

Shydlovskiy Pavlo S. , Tsvirkun Ostap I.** ,
Péan Stéphane*** , Chymyrys Marharyta V.* ,
Mamchur Bohdan V.*****

NEW STUDY OF FOURTH DWELLING FROM MEZHRYCH UPPER PALAEOOLITHIC CAMPSITE: THE RESULTS OF INTERNATIONAL SUMMER SCHOOL ACTIVITY

Mezhyrich is an Epigravettian open air base camp, in the Middle Dnieper basin, dated to 14.9-14,3 ka ¹⁴C BP. During the second stage of research from 1976 to 1989 an international group of specialists under supervision of M. Gladkikh – the Head of the Department of Archaeology, Ethnography and Museology of T. Shevchenko National University of Kyiv, carried out the excavations and interdisciplinary research of the site. As the result in 1976 fourth mammoth bone dwelling and a field objects around it were opened. The fourth dwelling was partially excavated and left in place for the purpose of a future museumification. An exploration of the cultural layer of the dwelling unit revealed a number of interesting finds and field objects. The stratigraphic sections within this trench revealed several stages of functioning of this object and several layers of human activity.

Since 2018, the Dwelling 4 has been explored by an expedition involving organizations such as the Department of Archeology and Museum Studies at Taras Shevchenko National University of Kyiv (P. Shydlovskiy), National Museum of Natural History, France (S. Péan) with the involvement specialists in the field of zooarchaeology, geology, geomorphology, etc. As the current state of affairs requires a new description of the dwelling elements, one of the goals of the 2018-2019 study was to conduct stationary studies of the filling of the dwelling. This works have to be continue in order to obtain data on structural features and the degree of preservation of cultural remains inside the dwelling, and to carry out restoration work to provide a basis for future museumification of the object.

Key words: *Upper Palaeolithic, Epigravettian, household unit, mammoth bone dwelling, lithic technology, mammoth hunters.*

The site is located on the territory of the village Mezhyrich, Kaniv district of Cherkassy region. The vestige is situated on a cape formed by the valleys of the rivers Ros and Rosava about 12 km westward from the Dnieper River. From the point of view of geomorphology, the Mezhyrich settlement is related to the level of the second river terrace of the Ros, which has a height of 10-12 m above the modern floodplain. Palaeolithic cultural layers of the site lie at a depth of 2.5 m – 3 m from the modern cape surface, just above the main level of the alluvium of Ros second alluvial terrace. The anthropogenic layers is well preserved, with remains of objects, with preserved organic remains of bone, antler and tusk. The name of the settlement became eponymous for a number of Epigravettian sites in the Middle Dnieper region, which by the peculiarities of features of material culture, united in a Mezhyrichian culture or industrial tradition, notable sites such as Gontsy (Hintsy), Dobranichivka, Semenivka I-III and Buzhanka II, located on banks of the left tributaries of the Dnieper (Gladkikh 1977, p. 140-142; Nuzhnyi 2002; Nuzhnyi 2008, p. 98-110).

Mezhyrich is an Epigravettian open air base camp, in the Middle Dnieper basin, dated to 14.9-14,3 ka ¹⁴C BP (i.e. between 18.2 and 17.4 ka cal BP), inserted in a loessic sedimentary context. In 1966-1974, the site was researched by academician I.G. Pidoplichko who opened and completely excavated three dwellings with using of mammoth bones in structures. In the course of these studies, the objects of research were exclusively residential buildings, while the cultural layers itself, the production centres and field objects did not receive enough attention from specialists (Pidoplichko 1969, 1976).

The fourth residential unit was discovered during the drilling of the site territory in 1976, and in 1978 the dwelling itself and the surrounding area were cleared by an expedition under the guidance of Professor M.I. Gladkikh (Hladkykh) from Taras Shevchenko State University of Kyiv (Gladkikh, Kornietz, 1979 a, b; Kornietz et al. 1981).

Fieldworks found out the complicated structure of the unit, which included, in addition to mammoth bone dwelling, six outer pits around it and a “production centre” to the south of the

main cluster. The orientation of the assemblage by the world cardinal was observed in the location of external objects and large mammoth bones around the structure. The planigraphic complexity of the structure was compounded by the detection of two anthropogenic layers in the areas adjacent to the dwelling remains. During the excavation of the unit area, two horizons of cultural remains, separated by a sterile layer, were recorded to the south from the dwelling. The base of the dwelling is connected to the lower horizon. Traces of embryonic soil formation were observed at the level of the cultural layer (Gladkikh, Kornietz 1979a). In addition, symmetrical and rhythmic arrangements of the bones location were found in the outer cover of the dwelling.

Design features of the mammoth bone structure

The remains of the dwelling is a cluster of mammoth bones in the form of an elongated oval measuring 5.85 m x 4.62 m, the long axis of which is oriented from west to east. The height above the level of the ancient surface was 0.6 m. The main material used to construct the dwelling was large mammoth bones, which were functionally different in architectural terms: the basement (or "foundation") is made of a concentric circle of mammoth skulls and other large bones; the outer cover of the dwelling is mostly composed of scapulas, mandibles, pelvis bones and tusks; the "roof", which fell into the structure, mainly consists of tusks and flat bones (Gladkikh., Kornietz 1979b, p. 7-12; Gladkikh, Kornietz 1982). This dwelling is different from three ones found on the site in terms of features of the outer cover. In the first dwelling it was made up mostly of stacked mandibles inserted into each other, the outer cover of the second dwelling was formed by long bones, and in the third dwelling there were horizontally laid large long bones on the north side (Pidoplichko 1976). Skulls, mandibles, long and flat bones (scapulas, pelvis bones) were found in the outer cover of the fourth dwelling. In this building, all the elements of the previously found dwellings are represented. The most characteristic feature of it is the pronounced symmetry and rhythm in the location of the bones of the outer cover. A spectacular symmetrical group consisted of jaws from the western part of the structure. In the centre of the group was a large mandible, with the chin up. To the right and to the left of it there were two columns of stacked mandibles inserted into each other with chins down ("pine-like" pattern). To the right of this group (from the southwest side of the structure) was the second symmetrical composition, in the centre of which

was the skull of a young mammoth, mounted tusks up. To its left and right were two series consisted of two scapulas and a pelvis bone. To the left of the symmetrical group of mandibles (on the northwest side of the structure) there was a rhythmic group of bones in which 3 skulls and 2 anatomical groups of vertebrae alternate (Gladkikh, Kornietz 1979b, p. 5-18).

The symmetrical location of the bones of the outer lining is traced not only within the individual sections of the perimeter, but throughout the circumference of the structure, as the same groups of bones are located on opposite sides of the dwelling. Thus, two opposite groups of long bones were recorded close to the north-south line in the eastern half of the cluster. One skull and two flat bones lie to the right of each of these groups of long bones. In cases where it is possible to trace the mutual overlap of bones, the stacking order is clockwise.

Two large tusks were located outside the dwelling by the east-west line. Their convex parts were oriented towards the dwelling at a distance of 1.2 – 1.7 m from it. Both tusks were connected to the boundaries of the pits # 3 and 4. "Production centres" were located on the south and north sides of the dwelling, the position of which is correlated with the groups of long bones located on the respective sides of the cluster. Symmetrical placement of the bones was observed in all parts of the unit: in separate parts of the outer cover of the dwelling, around the outer cover and, finally, beyond. Such symmetrical and patterned bone disposal could have been aesthetic, symbolic, and even ritual, in nature or conditioned by production factors (Gladkikh 1999, p. 31-32) (Fig. 1: A).

The inner part of the cluster surface was mainly filled with tusks and flat bones that laid at different levels. At the upper part 39 tusks were found. In several cases, flat bones overlapped tusks or, conversely, tusks covered flat bones. Bones were close enough to each other, in only one case, there were sandy-loessic lenses between them. The cluster boundary areas were higher than the central part, which can be easily seen in cross sections. A few long bones in the lateral areas of the cluster stood vertically or close to this position.

A few bones bear traces of human modification. One long bone exhibits a transverse incision, after which it was broken. Several scapula have broken ridges. There were cases of pelvis bone alteration. Several flat bones are perforated with mostly rounded holes. A few bones bear ochre spots on the surface (Gladkikh, Kornietz 1979b, p. 11, fig. 4).

The ¹⁴C age of the bone structure was firstly determined at the Institute of Geochemistry

and Mineral Physics of the Academy of Sciences of the USSR, which ranged from 18 020 to 17 855 BP. According to M.I. Gladkikh, this dating much elder than the true age of the monument, and the site is younger than 17 000 BP (Gladkikh, Kornietz 1982). M.I. Gladkikh's interpretation turned out to be correct given the later series of dates performed in different labs, which dated the site within a 15th millennium BP.

Eight radiocarbon dates have been measured on the fourth dwelling (Table 1). In this

series, the dates received at the Kyiv laboratory, which dated the bone structure to about 18 ka BP, are not considered as they do not fit within the global chronostratigraphy of the site (Haesaerts et al. 2015). Instead, other dates determine the age of the dwelling and the filling from 15 242 to 14 300 BP. Recent AMS dates reduce the time span to 14 790 – 14 550 ¹⁴C BP, that in calendar years corresponds to 18 116 – 17 622 Cal BP (Haesaerts et al. 2015, p. 385-390).

