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BONE TOOLS FROM PŘEDMOSTÍ IN MORAVIA (CZECHOSLOVAKIA)

*ABSTRACT: Předmostí near Přerov in Moravia is one of the best-known mammoth-hunter settlement in Europe. It was discovered in 1880 and H. Wankel, K. J. Maška, M. Kříž, K. Absolon, K. Žebera and B. Klíma took an active part in its research. The Předmostí site was settled several times in the course of the Middle and Upper Palaeolithic and the overwhelming majority (well over 90 per cent) of the tens of thousands of pieces of the stone industry, as well as the entire bone industry and works of art discovered here come with certainty from the so-called main cultural layer, from Pavlovian. The relatively rich collection of bone instruments of diverse shape have not yet been published as a whole, only isolated reproductions of few pieces are known. The analysis of the complete collection of bone tools kept at the Anthropos Institute shows that their composition has the specific features of the central European Pavlovian. Most shapes lack analogies in the west European Upper Palaeolithic cultures. Practically the same holds also for eastern Europe, only few, sporadically scattered artifacts of this kind have been discovered. Předmostí, Dolní Věstonice and Pavlov, three sites yielding practically identical bone inventory, form the core of Pavlovian, with its highly developed art and rich stone and bone industries. This article is a reprint of a previously published article (Valoch K., 1982: *Anthropologie (Brno)* 20, 1: 57–69).*

KEY WORDS: Předmostí – Pavlovian – Paleolithic – Bone tools – Ivory tools – Reindeer-antler tools

The settlement of mammoth hunters embedded in the loess near Předmostí in Central Moravia is undoubtedly one of the best-known Palaeolithic localities anywhere in Europe. The site began to be excavated by J. Wankel in 1880, so the history of research here dates back more than 100 years. Despite excavations performed by multiple

generations of researchers – the latest were conducted by B. Klíma in 1971–1975 – and numerous references to significance of Předmostí and its cultural remains in all the literature about Palaeolithic, it happened that not only stratigraphy and excavation features but also material relics from this site remained as good as unknown.

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It must be regarded as a great merit that after about 100 years not only the history and progress of individual excavations but also some unknown section drawings and observations by J. Wankel, K. J. Maška, M. Kříž, J. Knies and K. Absolon scattered in excavation logs and various publications were comprehensively and lucidly published (Klíma 1970, Absolon, Klíma 1977). In this way the most important source of information about Předmostí was established.

The most frequent component of material culture from Předmostí were flint tools, whose total amount may exceed 40,000. After the Mikulov Chateau was destroyed by fire at the end of the war, only a mere 1400 pieces remained preserved in collections of the Anthropos Institute and some small assemblages were stored in several Moravian regional museums and private collections. Statistical recording of the material became impossible, it is welcome that the Institute of Archaeology of the Academy of Sciences has published the numerous drawings by K. Absolon along with his descriptive text (Absolon, Klíma 1977). In this way at least a selected stock of types was documented, even though without any stratigraphic division. Since it can be supposed that the absolute majority of artifacts came from the main Pavlovian layer, this catalogue can also be regarded as a base for the study of its typological variety.

The collections of the Anthropos Institute, fortunately, still keep in custody the unique objects of art, various bone, ivory and antler tools as well as exceptional stone objects. These inventory items also have suffered some damage, which, however, did not harm their overall appearance. It is almost beyond doubt (cf. Klíma 1970: 65) that all these finds belong to the main Pavlovian layer. This simplifies their evaluation because in this way they can be considered chronologically and culturally homogeneous.

Over the years, we have endeavored to publish the finds stored in the Anthropos Institute. The first paper dealt with stone rings, smoothed pebbles and a limestone ball (Valoch 1960) as exceptional Upper Palaeolithic objects. The finds of such stone rings are so far limited only to Moravia (Brno II grave, Dolní Věstonice, Pavlov) and the smoothed sandstone pebbles were also found at Willendorf II, layers 8 and 9 (Felgenhauer 1956–1959: Taf. 44:12); the small ball has no analogies.

Later we summarized anthropomorphic and zoomorphic objects of art (Valoch 1969) and also non-figural engravings (Valoch 1975). In the meantime B. Klíma (1974) published the only clay-modeled and fired animal figurine of a wolverine, which was discovered at Předmostí. The best examples of these pieces of art were

already many times pictured and some of them (an engraved female figure, a mammoth figurine) can be found in the most books about Palaeolithic art. However, all of the objects were presented for the first time as a complete collection, whose overall character expressed the specific traits of Pavlovian – the Central European group of the Gravettoid technocomplex. Thereby came to light that the numerous tools as well as bone and tusk fragments bear various rows of incisions, which could hardly be documented entirely and which cannot be considered as art in the narrow sense of the word.

There is still a large collection of artifacts made of bone, ivory and reindeer antler, whose classification and publishing has been in our plans for years. The discovery of these morphologically specific artifacts in the last two decades of the 19th century was a historic event because it was the first time that an inventory appeared in Europe which was different from French standards and did not find its analogies earlier than some decades later in Dolní Věstonice and Pavlov and to a minor extent at various sites of Eastern Europe. The unique character of these artifacts was so conspicuous that H. Obermaier declared an oar-like flat club, which was not yet known elsewhere, to be characteristic of Předmostí (Obermaier 1912: 300) and still 1924 H. Breuil saw himself forced to close his report on Předmostí with following sentence: "...Par beaucoup des types industriels osseux, il se classe aussi dans l'Aurignacien supérieur mais par beaucoup d'autres, il demeure original et ne ressemble à rien de connu..." (Breuil 1924: 546).

Some difficulties arose with the analysis of bone tools; several forms are quite unconventional, unnamed and their functional purpose remains unknown. The most important among them are fortunately represented by multiple specimens so that no doubts arise as to their intentional forming or the same recurring use-wear pattern. In this way we were able to distinguish multiple groups of similar artifacts, which can be regarded as types. Moreover, attention can be drawn to several products of bone and tusk splitting, which demonstrate the technical skills of their makers. All palaeontological determinations were kindly conducted by Prof. Dr. R. Musil. The drawings *Figures 1–2* were made by L. Najmrová, the photos *Figures 3–11, 16, 17* by E. Dania and *Figures 12–15, 18* by L. Píchová in the Anthropos Institute.

SPLINTERED BONES AND TUSKS

The splinter technique, which has been used for working stone since the very emergence of man, was

soon also applied to bones and tusks. Evidence thereof is given by Lower and Middle Palaeolithic bone tools, which have become more and more frequent lately. It was still in the middle Upper Palaeolithic that tools were made by simple splitting, as is documented by numerous examples from Předmostí.

