooth, and shiny surfaces (Semenov, 1968: 79).

Use-wear analysis has revealed wear signs resulting from wearing of the talcite pendant (see Fig. 6, *5*, *6*). At ×40–200 magnification, we discovered traces of microdamage, including single, differently directed, shallow and twisting, thin and short scratches, on both sides of the item, in sharp contrast with the smoothly polished surface. The described signs of wear are accompanied by soft coating polish penetrating deep into the microrelief of the artifact's face. The presence of attrition marks overlying concentric grooves caused by drilling on this item may indicate prolonged and free movement of the pendant along the thread. This complex of traces is interpreted as signs of contact between the pendant and clothes or human skin during everyday wear of the ornament.

Conclusions

The results of our study suggest the existence of tradition of personal ornaments production from soft stones, in western Central Asia, ca 10,700–8200 cal BP. According to the reconstruction, the manufacturing process included several sequential steps. The Early Holocene inhabitants of the Obishir-5 site produced stone ornaments from local raw materials (talcite and serpentinite), the source of which was located 4.5 km away from the site. Small pebbles, shatters, and spalls split from nodules were used as blanks. Subsequent manufacturing stages included treating the surfaces of blanks with abrasive stones and burins, then biconical drilling and polishing. Comparison of the results of studying the ornaments discovered in 2015–2016 with the data on similar finds of 1966–1973 suggests the use of identical techniques and tools for the manufacture of all these items.

The ornaments from Obishir-5 are the earliest evidence of the use of grinding and drilling of stones in western Central Asia. In this regard, the problem of identifying the tools that were employed for grinding, planing, and drilling in soft stones by the site inhabitants seems to be an important question, which must be answered by functional analysis of burins and borers on microblades known in the Early Holocene layers of this site. Establishing technological interconnections between personal ornaments and various types of stone tools will allow more detailed reconstruction of the chaîne opératoire in manufacture of studied nonutilitarian items, assuming that the entire ornaments production cycle (or part thereof) was carried out on-site.

Experimental use-wear analysis has revealed a complex microstratigraphy of wear and treatment signs on the stone pendants. We established that abraders and burins were employed at the stage of preform manufacture to prepare the initial blank surface, while polishing resulted in the deformation of grinding and planing marks. During wearing of the pendants, traces of microwear were overlaid on wear related to production. The context of the analyzed talcite pendant, petrophysical properties of its material, and morphology of polishing and deformation marks point to a prolonged use of this item for ornamentation of clothes or as a personal amulet. Most probably, the item lost its value after partial destruction of its upper portion, which disabled its further use as an ornament.

In western Central Asia, personal ornaments made from stone, bones, and mollusk shells are recorded in the Late Mesolithic to Early Neolithic archaeological complexes dated to the period between 9000 and 7000 cal BP. The Early Holocene industry in Dam-Dam Cheshme 2 Cave (Eastern Caspian region) contains pendants made from shells and a stone sub-rectangular pendant with a biconical hole displaced to one edge (Markov, 1966: 114). A series of oval pendants from ornamental stones have been identified from Late Mesolithic to Neolithic complexes at the sites of Madyar, Dorazkul, Yangikadam, and Taypak, in the Ferghana Valley (Islamov, Timofeev, 1986; Korobkova, 1989: 161). Some similarity to the artifacts under consideration is demonstrated by the ornaments typical of the early and middle stages of the Jeitun Neolithic culture (Korobkova, 1996: 96).

Analogous stone pendants from the Early Holocene complexes in western Central Asia are also known in the Near East. A tradition of pendant production from ornamental stones and bones is found in the Late Natufian culture of the el-Wad and Rosh Horesha sites dated to 13,000–11,500 cal BP

(Weinstein-Evron et al., 2007; Bar-Yosef Mayer, Porat, 2008; Bar-Yosef Mayer, Porat, Weinstein-Evron, 2013). Personal stone ornaments gained widespread use in the pre-pottery Neolithic of the Near East, between 11,500–6500 cal BP, such as Gilgal 1 and 3, Hatula, Jericho, Nahal Hemar Cave, and Kfar HaHoresh (Bar-Yosef Mayer, Porat, 2008; Belfer-Cohen, Goring-Morris, 2010). Isolated stone polished pendants have been found on the Middle East Körtik Tepe and Shanidar sites of the pre-pottery Neolithic, dated to 11,000–8000 cal BP (Solecki, 1969; Alarashi, 2016).

Among the materials from the mentioned sites of the Middle and Near East, the most abundant artifacts include oval and sub-rectangular polished stone pendants with one biconical drilled hole each, oval pendants with two holes each, discoid flat polished beads, cylindrical pipe-shaped beads; oval bone pendants with one hole each, rectangular pendants with two holes each, and ornaments made from mollusk shells. The items of said types were made using techniques similar to those employed at Obishir-5.

Taking into account the chronological attribution of the assemblages found in these areas and comprising morphologically and technologically similar personal ornaments, given the earlier date for these stone pendants in the Near East, they may have spread to Central Asia through cultural diffusion or human movements during the Early Holocene.

According to the "braided stream" hypothesis, groups of the population of western Central Asia, the Near East, and the Middle East repeatedly came into direct or mediated contacts (Krivoshapkin, 2012; Kolobova, 2014; Shnaider, 2015). The episodes of intercultural contacts, such as migrations, exchange of ideas and technologies, at the boundaries of the settled areas can be traced from the Middle to Upper Paleolithic transition period through the Neolithic (Davis, Ranov, 1999; Brunet, 1999; Richter et al., 2010; Kolobova, 2014; Shnaider, 2015; Kolobova, Shnaider, Krivoshapkin, 2016). The presence of similar technologies for the manufacture of personal stone ornaments in the Late Pleistocene to Early Holocene industries may be a particularly striking manifestation of this process, which was earlier substantiated only by the techno-typological similarity between certain elements of lithic industries.

Acknowledgements

Archaeological studies were supported by the Russian Science Foundation (Project No. 14-50-00036), geological survey, by the Institute of Geological Sciences, Polish Academy of Sciences (2017). The authors express their gratitude to D. Bar-Yosef Mayer (Tel Aviv University, Israel), N. Gubenko (Israel Antiquities Authority, Jerusalem), and N.E. Belousova (IAET SB RAS) for advice in preparation of this study.

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Received May 22, 2017.