Table 1. Available radiocarbon dates from Mezhyrich Dwelling 4:

	Location, Excavation	Material	¹⁴ C BP	Lab code	Cal age BP (OxCal v4.2.3)	Reference
1	cultural layer (1978)	burned bone	17 855 ± 950	KI-1054		Gladkikh, Kornietz, 1979b, p. 16-17
2	cultural layer (1978)	mammoth burned tooth	18 020 ±600	KI-1055		Gladkikh, Kornietz, 1979b, p. 16-17
3	DW 4	burned bone	15 242 ±1080	QC-900B		Gladkikh, Kornietz 1982, p. 18
4	DW 4	mammoth burned bone	14 300 ± 300	GIN-2596		Soffer 1993, p. 25-26
5	DW 4, "Toptalishche" (1984)	OS 07-3 wolf femur	15 210 ± 130	SacA-14981		Haesaerts et al. 2015
6	Sq. 323, north edge, To-2 (2005-2008)	mammoth femur	14 550 ± 70	GrN-29876	17 622-17 843	Haesaerts et al. 2015
7	Sq. 344, south edge, To-2 (2005-2008)	mammoth femur	14 560 ± 70	GrN-29877	17 619-17 865	Haesaerts et al. 2015
8	Sq. 344, south edge, To-2 (2005-2008)	The same (#7)	14 790 ± 60	OxA-15587	17 875-18 116	Haesaerts et al. 2015

Study of the internal filling of Dwelling 4

The interior space of the dwelling has been studied since 1983, when, during expedition works directed by N.L. Kornietz, 25 tusks were removed from the surface of the inner part of the cluster in order to prevent their destruction by natural factors. Their storage location, indicated in the village of Mezhyrich, remains unknown. The same report describes that a layer-by-layer photographic plan was performed during the work to record the location of the finds; however, there is no such plan among the available documentation (Snider 1994, p. 41).

In 1994, to investigate the cultural layer inside Dwelling 4, excavation in the form of a trench 5.5 m long and 1 m wide located along the long axis of the dwelling from northeast to southwest was started. This trench runs along the line of squares 332Б, 333 А, Б, 334 А, Б (Kornietz 1995, p. 14-16; Soffer et al. 1997). An exploration of the interior filling of the dwelling revealed numerous finds and objects (Fig. 1: B).

In the centre of dwelling in square 333Б at a depth of – 405 cm, a spot filled with ash was revealed, and interpreted as an internal hearth. From the north, south and west, a bone with

traces of ochre and several horizontal tusks enclosed the hearth. A control trench showed that the hearth on the peripheral section was less than 3 cm thick. At a depth of – 411.3 cm, a horizontal reindeer antler, a fragment of burned bone and a flint flake were found below the hearth, separated from the lower level of the ash lens by a 5-6 cm thick layer of sterile loess. These finds apparently laid on an earlier living surface of the dwelling than the surface associated with the hearth spot (Kornietz, Suntsov, Soffer 1996, p. 20-21).

Modern research of the Dwelling 4

Since 2010, the Mezhyrich settlement has been explored by an expedition involving organizations such as the Department of Archaeology and Museum Studies, Taras Shevchenko National University of Kyiv (P. Shydlovskiy), National Museum of Natural History, France (S. Péan) with the involvement of national and foreign specialists in the field of zooarchaeology, geology, paleobotany, geomorphology, etc. In recent years, a number of analyses have been conducted by experts from different fields, the results of which have been published in two issues of *L'Anthropologie* (Péan et al. 2015).

Scientific analysis and processing of archaeological materials helped to draw new conclusions about the life of the inhabitants of the site, as well as unique materials for observations of zooarchaeologists and paleobotanists. Stratigraphic sections became a scientific laboratory for geologists and geomorphologists (Haesaerts et al. 2015). Methods of archaeological research have been improved, a deeper and comprehensive scientific analysis of the extracted materials has become, and thus our ideas about the life and culture of the ancient population of Ukraine have expanded (Shydlovskiy et al. 2012; 2013; 2014; 2015; 2016; Nuzhnyi, Shydlovskiy 2015).

The Mezhyrich International Archaeology Summer School, which took place in 2018-2019, was dedicated to young scientists in archaeology, especially Master students, PhD students and post-graduate early career researchers, from the following institutions of Ukraine and France: Taras Shevchenko National University of Kyiv, National University "Kyiv-Mohyla Academy", Institute of Archaeology NAS of Ukraine, Muséum National d'Histoire Naturelle in Paris. (Shydlovskiy et al. 2018)

During the 2018-2019 Summer school project implementation, which took place during field works in Mezhyrich within the framework of the Ukrainian State Fund for Fundamental Research project (№ Ф77/38811) named "Mezhyrich mammoth-hunters' settlement: archaeological research and museumification", educative and research works were together conducted and INQUA Project 1804S: Mezhyrich International Archaeology Summer School, interdisciplinary study of an Upper Pleistocene site (Shydlovskiy et al. 2019).

One of the goals of the 2018-2019 study was to conduct stationary research of the fourth mammoth bone dwelling in order to obtain data on structural features and the degree of preservation of cultural remains inside the dwelling, to carry out restoration work to provide a basis for future museumification of the object. Archaeological studies were planned to be carried out inside the dwelling, with the structural elements of it being left in place and the bone remains restored in order to preserve the archaeological site. Considering the destructive processes that negatively affect the state of bone material preservation, the most appropriate currently is the restoration work of the preserved elements of the dwelling structure with its stay in place. At the same time, it is necessary to conduct a scientific study of the internal filling of the structure at the modern scientific level. This approach will, on the one hand, preserve the site for exhibiting and implementing the idea of museumifica-

tion and, on the other, to receive scientifically meaningful information that is gradually due to destructive processes (Shydlovskiy 2013; Samoilenko, Shydlovskiy 2016).

After arranging the technical conditions, namely the installation of wooden flooring around the perimeter of the hangar and lighting, there was a direct archaeological and restoration study of the mammoth bone structure. The first stage in the study of the dwelling was the cleansing of the bones – the elements of the structure and the filling of the dwelling – from the bone crumbs and small undefined bone fragments. This "garbage", which almost completely covered some areas of the dwelling, was the result of destructive processes of both endogenous nature (decay of ivory, cranial, small bones under the influence of air, penetration of sunlight, etc.) and exogenous nature. Particular damage and activation of the processes of bone decay have caused by damage to the roof of the metal cover from a significant amount of snow in the spring of 2010. After completely clearing the cluster of Dwelling 4, the task of restoring and gluing individual large bones from the housing structure and strengthening the bone remnants with the help of adhesive liquids began. Some fragments of broken bones were removed from their original location for the purpose of gluing under laboratory conditions, and then returned to the site already in the restored state (Fig. 2).

As a result of the destructive processes of natural and anthropogenic origin, the part of the bones that made up the dwelling structure has disappeared – been stolen or removed in the course of scientific research (since the structure has been in the open state since 1978). However, these processes made it possible to look more closely at the features of the location of the bones and the structural elements. It was found that the "foundation" of the structure consisted of mammoth skulls mounted in a circle. Sometimes the long bones of the mammoth were dug into the base of the structure from the inside. The outer lining of the flat bones and lower jaws was outside the base of the dwelling (Fig. 3: 1).

The next step in the study of the dwelling was the horizontal clearing of the trench, which was excavated by the works of N.L. Kornietz in 1994-1995 along the long axis of the dwelling from the northeast to the southwest (Kornietz 1995). In 2018-2019, the most attention was paid to the two opposite ends of the trench, namely the sections West (squares 332B, 333A) and East (squares 334 A, B).

While the research of the trench a bright collection of products of flint and organic materials was discovered, together with osteological remains of Pleistocene fauna. In all, 239 bone

fragments were found in two years of dwelling filling research, the vast majority of which (47.7%) are highly fragmented and difficult to identify. A large number of undetermined bones are burned (25.5%), although the most bones does not bear traces of being on fire (74.5%).

Of the fragments identified, the vast majority belong to the mammoth (97 items, 40.5%). The bones of this animal are predominantly skull and tusk fragments, which is not surprising due to their considerable fragility. To a lesser extent, there are fragments of teeth; single specimens are fragments of tubular and flat bones. The second place after the mammoth in the number of fragments is occupied by a hare, represented by 15 identified and (and 8 that can be assumed) bones and anatomical groups. Among them are anatomical groups of vertebrae, bones of limbs and scapula. In addition to these species, there are bones of fox and large ungulates.

From the whole assemblage of faunal remains, there are 27 fragments of bones with traces of processing. The largest number among the treated bones is the tubular bones of limbs of small and middle-sized mammals – hare and fox (radius, tibia, ulna, fibula), totalling 15 items. In addition, there are six fragments of processed tusk. A series of three specimens presents treated mammalian ribs of large mammals (mammoth). In unique cases, the treated tubular bone of a large mammal and tooth of a medium / large mammal are present (Table 2).