Figure 1:11. Thin triangular bone flake with dorsal side, bearing multiple scars after earlier detachments.

Figure 1:12. The diaphyseal part is retouched and rounded (worn by use?) on the left longitudinal edge of the inner side, and corroded by roots on the outside. The best artifact adapted by appropriate retouch was already pictured by H. Breuil (1924: Fig. 20:5); it is the medial part (shaft) of a spatula smoothed on both faces.

Figure 2:3. Splintered piece of a mammoth bone with well-distinguished grip on the lower end, the distal part is flattened and ends in an originally sharp edge. Tusks were also splintered in a similar way, which was surely much more difficult.

Figure 3:5. Longitudinally split tusk. There are more of them in Předmostí, and also long and thick tusks, whose splitting demanded not only considerable power and skilfulness but also appropriate axe-like tools.

Figure 3:2. Stump-like tusk segment split-off on all sides as a nucleus.

Figure 2:2. Elongated ivory flake, distally thin and originally probably sharp (the end is broken-off), proximally trimmed also on the upper side (freshly damaged on the right). As far as morphology and maybe also functional purpose are concerned, this object is analogous to the bone tool on *Figure 2:3*.

Figure 1:5. Ivory flake with three scars on the dorsal side and an even splitting facet on the ventral side (proximally freshly damaged). Morphologically similar to the bone flake on *Figure 1:11*.

Figures 1:8, 3:1. There are some tusk splinters of exceptional form, which are reminiscent of the well-known "protolithic boneheads" from Petershöhle Cave near Velden (Hörmann 1923). They are splintered always in two opposite directions so that approximately in the middle where the scars fade away a swelling with a transversal ridge emerges. (*Figure 1:8* is proximally freshly damaged).

CUT MARKS IN BONES AND TUSK

Figure 1:1. Splinter of a long bone with a deep transversal groove.

Figure 3:3. Bone fragments with multiple parallel short fine transversal grooves.

Figure 1:3. Fragment of a long bone bearing many longitudinal fine cut marks as well as several short transversal incisions on the lateral side.

Figure 1:10. Fragment of a flat mammoth bone covered with more or less parallel grooves on the whole surface. The grooves were spread over a larger surface of the original bone, from which the find represents only a fragment.

Figure 1:2. Small piece of a long bone opened longitudinally using the groove and splinter technique.

Figure 2:1. Distal part of a wolf femur, whose surface is covered with numerous fine longitudinal parallel incisions. When the bone was broken in two, a long fissure emerged which accidentally disturbed about 20 short incisions; the row of incisions evidently continued on the broken-off part.

Figure 3:4. Pointed end of a thin tusk bearing two rows of short incisions in its lower part. Nine horizontal and about 11 oblique incisions are well visible.

The purpose of all these artifacts is probably quite varied. The transversal and longitudinal grooves are typical wear marks emerging with butchering (*décarnisation*), as was described by H. Martin (1907–1910) from the Mousterian of La Quina. The bone fragment covered with incisions can be regarded as a cutting pad. The opened long bone may have only been production waste because the aim was maybe to obtain a splinter, as it was with reindeer antler in Magdalenian. The incisions on the wolf femur and on the tusk fall within the realm of records rather than decorative art.

WORN TUSK SEGMENTS

A specific use wear of tusk fragments was detected in three artifacts, from which the best and largest one is pictured (*Figure 3:6*). The tusk hewn-off at the lower end is so much abraded on almost the whole surface that the bone substance became considerably reduced and individual tooth lamellae stick out shingle-like one above the other. The upper worn end is rounded and slightly concave. The artifact was discovered by K. Absolon in 1928. The use wear detected, which can be observed in the same form on three artifacts, is undoubtedly intentional. The relevant working procedure, however, cannot be identified; most probably it was rubbing or something of the sort.

AWLS

A large amount of awls were found manufactured of various bone splinters, often still bearing an epiphyseal

remnant. Our collections comprise a total of 16 proximal, 14 medial and 2 distal parts as well as 5 entire tools. We have pictured four complete specimens and one distal point (*Figure 4:1–5*); the first artifact is decorated with two rows of notches (8 on the right, 15 on the left; cf. Breuil 1924: Fig. 13:4). A smoothed blunt-pointed bone splinter bears a specific z-shaped engraving made with triple line (*Figure 1:4*).

"FISHHOOK"

Figure 1:7. An ivory-carved morphologically remarkable artifact, which ends in a longer and a shorter point. Total length 58 mm, shorter part 40 mm, the longer point is 8 mm and the shorter one 5 mm thick, both of them are round in cross-section, the base is freshly broken-off (cf. Breuil 1924: Fig. 16:5). The shape of the artifact is strongly reminiscent of a fishhook.

PROJECTILE POINTS

The usual form of projectile points are round ivory sticks, often curved parallel to the shape of the tusk. Their base, which is preserved only in a few specimens, is mostly trimmed to form a cone. In most cases only fragments were found: 26 medial, among them one with multiple transversal grooves, 6 proximal and 10 distal (*Figure 4:10–11*), among the latter is one with transversal grooves again. Only the three entire points are pictured (*Figure 4:8–9, 12*; cf. Breuil 1924: Fig. 13:5, 8–9). The first point has a blunt-pointed, the second a widened, and the third one a conical base. Besides these cylindrical points there are also some morphological specifics:

Figure 1:9. Distal part of an ivory point, thick oval-shaped and slightly angled in cross-section, on whose left side is a cavity reminiscent of a blood groove. The artifact is heavily corroded and reconstructed in the lower part.

Figure 4:7. Thin point made of reindeer antler, roundly-rectangular in cross-section, proximally widened and flattened. The base was bilaterally thinned by scraping to such an extent that the end has broken off. Discovered by M. Kříž (1903: 229; cf. Breuil 1924: Fig. 16:4).

Figure 1:6. Proximal part of a point from reindeer antler, roundly-rectangular in cross-section, with bilaterally chisel-like flattened base. Discovered by M. Kříž (cf. Breuil 1924: Fig. 13:2). This artifact is analogous to Magdalenian projectile points.

"DAGGERS"

Figure 5:1–3. From Předmostí we know of three entirely similar sharply pointed "daggers", two of them (*Figure 5:2–3*) equipped with marginal notches (Absolon 1922: Fig. 299, 1957: Figs. 19–21, by mistake 5 specimens are presented, Breuil 1924: Fig. 13:3, 6). Discovered by M. Kříž (1903: 230) and K. J. Maška. Two of them are made from distal parts of fibulae of a single individual (?) of *Panthera leo* (*Figure 5:1*, right fibula, 5:3, left fibula), the third specimen (5:2) probably comes from the proximal part of a metapodial of an unspecified animal species (according to pers. comm. by R. Musil).