West section

In the previous years, a mammoth skull and accumulation of small flint debitage at a depth of – 388-389 cm were discovered in this area, extending with a slope to the centre of the dwelling. Inside this cluster a sandstone abrasive with traces of red ochre on the surface were found. Among the faunal remains, the vertebrae of the polar fox attract attention. The bone products are represented by a mammoth tusk needle with a hole, 51 mm long and 3 mm in diameter and a hammer made of reindeer antler in sq. 332Б (Kornietz et al. 1996, p. 18-21, 30).

The results of our studies showed that the filling in this section of the trench was not completely excavated, which allowed to continue the study of cultural layers inside the dwelling. In the section “West”, surveys were carried out within the square 332Б, where clusters of faunal remains, fragments of burned bones, ochre, flint and stone were found. In order to investigate the floor of the dwelling, from which the surface of the study stopped in 1996, a fragment of tusk lying horizontally was removed. The tusk covered two sandstone abrasives and small bone fragments. Among the cluster, two anatomical groups of vertebrae from medium-sized mam-

mals were found in the southeast wall of the square (Fig. 3: 2; 4: 1).

The different depth of the findings should be noted. Two fragments of tusk and a mammoth scapula (№ 422) lie horizontally on one surface at a depth of – 407 – 408 cm, on which previous excavations were stopped. Below this level, the finds reach (e.g. flat abrasive) of the level – 414 – 416 cm. At the same time, the anatomical groups that were in the wall of the square are located above the main number of artifacts, at depths of – 400 – 402 cm. Further clearing the trench revealed that the end of long bone (№ 7K), which was set vertically in the square 332Г, is located well below the floor level of the dwelling, and most likely was dug into the ancient surface (Fig. 4: 2).

A small number of flakes and blades, a single core and several implements represents the flint products from the western part of the trench. The core is made on the Kaniv flint, and there is a cortex on one side. The product is highly reduced prismatic, bidirectional with offset splitting fronts. One platform is sloping, the opposite platform is reduced, straight. Both platforms are not faceted (Fig. 5: 7).

Among the lithic artifacts originating from the area of the trench, there are only six retouched ones, five of which are made on blade blanks (Table 3). The most numerous category are burins (3 specimens), two of which are combined. One tool is a single-end burin on truncation at the distal end of the blade (Fig. 5: 4). The second item combines the burin on truncation at the proximal end and the angle burin at the breakage of distal part of the blade (Fig. 5: 5). Another specimen – a three-end burin combined with a low scraper retouching of the proximal edge of the blade (Fig. 5: 6).

Another tool is a crested bladelet with irregular alternate retouching of the edge (Fig. 5: 3). One specimen presents a fragment of microlith – the medial part of a backed lanceolate product with a small semi-sloping retouching of the edge (Fig. 5: 2). The only tool on the flake – the tablet, processed by a high, sometimes counter-retouching on all sides, with clogged edges. The surface of the product is highly polished from use, possibly as a retoucher (Fig. 5: 1). Two sandstone abrasives were found in this trench. One of the stones is a flat tile of quartzite, the surface of which is covered with red dye.

Among human-modified bone remains, bones with traces of deliberate processing and finished products or fragments should be mentioned. Among the first a series of limb bones of medium-sized mammals (a hare/fox) with cuts on distal parts near an epiphysis attracts attention (Fig. 6: 4-6). Products and their fragments

are represented by a series of tools for skin processing – two awls made on long bones of medium-sized mammals (Fig. 5: 8-9) (one – from square 333B and the other – from square 333Г) and two needles (Fig. 6: 2-3).

East section

In 1994-1995, a mammoth scapula, fragments of other bones and tusks of a mammoth, some of which were more than 50 cm long, were discovered and removed on the section "East". Between the large bones near the eastern wall of the dwelling (square 334B) an ivory point measuring 31 X 1.8 cm was found lying below the tusk. A complete skeleton of a polar fox (square 334B) was found among the faunal remains. Stone abrasive found in the square 334A.

The most interesting object the most part of which have been excavated during 2018-2019 in square 334B and partly on adjacent squares is Workshop 1 – the place of flint processing. The vast majority of artifacts from the cultural layer, located below the 1995-1996 trench floor, came from the square 334B, and partly from the squares 334A and 334Г (Fig. 3: 3). The workshop was in a sandy layer in the middle of loessic sediments, partially covered from above by bone finds covered with a ochre.

The lithic debitage was mainly concentrated in the central part of the square 334B and in its southern corner, at the boundary of the square 334Г, forming two micro-clusters, each containing a considerable number of chips, flakes, blades and bladelets, and several cores. Fragments of bones, some of which have traces of processing and dyeing, accompanied the flint products. In the central part of the square, the cluster immediately borders the skulls underlying the dwelling (Fig. 7: 1).

The southern microcluster was overlapped by several small bone fragments and bordered by a young mammoth scapula with an ochre spot on the surface. On the other area of the section "East", the finds were distributed without noticeable concentrations, but still dense compared to the western part of the trench.

The dissemination of the finds vertically captures the fall of the surface from northwest to southeast within the area. Thus, the artifacts found in the eastern corner of section "East" are located at depths of – 408 – 410 cm, while in the main concentration of flakes in the southern corner the depth reaches – 415 – 416 cm. At this level, the debitage lay in the greyish sand, which stood out quite clearly against the backdrop of the trench loessic floor. This made it possible to assume that there was an artificial depression here (Fig. 7: 2).

In total, 1064 lithic products were obtained from the trench, including a number of imple-

ments, cores and their debris, and a large amount of technical waste from flint knapping, as well as animal bones, including burnt, ochre and a number of minerals of red and grey colours. The raw material of which most of the artifacts are made is predominantly Kaniv flint originating from Kaniv dislocations and which deposits recorded approximately 12 km east of the site in Mar'in Yar.

Only 18 tools come from the Workshop 1, together with 342 flakes, 274 blade preforms, 407 chips, 8 cores (including two fragments) and 3 burin spalls. Most of the six identified cores, are bipolar with two striking platforms (4) and only 2 specimens belong to unipolar. Platforms are formed by one – several wide spalls, only in two cases are faceted (Fig. 8: 4-5). All bipolar cores are highly reduced, varying in the range of 27-34 mm in length, and one is generally quite small, measuring 25x18x16 mm. Usually, these cores have one straight and the opposite sloping platforms relatively to the cleavage front (Fig. 8: 2-5).

Both unipolar cores have a flat, not faceted platform with reduction, in one case straight, in the other – sloping. The sizes of unipolar cores (66 and 42 mm in length) are slightly larger than bipolar (Fig. 8: 1, 6).

Among 342 identified flakes (54% of waste) 283 secondary, 88 are with cortex, 20 tablets and crested. In general, among the identified flakes 57% intact, 14% distal, 13% medial, 8% proximal particles and 8% of debris. The faceting of the dorsal surface is dominated by parallel 56%, lateral 16% and with cortex are 13%. By type of platform: point 34%, linear 26%, flat 22%, natural 10%, dihedral 6%, faceted 1%.

Among the 275 lamellar products, 101 blades are prevalent (37%), less available bladelets – 94 specimens (34%) and 80 microblades (29%). Among the identified blades, 27 are intact, 32 are distal, 21 are proximal, 21 medial particles. The largest number of blades with a parallel faceting of the dorsal surface (54), quite a lot of crested (20), bidirectional only 9, with a cortex – 5, and 13 of other types. By type of platforms: pointed 30%, linear 30%, flat 17%, on cortex 5%, dihedral 10%, faceted 3%, destroyed 5%. The average dimensions of the blades are as follows: length 31.7 mm, width 15.2 mm, thickness 3.7 mm.

Among the detected bladelets (94, 14% of debitage) 19 intact, 23 distal, 29 proximal, medial 23 particles. By the faceting on the dorsal surface are mainly parallel – 60, as well as 19 crested, 2 with cortex, 9 bidirectional and 4 lateral. By type of platform: pointed 50%, linear 23%, flat 10%, on cortex 6%, dihedral 4%, faceted 5%. The average size of the bladelets, the following: length 23.3 mm, width 9.5 mm, thickness 2.6 mm.

Among the defined microblades 15 intact, 16 distal, 20 proximal and 28 medial particles. By the faceting the dorsal surface are mainly parallel – 50 (62%), as well as 18 (23%) crested, 5 (6%) with cortex, 2 (3%) bidirectional and 5 (6%) are lateral. By type of platform: point 46%, linear 29%, flat 3%, on cortex 6%, dihedral 3%. The average size of the microblades is as follows: length 15.4 mm, width 6 mm, thickness 1.4 mm.

Tools from the area of the Workshop 1 are represented by burins (5 specimens), end scrapers (4), truncated flakes (4), microliths (3) and two retouched blades. In total, 27 retouched items were found from the East section (together with the Workshop 1 and adjacent areas).

Burins are the leading category of products (7 specimens), made mainly on blades, two on elongated fragments (Fig. 9: 13-14) and one on the flake (Fig. 9: 15). The vast majority of burins are single-end, and only two products are bilateral (Fig. 9: 15-16). According to the type of design of the working edge, most (4 items) are angle (Fig. 9: 11-13, 16). Some specimens have a marginal retouch on the ventral surface (Fig. 9: 12, 16). These tools are made of unidirectional and bidirectional blades and a single core-like debris, with variations in the range of 3.3 – 3.6 cm in length and 1.2-1.7 cm in width.

The burins on truncation (two intact and one fragment) vary much more in the nature of the preform. They are made on a core-like fragment (Fig. 9: 14), a parallel blade (Fig. 9: 10) and a flake with cortex. The latter is double bilateral (Fig. 9: 15). The two whole specimens are somewhat more massive than the series of angle burins – the length varies within 5.4-6.2 cm and the width – 2.5-3 cm.

Four end scrapers are divided into two distinct types. One type covers two intact end scrapers made on double-sloping crested blades with a rather high working edge, designed with characteristic fan-shaped retouching (Fig. 9: 19-20). The other two end scrapers – the whole and the fragment – are made on wide flakes with a low working edge (Fig. 9: 17-18).

Three microliths are the backed bladelets (Fig. 9: 1-3). One item is an atypical rectangle with macrotraces from use on the ventral surface (Fig. 9: 3).

The largest category of tools that are not morphologically sustainable type are truncated flakes and blades – 7 specimens. Among this category there are blade with cortex (Fig. 10: 4), tablet (Fig. 10: 6), two parallel (Fig. 10: 2, 5), two haphazardly faceted flakes (Fig. 10: 3, 7) and one retouched fragment (Fig. 10: 1). The short distal edge of the flake (Fig. 10: 3-4, 6-7), sometimes proximal (Fig. 10: 2), was usually subjected to transverse truncating, in one case there was

a sloping truncation of both edges (Fig. 10: 5). Working edges were designed mainly on the dorsal surface of the product, and only in three cases – on the ventral (Fig. 10: 4-5, 7).

Among the morphologically non-stable categories, 5 blade blanks with various processing of edges and one retouched burin spall were found in the area of the trench. These include intact and two proximal fragments with irregular retouching on the ventral (Fig. 9: 5, 8), dorsal surface (Fig. 9: 6) and alternatively (Fig. 9: 7, 9). Largely, these products do not form an independent category of tools, and the small marginal retouch is a consequence of their use.

In addition to flint products, Workshop 1 has one sandstone abrasive and several fragments of similar products.

The majority of lithic artifacts from the filling of the dwelling were made from Kaniv flint originating from the Kaniv dislocations which outcrops were recorded approximately 12 km east of the site in Maryin Yar. The immediate proximity of the raw material outcrops to the Mezhyrich settlement, led to the possibility of using local flint to make the necessary tools. Thus, according to the calculations of materials from excavations 1995 – 1996, more than 70% of the products are made of local flint. The presence of a large number of cores and artifacts with cortex remnants indicates the initial treatment directly in the site (Kornietz et al. 1996).

Having carried out technological analysis of materials it is possible to say in advance that this sector of dwelling was functionally connected with flint processing activity. First, the amount of technical waste indicates the carrying out of the primary treatment of flint and partly secondary, which meets the standards of the Mezhyrichian industry and can be considered as one of the reference objects of this techno-complex.

The cores are mainly prismatic and conical, in most cases with the reduction of the cornice by small cleavages, with two or one striking platforms formed by one or two wide cleavages, with several splitting fronts and almost all fully reduced. The lamellar products together with the tools on the lamellar preforms made up the 45% of all assemblage. Basically, standardized medium width blades were obtained, due to the use of a soft mineral hammer, mainly due to the “tangential impact”. In addition, part of the blades were obtained using a hard mineral hammer and a soft organic. Though very small (only 2.8% of the artifacts found), but a fairly typical sample of tools: classic microliths (backed blades), burins and end scrapers. An interesting feature of the tool kit is a series of truncated implements, which can testify to the specifics of activity in this part of the dwelling.

Table 2. Fourth dwelling 2018-2019. Faunal assemblage

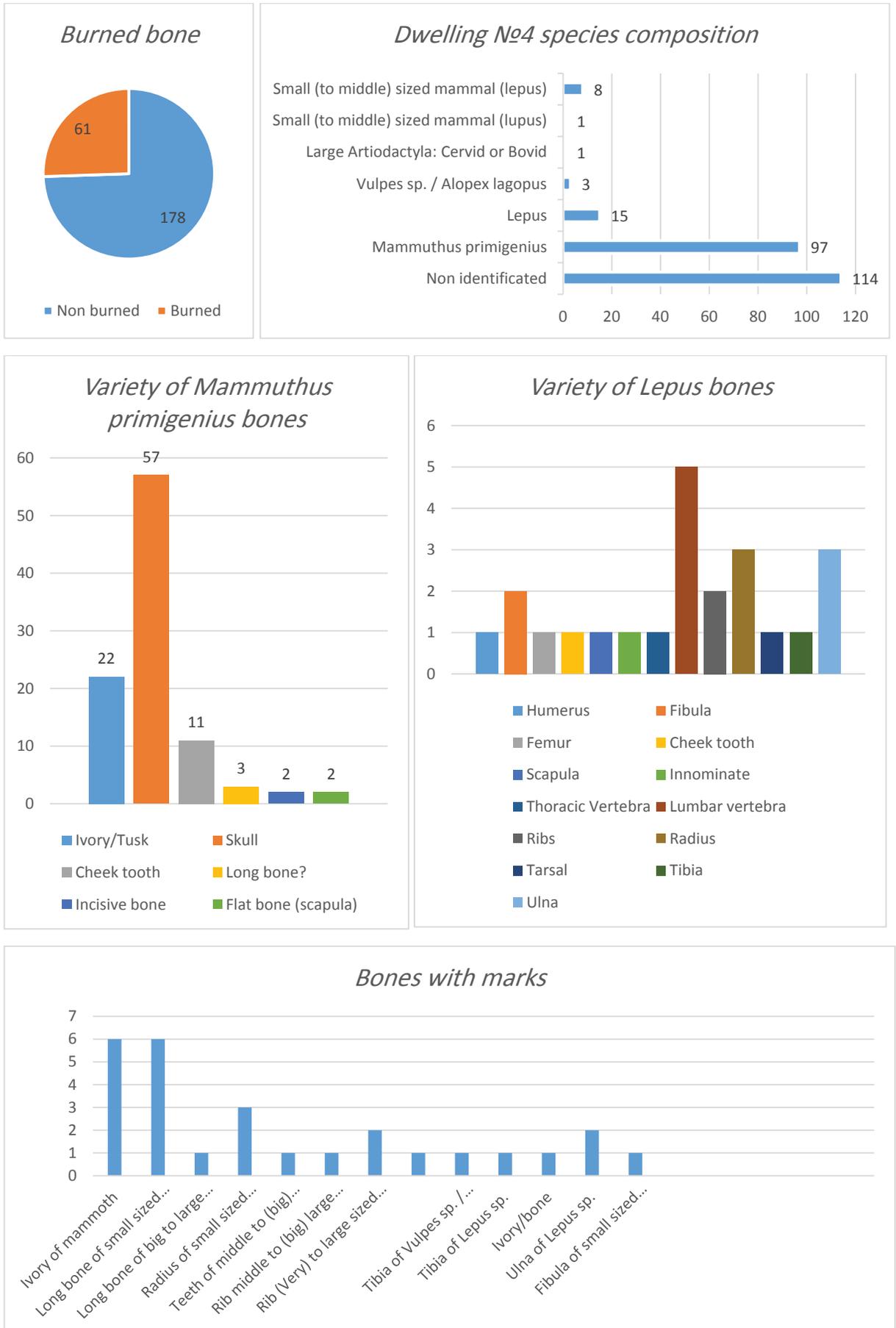


Table 3. Fourth dwelling 2018-2019. Lithic assemblage

Category	Type	Section EAST		Section WEST		In all	
		Quant	%	Quant	%	Quant	%
Wastes:							
Flakes		342	54.3	25	62.5	367	54.8
	With cortex	88		3		91	
	tablets+crested	20		3		23	
	other	234		19		253	
(chips)		(407)		(45)		(452)	
Blades		101	16	6	15	107	16
	With cortex	5		2		7	
	crested	20		1		21	
	parallel	54		1		55	
	bidirectional	9		2		11	
	other	13				13	
Bladelets		94	14.9	4	10	98	14.6
	With cortex	2				2	
	crested	19				19	
	parallel	60		4		64	
	bidirectional	9				9	
	other	4				4	
Microblades		80	12.7	2	5	82	12.2
	With cortex	5				5	
	crested	18				18	
	parallel	50		2		52	
	bidirectional	2				2	
	other	5				5	
Burin spalls		5	0.8	2	5.0	7	1
Cores		8	1.3	1	2.5	9	1.3
	unipolar	2				2	
	bipolar	4		1		5	
	Core-like debris	2				2	
TOTAL wastes		630	100	40	100	670	100
waste % of all products			95.9		87.0		95.3
Tools:							
		Quant	%	Quant	%	Quant	%
Burins		7	25.9	2	33.3	9	27.3
	angle	4				4	
	on truncation	3		1		4	
	on truncation +angle			1		1	
End scrapers		4	14.8			4	12.1
	high	2					
	low	2					
Combined	Burin+end scraper			1	16.7	1	3.0
Retouched blades		5	18.5	1	16.7	6	18.2
Retouched burin spall		1	3.7			1	3.0
Truncated		7	25.9	1	16.7	8	24.2
Microliths		3	11.1	1	16.7	4	12.1
TOTAL tools		27	100	6	100	33	100
tool % of all products			4.1		13.0		4.7
TOTAL		657		46		703	
TOTAL with chips		1064		91		1155	

In general, after preliminary technological analysis of the lithic materials from Workshop 1 and from the layer around it, it is possible to state the typical technology of primary splitting for the Mezhyrichian industry. This will make it possible in the future to make a comparative study with other objects of this type. Thus, 2007-2008 studies revealed an external workshop at the edge of the pit № 7 of the first residential unit (Nuzhnyi, Shydlovskiy, 2015).