RIB TOOLS

The assemblage under review includes a quite high number (about 50 pieces) of variously used and worn mammoth ribs. Forms which are represented by multiple specimens can be divided into six types:

- Ribs, whose end is pointedly arched and the edges in this part are worn (*Figures 6:2, 7: 7–8*).
- Ribs, whose end is pointed by bilateral use wear and the arched surface is abraded down to the spongy bone (*Figure 6:1*).
- Ribs, whose end is transversally slightly arched and worn only in this particular region (*Figure 7:6*). In some of them the adjacent surface is laterally slightly flattened (*Figure 6:3*).
- Ribs, whose end is pointed by deep lateral use wear (*Figures 6:7, 7:2*).
- Ribs, whose end is truncated whereby the edges became rounded and smoothed by subsequent use. The artifact pictured is bilaterally covered with criss-cross grooves and on one of the lateral sides also with numerous blow marks (*Figure 6:4*).
- Similarly worn and smoothed ribs which, however, were obliquely truncated so that a prominent angle emerged (*Figure 6:5*). To this type belongs one of the most beautiful decorated objects from Předmostí (Valoch 1975: Taf. VIII).

All the types described above were made of entire ribs. Artifacts from ribs split horizontally in two, whose end is rounded (*Figure 7:4–5*), were embraced in a separate group.

Among the artifacts pictured are two rare items: *Figure 6:6*. A rib fragment abraded down to the spongy bone at both ends and on the whole surface; an edge emerged by use wear on both of the flattened ends.

Figure 7:1. Rib of a small animal with one end ogive-like worn and bifurcated. There are still two other mammoth ribs, whose ends are also formed in this way.

Some tusk splinters corresponding morphologically to rib tools are worn in a similar way at their ends and were probably used for the same purpose. The use of rib tools, regarding different forms of their working ends, was surely varied. Some of them, however, were most probably used as diggers for moving soil.

SPATULAS

Spatula- or shovel-shaped tools are quite frequent in Předmostí. They are mostly made of massive splinters of long bones, on which an epiphyseal remnant was left to be used as a grip. The shaft protruding from this grip is usually quite slim and oval in cross-section but widens mostly symmetrically towards the distal end, which is flattened, too. The working end is always convex and in some artifacts spalled in a few places. The whole surface of the artifacts is always polished, and some of them are curved in lateral view. They were already pictured by M. Kříž (1903: 227), H. Obermaier (1912: Abb. 190), K. Absolon (1922: Abb. 298), H. Breuil (1924: Fig. 20:1–4) and B. Klíma (Absolon, Klíma 1977: Abb. 38:1–2). Our collections include:

- 4 entire spatulas (*Figure 8:1–2*);
- 16 distal parts (without grip) (*Figures 8:3, 9:2*);
- 27 medial parts (mostly slim shaft fragments);
- 14 proximal parts (with epiphyseal remnant);
- 13 distal and medial parts split lengthwise.

Only a single tool is carved from a tusk; its shaft is slim, almost round in cross-section, the grip is broken-off, the wide well distinguished blade is freshly damaged at the distal end (*Figure 9:1*; cf. Breuil 1924: Fig. 15:4).

The shape and size of these artifacts indicate that they may have been used for moving soil, e.g., when building huts, as was already supposed by B. Klíma (1955). But most of the tools did not withstand the required load, which is documented by numerous fragments. The ivory spoon, however, could hardly have been used for such an activity. The miniature bone spatula (*Figure 4:6*) can be regarded as a curiosity.

As a separate type two spatula fragments shall be distinguished, which are chisel-like and worn (spalled) at one end. These artifacts were probably turned into chisels to serve a new purpose after being broken.

GRINDERS

Among characteristic artifacts from Předmostí are numerous grinders made of tusk segments. These are either terminal parts of tusks, in which the narrowed part was used as a handle and the thicker end as the working surface, or medial parts in which mostly both ends were used. According to the form of working surfaces we can distinguish following types:

- a) With one working end (and fragments). Even through to concave, 12 specimens (*Figure 10:1, 3*); convex, 10 specimens (*Figures 10:2, 11:1–2*).
- b) With two working ends. Even through to concave, 3 specimens (*Figure 10:4*); convex, 1 specimen (*Figure 10:5*); even and convex, 1 specimen (Breuil 1924: Fig. 15:3).

Damaged specimens (2 pcs) and damaged specimens decorated with grooves (2 pcs).

The smooth polished working surfaces indicate that these tools were used for grinding relatively soft substances.

"WEDGE"

Figure 12:1. A wedge-shaped artifact made of a flattened tusk segment with long and relatively sharp edge. On the opposite conical end, we can see how such pieces were detached from the tusk. The tusk was first grooved all around and then gradually cut off deeper and deeper slanting to the middle, as if a thick rod would be cut off with a steel knife, until a relatively thin stick remained which was then broken or hewn off.

SPONGIOUS POINTED TOOLS

This and the following group comprise tools, which had not yet been described in scientific literature; the first drawing of such a pointed tool was pictured by B. Klíma (Absolon, Klíma 1977: Abb. 35). It was only this single specimen that was stored in the original collection of the Moravian Museum; all the others were rediscovered over years during cleaning and conservation of osteological material from old excavations by Maška, Kříž and Absolon. The collection of bone tools from Předmostí was thus enriched with two specific types.

Pointed tools were made of spongy long bone so that a part of former epiphysis was used as a thick grip and the spongy bone was trimmed to form a point. The point can be of various shape – elongated and round in

cross-section (*Figure 12:2*), blunt and quite thin (*Figure 12:3*), wide with a transversal edge (*Figure 13:1*) or only short and massive (*Figure 13:2*). Seven pieces in total were found.

SPONGIOUS ARTIFACTS

This group comprises both artifacts, which do not bear any remnants of the compact bone and those whose one side is still bordered with compact bone but this is not determinative of their form. It is essential that the spongy part can be regarded as the working surface and that the overall form is entirely different so that our collection does not include two equally shaped specimens. There are in total:

- 7 specimens only from spongy bone (*Figure 14:2–3*);
- 6 specimens including a part of compact bone (*Figure 14:1*);
- 8 bone fragments worn down to the spongy bone.

The largest tool with a globular protrusion (*Figure 14:3*) was already stored in the collections, all the others were discovered among the osteological material.