Products from organic materials originating from the section "East" are represented by bones with traces of processing and finished products, among which is a series of three fragments of treated ribs of a mammoth. All three products are distal parts of mammoth ribs transversally trimmed and broken, traces of scraping are observed on their surface. The first fragment, measuring 13x3x1 cm, does not carry any trace of additional processing (Fig. 11: 1). The second fragment of the rib, also transversely trimmed, on the convex surface has a longitudinal engraved line, which is transversely crossed by regular incisions, arranged in groups approximately every 3 cm. From the trimmed end the number of incisions has the order –2–1–4–2–2 (Fig. 11: 2). The third fragment of the rib is transversely cut at both ends, measuring 11x2.1x0.75 cm. However, unlike the first two, it has an additional treatment in the form of narrowing at the edges (Fig. 12: 1).

Another product is carved from mammoth tusk, morphologically very similar to the previous rib fragment, also measuring 11x2.3x0.75 cm. It transversally cut at both ends, narrowed, and flattened to the distal end. On the edge of this product are traced regular incisions (Fig. 12: 2).

The finished product is represented by a fragment of a needle from a sharpened bone of a small mammal with a longitudinal groove at the distal end (Fig. 10: 9). In addition to the described findings, some of the organic remains carry traces of treatment, among which: the flake from the bone of a large mammal, fragments of processed tusks (Fig. 10: 10), incised and broken long bones of medium-sized mammals with traces of treatment in the area of the epiphyses. The bead of the mammalian tooth that is completely ground on all sides and does not have a through hole should be attributed to pendant (Fig. 10: 9).

Discussion

The question of multiple living surfaces in dwelling 4 remains open. The vertical distribution of the findings in the trench does not preclude the existence of two or even three surfaces. The existence of two different surfaces inside the dwelling 4 is indicated by the occur-

rence of findings at two different levels. Previous studies have found that most of the finds on the square 332B was located at a depth of –392 to –396.5 cm. Below this level of finds, the deposits were sterile to a depth of –404 cm, at which another level of findings was found. A similar situation was noted in the square 334A, where many of the findings lie at a depth of –399 to –403 cm, while other findings from this square were separated from the upper layer by sterile sand with a thickness of up to 5 cm and lay at a depth of –406 to –411 cm. The most reliable evidence of the existence of two living surfaces inside the dwelling was the excavation of the control trench on the square 333B. Thus, the authors of the study conclude on two episodes of dwelling functioning (Adovasio, Lenz, 1996, p. 46-47; Soffer et al. 1997).

Thus, as a result of studying the occupancy in a trench extending through the central part of the fourth dwelling, at least two living surfaces were found, which may correspond to the two cultural layers identified by M.I. Gladkikh south of Dwelling 4. The bottom layer and the level of living are related to the stage of housing establishment, while the upper was delayed after a while, as evidenced by the presence of sterile loessic layers outside the dwelling and sand in the dwelling. The spread of cultural remains within the trench showed that the basement bones of the dwelling were dug into the ground, not simply mounted on its surface.

The presence in the dwelling of anatomically complete skeletons of fur animals, together with lithic end scrapers and, bone awls and needles, suggests that there may have been a removal of skins from these animals for the manufacture of clothing, which in turn may indicate winter residence in the dwelling (Kornietz et al., 1996: 18-21).

Thus, in the course of the study of the trench, which is located along the long axis in the filling of the house, two functionally different sections were found opposite of the central part with the remains of the hearth. Cultural remains in the southwestern area (anatomical groups of fur animals, punctures) testify to fur and leather processing operations here, while the north-eastern part of the trench shows vivid evidence of operations in the processing of flint and the manufacture of tools. There are also certain specifics in the different set of flint tools. In general, the presence of these actions inside the dwelling indirectly indicates a cold period of the year. But such functional distribution between different sectors within a dwelling may indicate the presence of specific places for industries of different nature.

Conclusion

Thus, as a result of the work carried out in 2018-2019, archaeological and restoration studies were conducted of the Mezhyrich mammoth hunters' settlement. During the clearing of the Dwelling 4, a number of bones directly forming the dwelling construction were restored. In addition, the excavations of two opposite sections inside cluster have identified new archaeological materials and objects. These include a series of bone and flint artifacts, as well as a place for flint processing and manufacturing of tools. The new materials show quite clearly the features of the hunting group's livelihood in the last glaciation, in particular providing evidence of the sectoral use of inner living space.

The study of the surrounding objects, namely the plot of the rich cultural layer (Unit 1) and the northern sector of the pit №6 (Unit 2) made it possible to find out the microstratigraphic fea-

tures of the settlement and to understand the dynamics of the site development over time.

Mammoth bone dwelling is a testament to the most ancient forms of architecture used by Homo Sapiens in harsh periglacial conditions, with utilitarian, ergonomic, aesthetic and world-view features that characterize it as a dwelling. The conservation of dwelling from mammoth bones has become more relevant to the archaeological heritage in modern Ukraine, which will allow the display of the monument for visitors, will have a positive impact on the development of the tourism industry and local infrastructure.

In the future, based on the experience of leading the Summer school, it will be possible to form an international focus group oriented to the new issues about cultural and chronological, seasonal and palaeoeconomical interpretation of the Upper Palaeolithic sites in the Middle Dnieper basin area.

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**П.С. Шидловський, О.І. Цвіркун,
С. Пеан, М.В. Чимирус, Б.В. Мамчур**

НОВІ ДОСЛІДЖЕННЯ ЧЕТВЕРТОГО ЖИТЛА МЕЖИРІЦЬКОЇ ВЕРХНЬОПАЛЕОЛІТИЧНОЇ СТОЯНКИ: РЕЗУЛЬТАТИ РОБОТИ МІЖНАРОДНОЇ ЛІТНЬОЇ ШКОЛИ

Межирицька палеолітична стоянка – пам'ятка національного значення, що відноситься до епіграветського культурного кола і датується в межах 14,9 – 14,3 тис. ВР. Протягом більш ніж півсторичного дослідження пам'ятки на площі поселення було виявлено чотири житла з кіток мамонта, що оточені господарськими об'єктами і які складають окремі господарсько-побутові комплекси. Завдяки детальним мікростратиграфічним дослідженням встановлено мінімум три епізоди заселення пам'ятки. Четверте житло, виявлене у 1976 р. експедицією М.І. Гладких залишене на місці з метою музеєфікації та планомірного вивчення.

Дослідницькі роботи в 2018-2019 рр. проводились в рамках проекту №Ф77/38811 Державного фонду фундаментальних досліджень «Межирицька стоянка мисливців на мамонтів: археологічні дослідження та музеєфікація» і проекту 1804S Міжнародної спілки по вивченню четвертинного періоду (INQUA) «MEZHRYCH INTERNATIONAL ARCHAEOLOGY SUMMER SCHOOL: interdisciplinary study of a Late Pleistocene site». Останній проект передбачав обмін досвідом між вченими з різних наукових і навчальних закладів та навчання молодих вчених і студентів сучасним методикам фіксації та інтерпретації археологічних знахідок. Археолого-реставраційні роботи над рештками четвертого житла включали такі завдання: проведення реставраційних робіт над кістками – склейки великих кісток – елементів конструкції житла, надання зміщеним кісткам первинного розташування, тощо; археологічне дослідження в межах траншеї 1, що була прокладена експедицією Н. Корнієць у 1995-1996 рр.

Метою археологічних досліджень внутрішнього простору житла стало детальне вивчення мікростратиграфічних особливостей заповнення, встановлення рівнів відкладів всередині споруди та отримання серій виробів з кременю та кістки для з'ясування типологічних та технологічних особливостей комплексу. Внутрішній простір житла досліджувався у двох окремих ділянках траншеї 1, що розташовуються у двох протилежних від центрального вогнища сторонах – північно-західній та південно-східній. Дослідження внутрішнього простору житла виявило складну структуру заповнення, що відзначається наявністю декількох поверхонь існування та спеціалізацією окремих ділянок.

Ключові слова: пізній палеоліт, епігравет, господарсько-побутовий комплекс, житло з кісток мамонта, технологія кременеобробки, мисливці на мамонта.