As far as the purpose of all these artifacts is concerned, it only can be supposed that the rough spongy bone was suitable for scraping (as a rubbing tool for cleaning the skins?). All the artifacts are pretty handy and their dimensions vary so that they could be operated by one or two hands.

HOLLOWED AND PERFORATED ARTIFACTS

Among the specialties of Předmostí are also quite a large number of perforated mammoth bones, which have caused amazement since their discovery. These bones were as yet unknown; bones in which hollows were drilled through the compact bone down to the spongy bone (6 pcs) or artifacts in which the spongy bone was removed from transversally split bones (3 pcs). From among these pieces we have a mammoth metapodial pictured with a 4.5 cm deep hollow (*Figure 15:1*) and a radius of woolly rhinoceros with one hollow at each end (*Figure 15:2*). The hollows are 3 cm and 4 cm deep. The most important find of this kind, however, is the right part of a mammoth pelvis (*Figure 18*) from an excavation by K. J. Maška with two hollows on its dorsal surface. One of them, 8 cm in diameter and max. 3.5 cm in depth, is situated on the wing of iliac bone near the iliac crest, and the other, 5 cm in diameter and max. 4.5 cm in depth, on the body of pubic bone.

The *tabula ischiadica* and *ramus symphysicus* were hewn off for this purpose. The distance between both these hollows is 60 cm.

A total of 5 perforated artifacts were found, all of them made of mammoth bone; among them are carpalia and tarsalia with central hole (*Figure 16:1–2*) as well as long bones (*Figure 17:1–2*) and a rib with two rows of various grooves (*Figure 17:3*; cf. Breuil 1924: Fig. 20:7), which are perforated at one end.

The above-mentioned holes are of a different shape, which indicates a different functional purpose of these artifacts. The carpal or tarsal bones have a vertical hole, whereas the holes in long bones and in the rib are quite inclined so that on the surface emerged, maybe by use wear, a sort of groove in the compact bone.

The way these tools were used remains a mystery but reconstructing them as a composite tool with inserted axe-like component (Klíma 1970: S. 72, Abb. 1) seems to be highly unlikely to us. The inclination of the hole as well as the ground-out groove beginning within, in which probably a round object was inserted, rule out such a manipulation. It is possible that the perforated bones as well as those with hollows, if placed firmly in soil, may have been used to anchor the construction of a tent, hut or oven by sticking wooden rods into the holes and hollows. The large pelvic bone suggests such a use, quite persuasively.

REINDEER-ANTLER TOOLS

The collections of the Anthropos Institute originally included a whole series of reindeer-antler tools, which apart from a few exceptions got strangely lost. There only remained a perforated baton with inclined hole (*Figure 5:4*; discovered by Kříž 1903: 225, cf. Breuil 1924: Fig. 13:7), which is reminiscent of the aforementioned perforated bones.

In the photo archive of our institute there is a negative made by E. Dania, which shows a second perforated baton broken in place of the hole (cf. Breuil 1924: Fig. 13:1) and a piece of antler shaped like the Lyngby axes (Absolon, Klíma 1977: 72, Abb. 3, equal to Fig. 20:6 in Breuil 1924?). Kříž (1903: 230) mentions that besides a complete specimen he also discovered two other perforated batons broken at the hole. On the aforesaid negative are still six other antler fragments, which were probably cut, polished or otherwise used.

There are most probably more objects that got lost but in view of the fact that no exact inventory with drawings was set up, they cannot be identified. After the

publication by Breuil (1924) following artifacts could not be found: an engraved slate slab with dye residues (Fig. 2:1), a shoulder-blade fragment with color stripes (Fig. 19), and an ivory cylinder with a prominence and an eye (Fig. 20:8). The rib tools pictured here on *Figure 7:4-5* also are caught only on a negative while the originals can no longer be found.

COMPARATIVE STUDY

The bone, ivory and reindeer-antler tools from Předmostí form a collection, which is unique within the European Palaeolithic and is presented here for the first time in its complexity. However, we were able to display only a list of available typological groups with a few pieces of evidence. The variation range of mainly the rib tools and the spongy artifacts was by far not exhausted; some pieces among the bone and tusk splinters might still also be considered tools. It is significant that none of the forms from Předmostí are included in the list of types by I. Barandiarán (1967).

The entire collection gives a quite rude impression, not only by the dimensions of mammoth bones but mainly by the mostly only perfunctory adjustment answering the particular purpose. On the other hand it offers one of the best examples how Palaeolithic people utilized available organic material. It is mostly the Magdalenian, which is considered to have reached maximum skillfulness in processing bones and antler. It is true that individual forms were already "standardized" and passed into the memory of man as abstracted "types" (e.g., the projectile points with chisel-like base which appear in identical form from Spain to Poland), but their variability is limited compared to Předmostí. Many artifacts from Předmostí can hardly be defined as "types"; they are rather similar tools summed up to form groups according to their morphology, whose functional purpose was probably the same. They often seem to have been manufactured on site.

It is worth mentioning a Magdalenoid proximal part of a projectile point from a reindeer antler (*Figure 1:6*), which differs from the other finds from Předmostí by its dark color. In view of the fact that Kříž has conducted parallel excavations at Předmostí and in the Karst caves (namely in the Pekárna Cave), it is well possible that this artifact may come from Pekárna and got by mistake into the collection from Předmostí. Kříž has published it as a find from Předmostí. A point with notched base is also extraordinary (*Figure 4:7*), which also seems to be rather Magdalenoid.

In the search for analogies we must keep in view especially both of the large mammoth hunters' camp sites in South Moravia – Dolní Věstonice and Pavlov. Absolon's excavations at Dolní Věstonice from 1924 yielded for the first time similar cylindrical points, rib tools and spatulas like those already known from Předmostí (Absolon 1938a, b), apart from numerous awls from which only a specimen decorated with rows of incisions shall be pointed out (Absolon 1957: Fig. 23). The post-war excavations by B. Klíma have extended the collection from Dolní Věstonice (Klíma 1963: Taf. 55–67). For the first time Klíma turned his attention to worn bone and tusk splinters (e.g., Klíma 1963: Taf. 60, 67) and there again awls were found, rib tools, spatulas and round-stick projectile points. Within the group of spatulas there is the well-known ivory "spoon" with splendid bilateral decoration, which was discovered by Absolon in 1934 (Absolon 1957: Fig. 26). Interesting is the occurrence of multiple arm bones and thighbones of small animals (hare, fox), bearing cut marks and split in two or cut, which also occur in Předmostí.