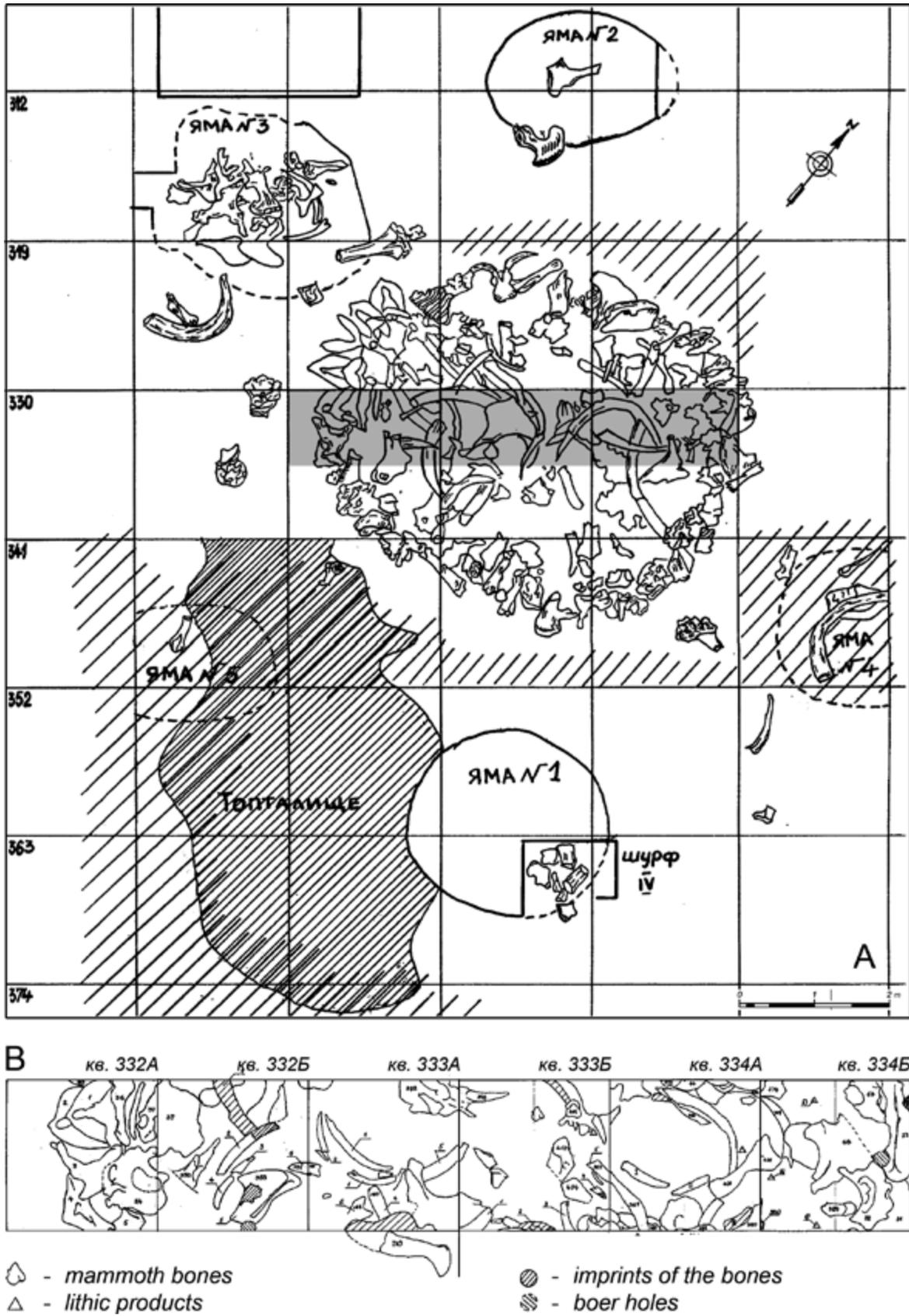


Fig. 1. Planigraphy of the fourth household unit according to the research of M.I. Gladkikh (1978-1981) and excavations of N.L. Kornietz (1994-1995) (by: Kornietz 1995): A - plan of the fourth unit; B - plan of the trench inside the dwelling 1994-1995

Рис. 1. Планіграфія четвертого господарсько-побутового комплексу за дослідженнями М.І. Гладких (1978-1981) та розкопками Н.Л. Корнієць (1994-1995) (за: Корнієць 1995): А – план четвертого ГПК; Б – план траншеї всередині житла 1994-1995 рр.



Fig. 2. The modern view of the fourth mammoth bone dwelling. Photo from the north-east and south-east
Рис. 2. Сучасний вигляд четвертого житла з кісток мамонта. Вигляд з північного та південного сходу

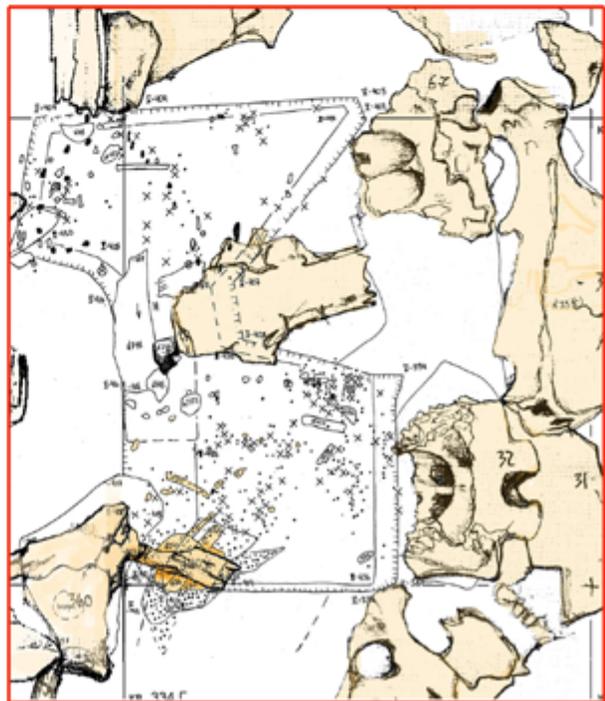
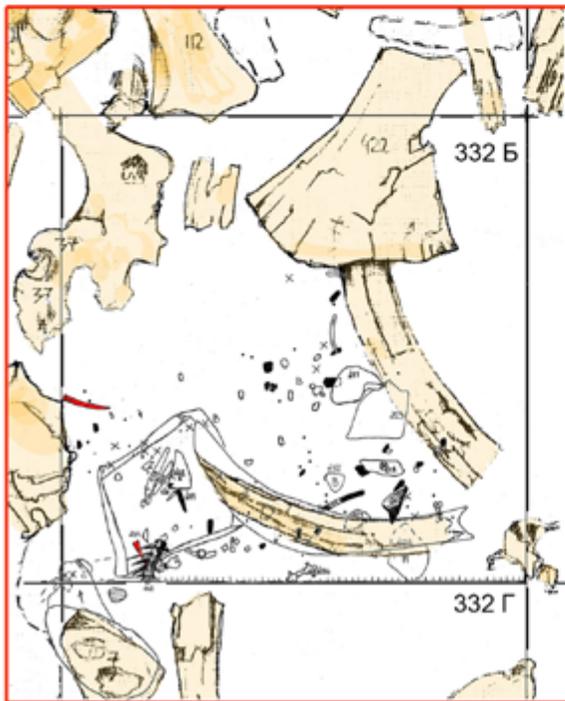
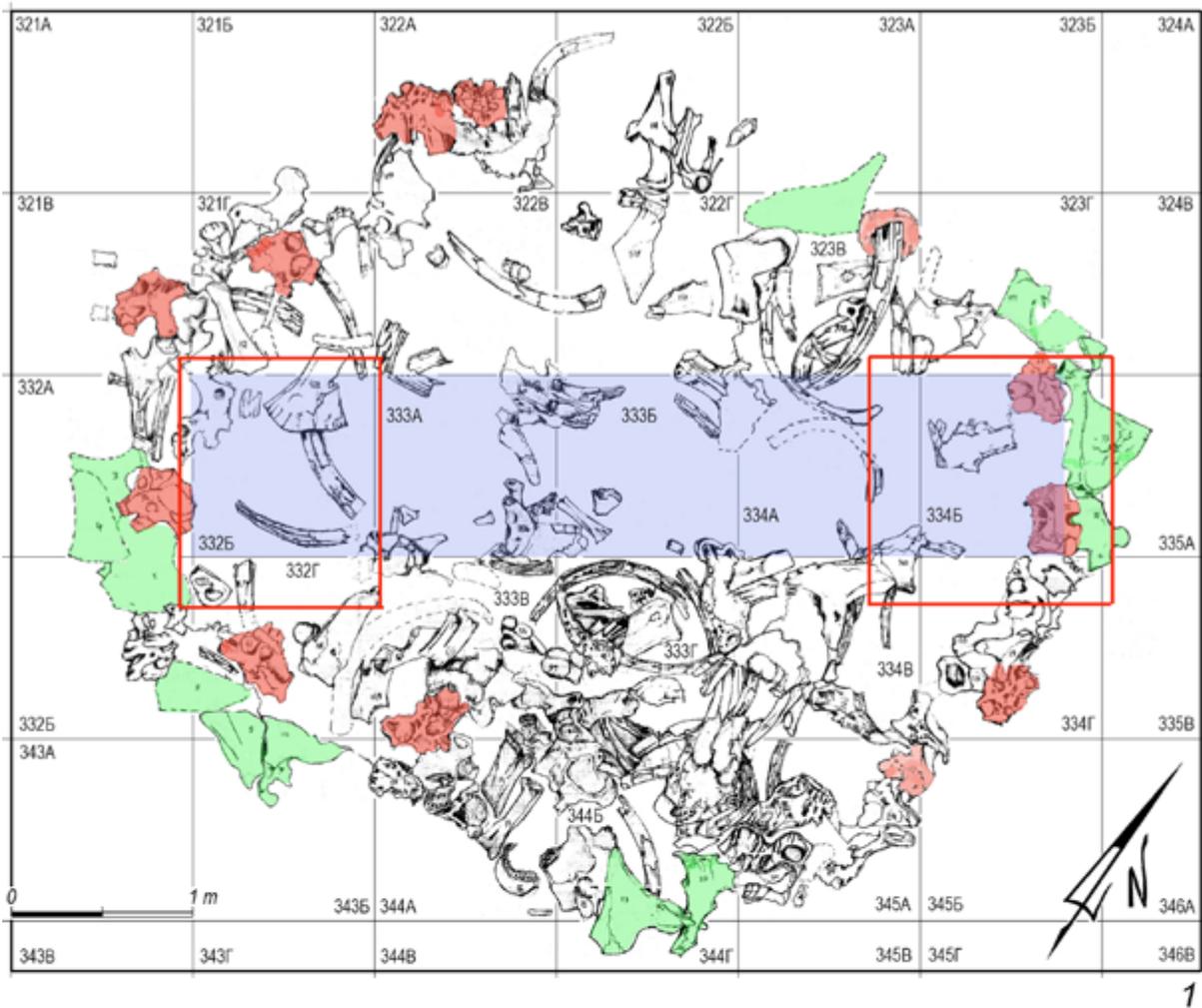


Fig. 3. Study of 2018-2019 inside the fourth dwelling: 1 - plan of the dwelling with excavated areas; 2 - West section; 3 - East section

Рис. 3. Дослідження 2018-2019 рр. в четвертому житлі: 1 – план житла з позначеними ділянками проведення розкопок; 2 – ділянка “West”; 3 – ділянка “East”



Fig. 4. Study of the West section
Рис. 4. Дослідження ділянки "West"

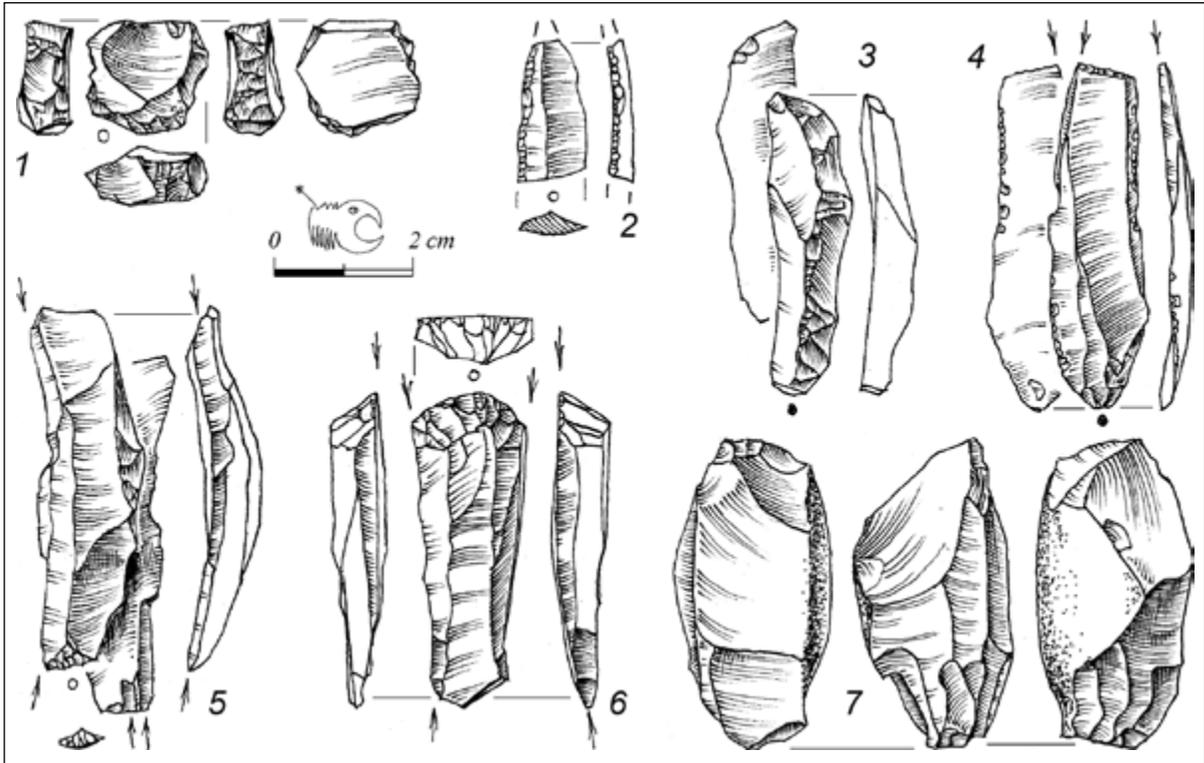


Fig. 5. West section. Flint and bone artifacts: 1-7 – lithic tools and core; 8-9 - awls from long bones of medium-sized mammals

Рис. 5. Ділянка "West". Вироби з кременю та кістки: 1-7 – крем'яні знаряддя та нуклеус; 8-9 – проколки з трубчастих кісток середніх ссавців



Fig. 6. West section. Processed tusk and bone artifacts: 1 - fragment of the tusk product; 2-3 - bone needles; 4-6 – bones of limbs of middle-sized mammals with traces of treatment

Рис. 6. Ділянка "West". Оброблені бивень та кістка: 1 – фрагмент виробу з бивня; 2-3 – кістяні голки; 4-6 – кістки кінцівок середніх ссавців з слідами обробки



Fig. 7. Location of Workshop 1 in East section
Рис. 7. Розташування Точка 1 на ділянці "East"