However, remarkable is that at Dolní Věstonice the grinders from tusk segments as well as the spongy pointed tools are represented only by a small and unremarkable piece from old excavations each. The spongy scrapers, perforated or hollowed bones as well as special forms from Předmostí (abraded tusk segments, daggers) do not occur at all. The antler axe, which was represented by a single and meanwhile lost piece in Předmostí, was found twice at Dolní Věstonice (one specimen by Absolon, the other by Klíma some years ago, both of them are unpublished). Perforated batons were not present at Dolní Věstonice and the other worked pieces of antler are quite rare. Similar to Předmostí there are some chisel-like worn fragments of spatulas.

Pavlov yielded many more finds than Dolní Věstonice, but these are unfortunately not yet published. According to preliminary brief reports and personal communications by B. Klíma and after personal inspection of the inventory it can be supposed that cylindrical projectile points, rib tools, spatulas (Klíma 1955: Abb. 15) and awls are present in a large amount. The considerable number of antler axes is significant (Klíma 1955), but their use as an axe-like weapon seems more likely to us because the work with soil assumed by Klíma would undoubtedly have caused damage to the mostly smooth and sharp oblique tine remnants. Spongy pointed tools are present, whereas perforated bones are not. As an example of specimens with hollowed out spongy bone Klíma pictured a piece of reindeer antler (1971: Taf. 3:34); such a hollowed piece

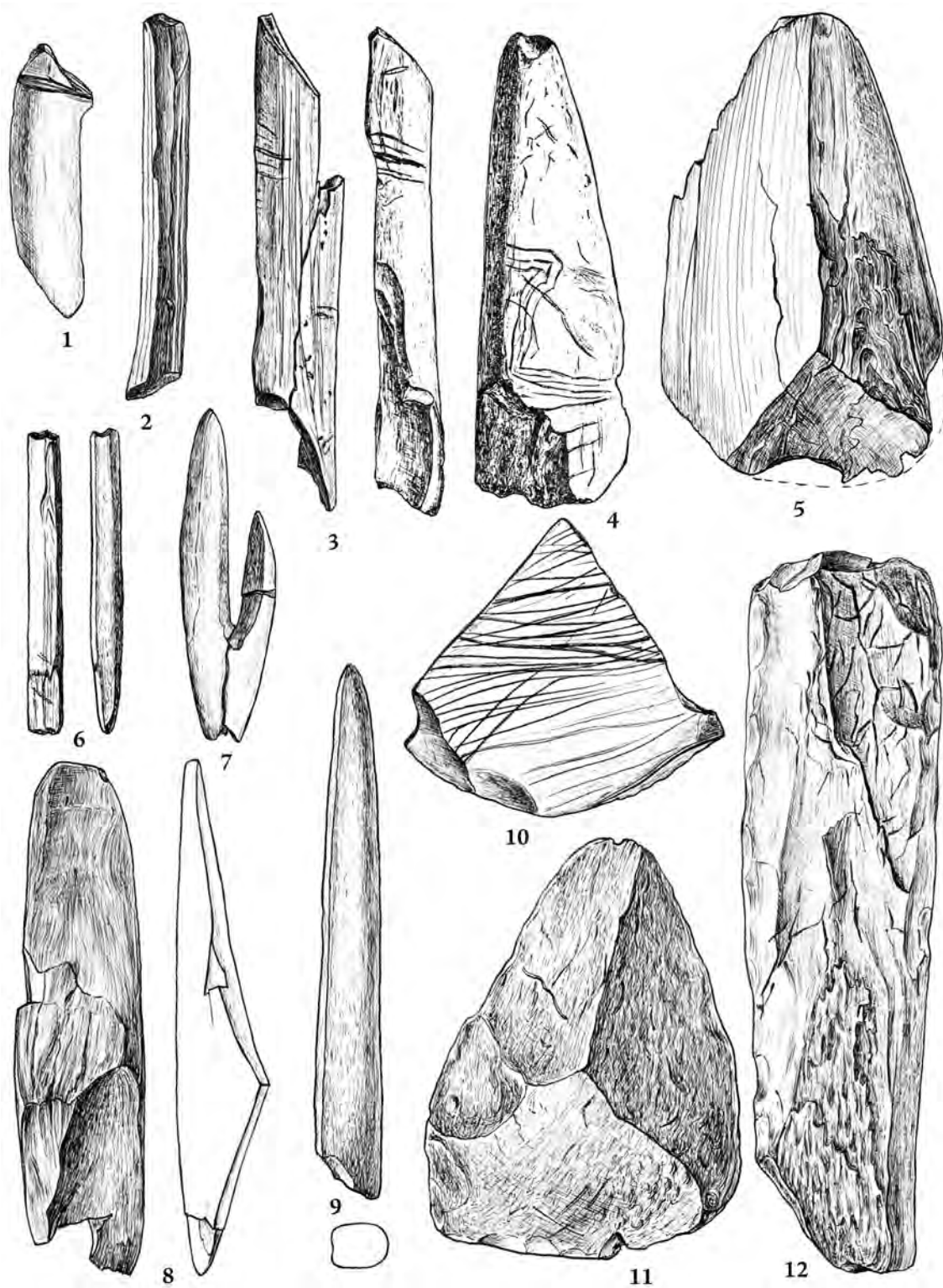


FIGURE 1. Předmostí. 1–3, 10, bone pieces with cut marks; 4, blunt-pointed tool with engravings; 5, 8, splintered ivory pieces; 6, 9, fragments of projectile points; 7, "fishhook"; 11, 12, splintered bone pieces (1/1 full size).

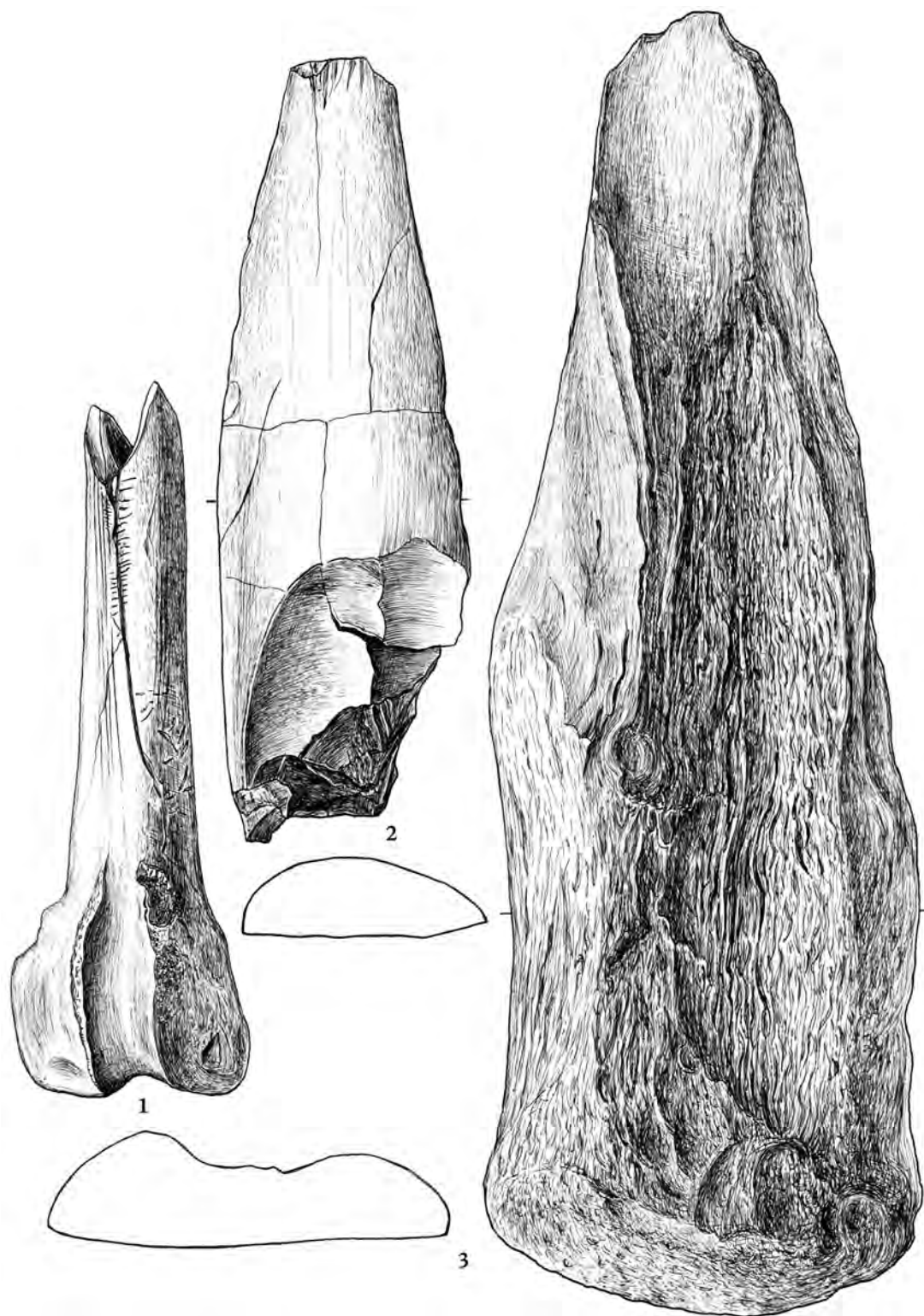


FIGURE 2. Předmostí. 1, wolf femur with incisions; 2, splintered piece of ivory; 3, tool from mammoth bone (1/1 full size).



FIGURE 3. Předmostí. 1, 2, 5, splintered tusk segments; 3, bone with cut marks; 6, shingle-like worn tusk (1/1 full size).



FIGURE 4. Předmostí. 1–5, awls; 6, miniature spatula; 7–12, projectile points (1–9, 1/1 full size; 10, 29 cm; 11, 36 cm; 12, 39 cm long).



FIGURE 5. Předmostí. 1–3, "daggers" (229 mm, 243 mm and 246 mm long); 4, perforated baton from reindeer antler (1/1 full size).

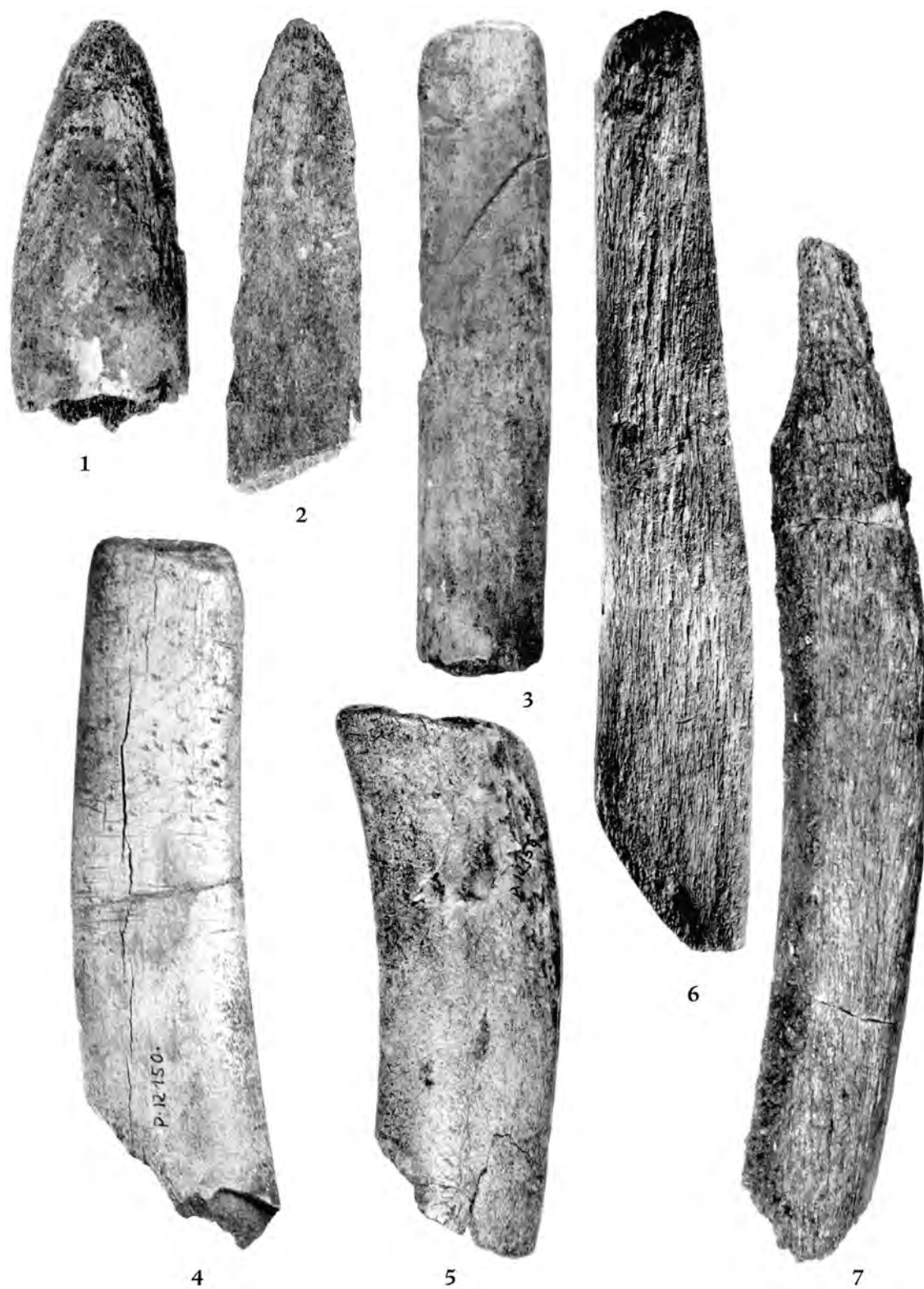


FIGURE 6. Předmostí. Rib tools (downscaled to ca. 2/3 of full size).