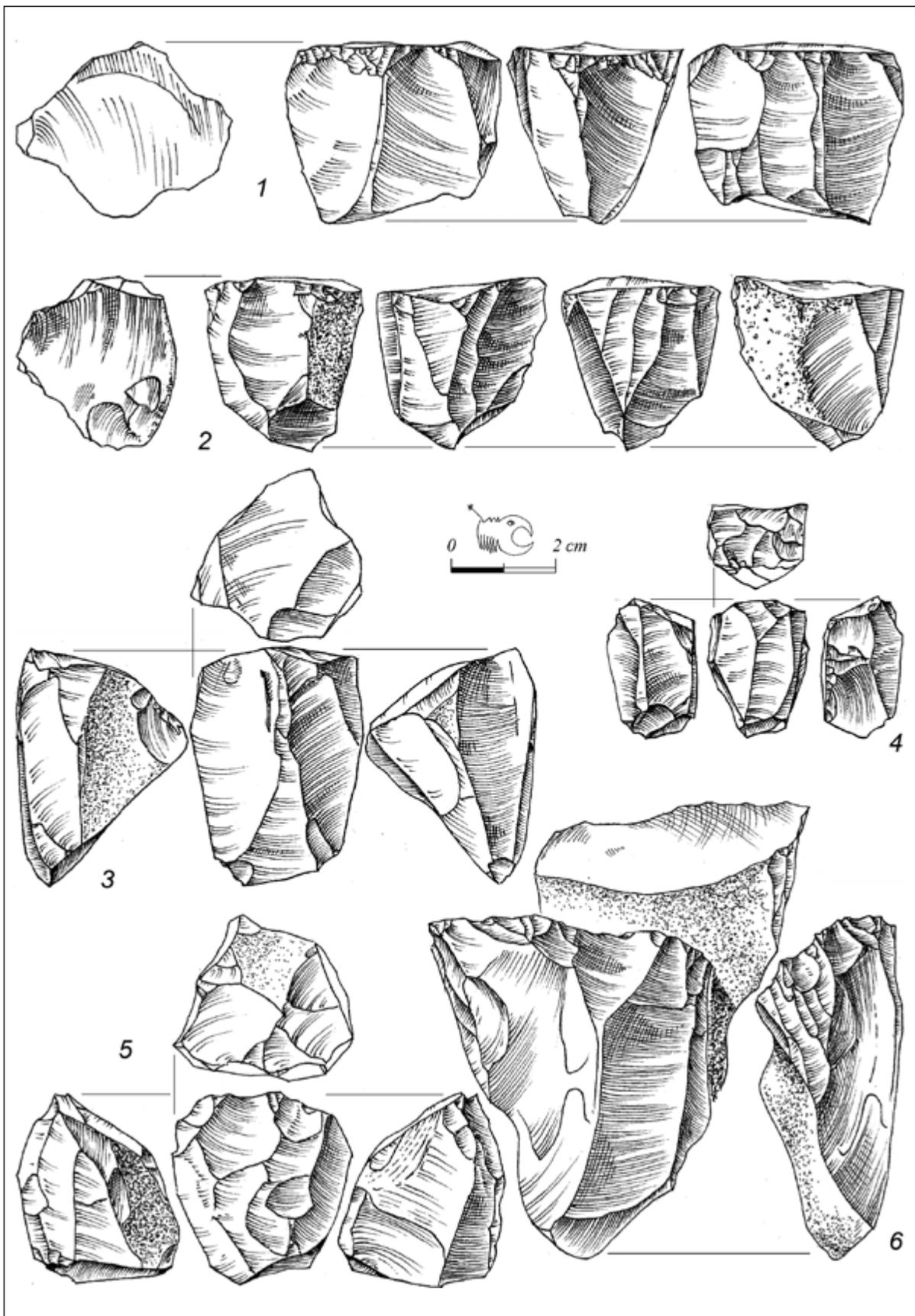


Fig. 8. East section. Lithic cores

Рис. 8. Ділянка "East". Крем'яні нуклеуси

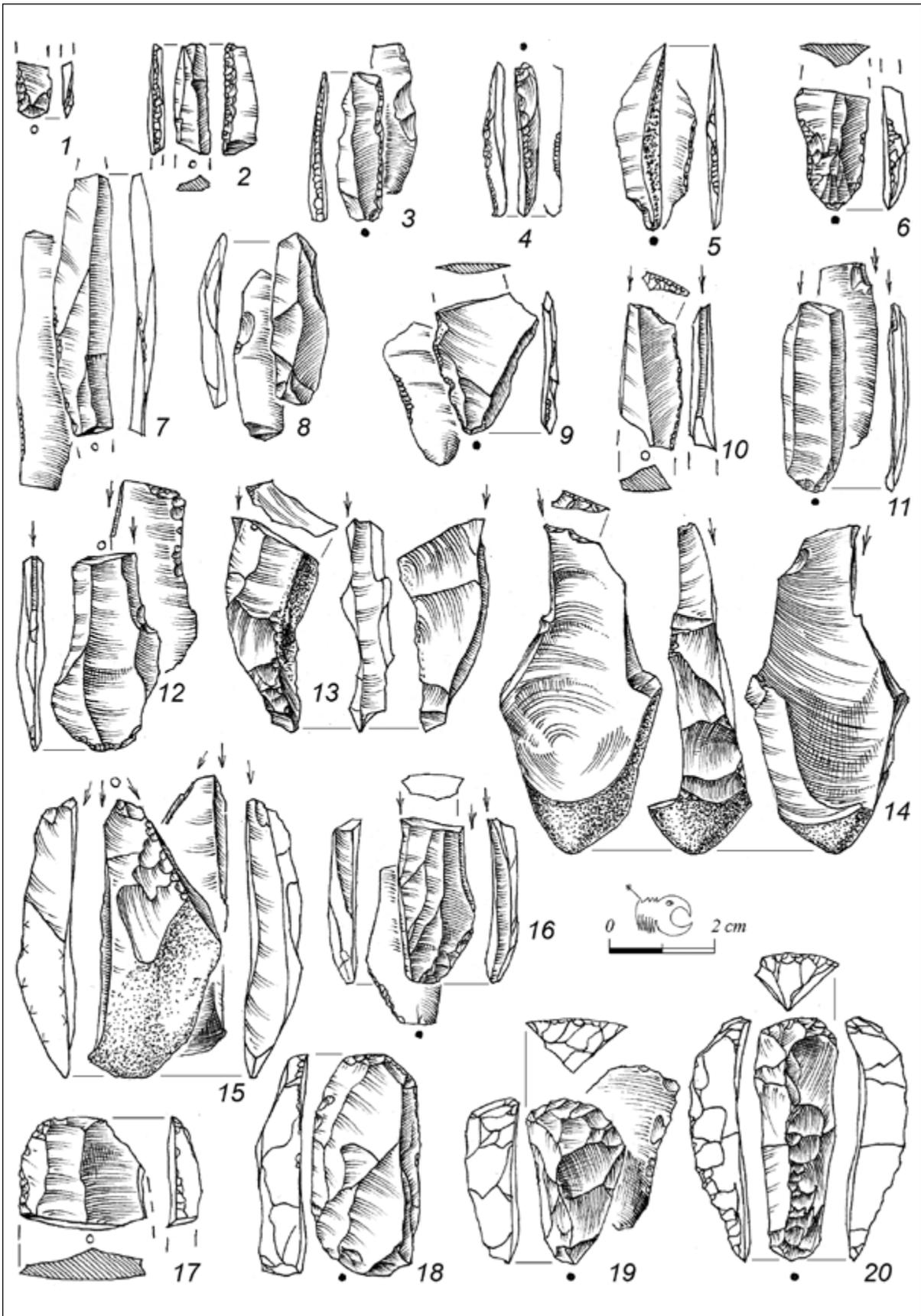


Fig. 9. East section. Lithic tools: 1-3 - microliths and their fragments; 4 – retouched burin spall; 5-9 – bladelets and blade with retouch; 10-16 – burins; 17-20 – end scrapers

Рис. 9. Ділянка "East". Крем'яні знаряддя праці з: 1-3 – мікроліти та їхні фрагменти; 4 – ретушований різцевий скол; 5-9 – оброблені пластинки та пластина; 10-16 – різці; 17-20 – скребки



Fig. 10. East section. Products made of flint and organic materials: 1-7 – retouched lithic artifacts; 8 – a fragment of bone needle; 9 - processed mammalian tooth; 10 - a fragment of the processed tusk

Рис. 10. Ділянка "East". Вироби з кременю та органічних матеріалів: 1-7 – крем'яні вироби з вторинною обробкою; 8 – фрагмент кістяної голки; 9 – оброблений зуб ссавця; 10 – фрагмент обробленого бивню

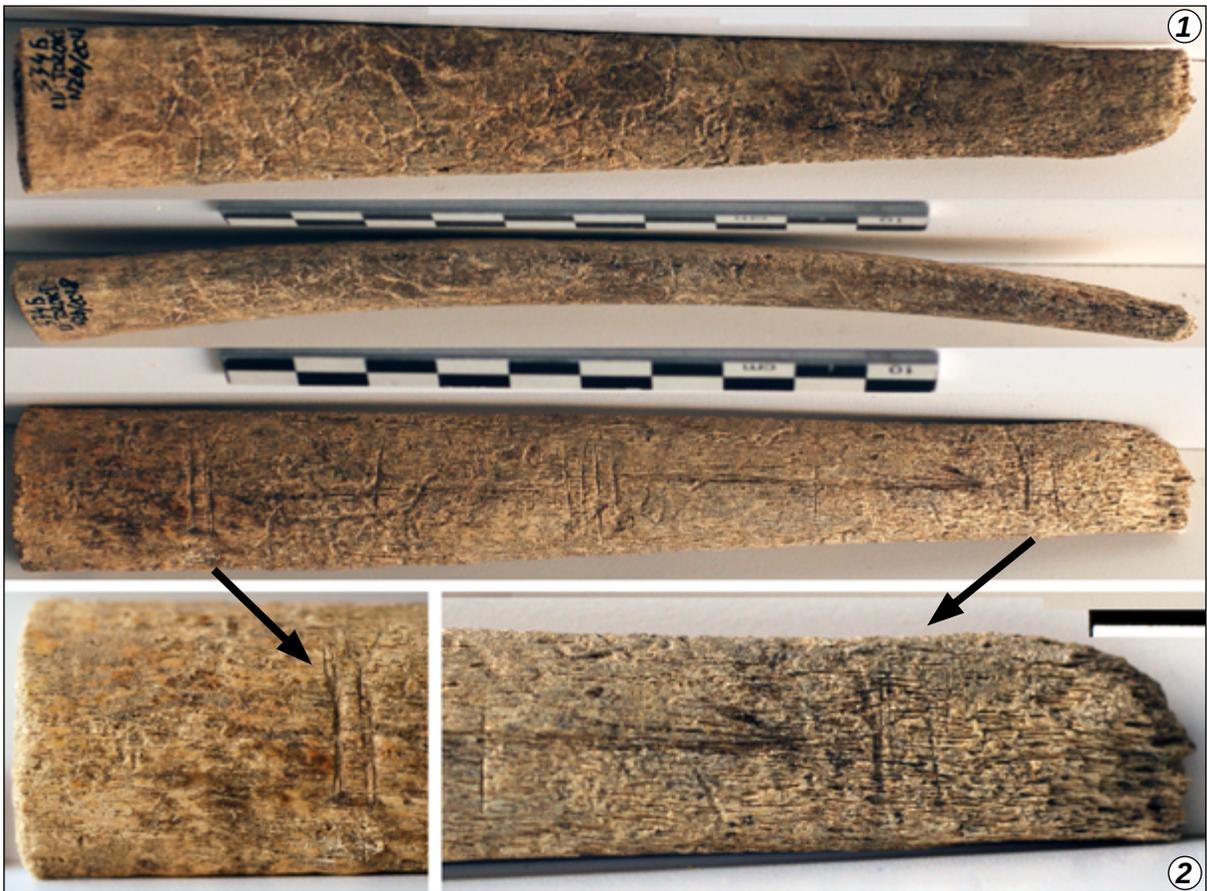


Fig. 11. East section. Processed distal parts of mammoth ribs

Рис. 11. Ділянка "East". Оброблені дистальні фрагменти ребер мамонта



Fig. 12. East section. Spatulas of bone and mammoth tusk: 1 – distal part of rib; 2 - processed tusk

Рис. 12. Ділянка "East". «Лопаточки» з кістки та бивню мамонта: 1 – дистальний фрагмент ребра; 2 – оброблений бивень