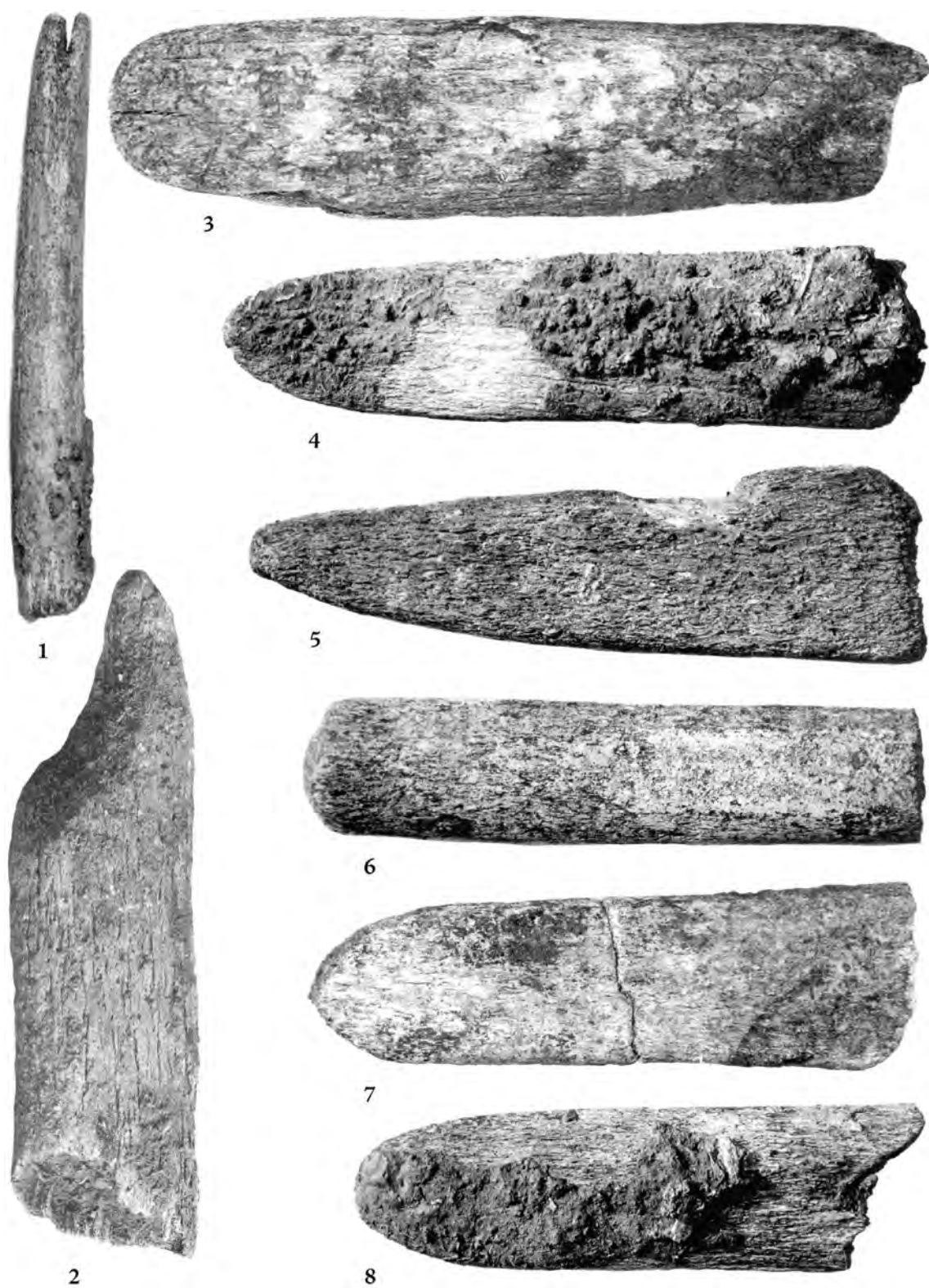


FIGURE 7. Předmostí. Rib tools (1/1 full size).



FIGURE 8. Předmostí. Spatulas (28 cm, 38 cm and 29 cm long).



FIGURE 9. Předmostí. 1, ivory spoon; 2, bone spatula (1/1 full size).

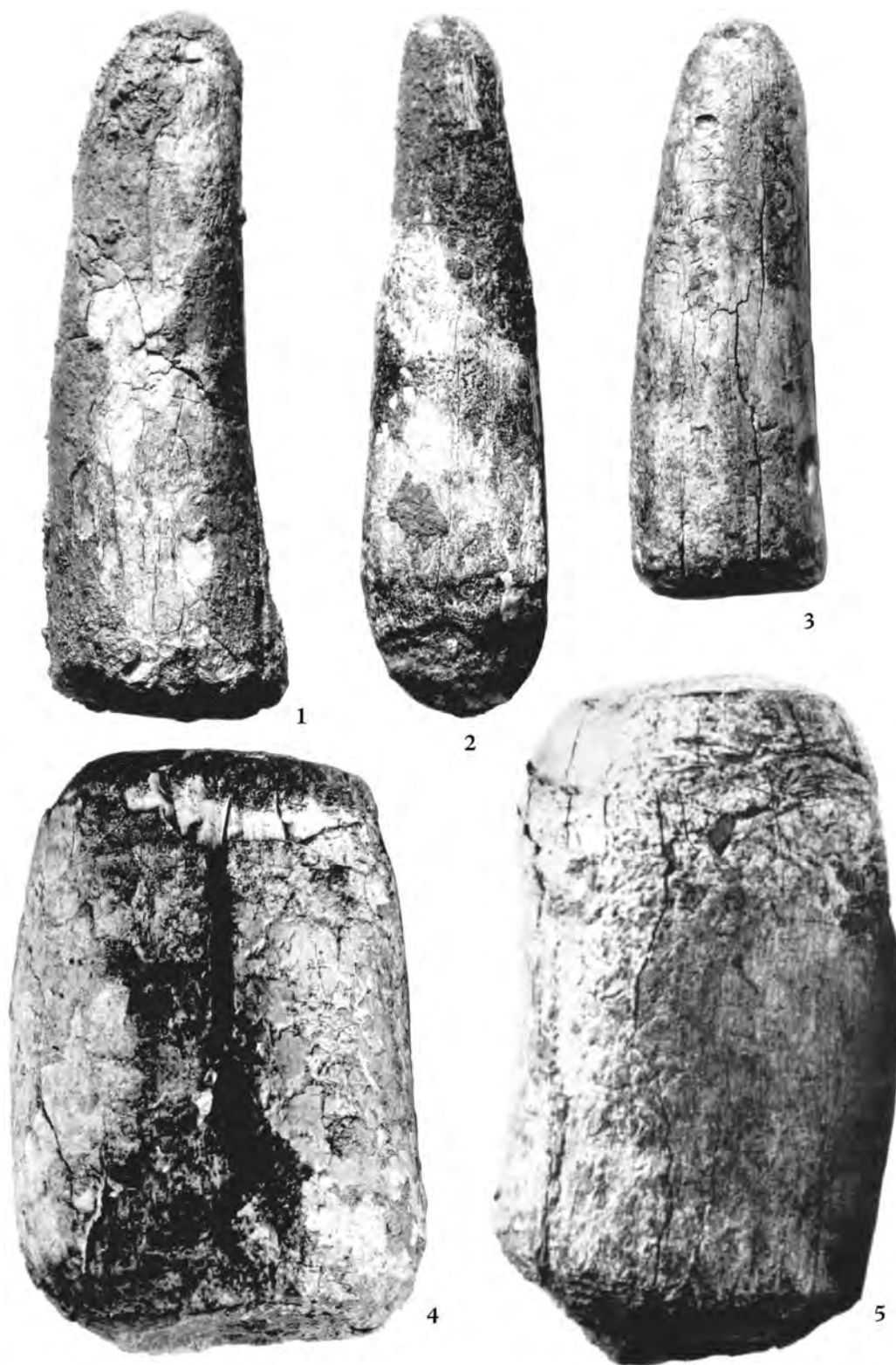


FIGURE 10. Předmostí. Grinders made of tusk segments (1/1 full size).

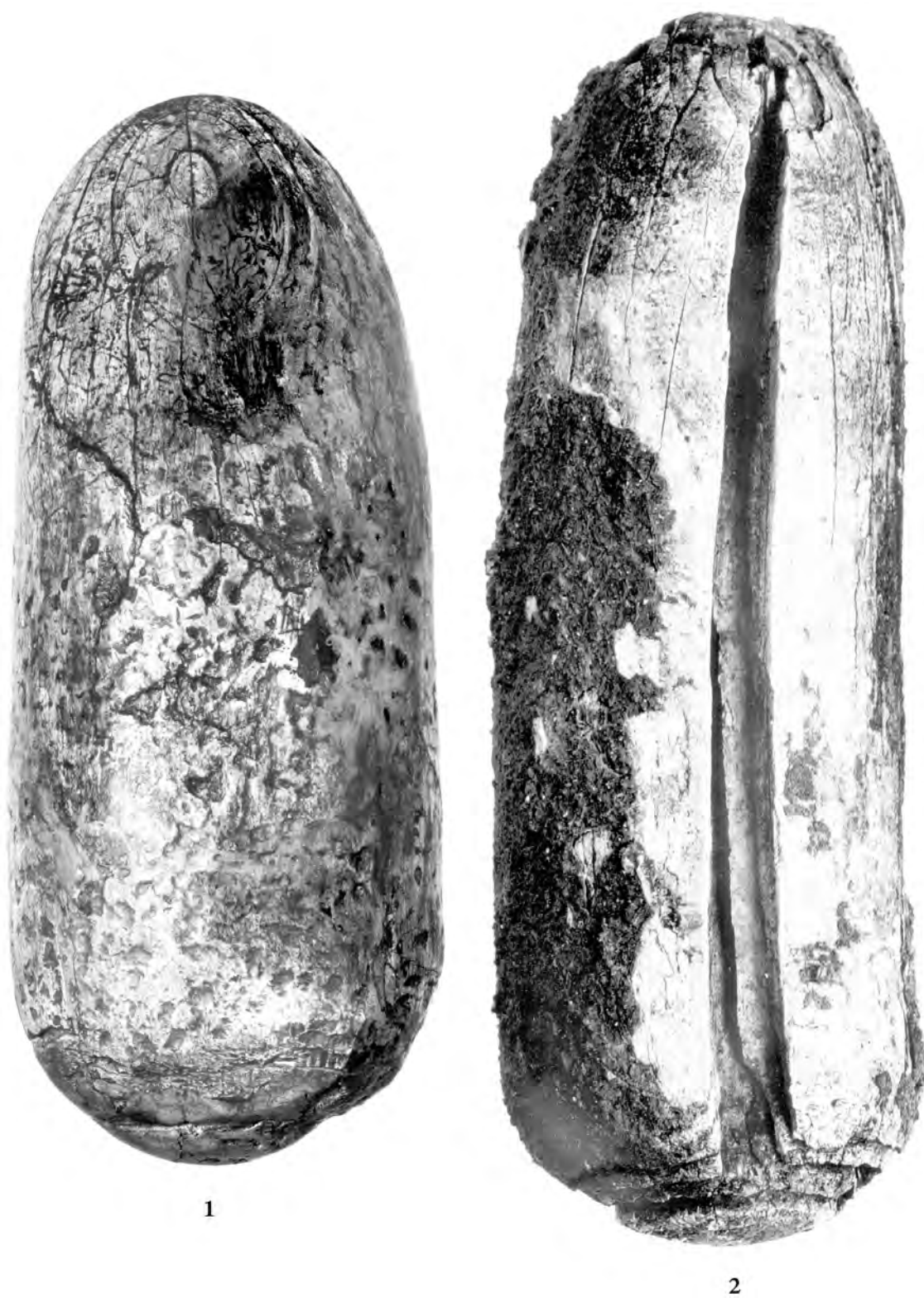


FIGURE 11. Předmostí. Grinders made of tusk segments (1/1 full size).

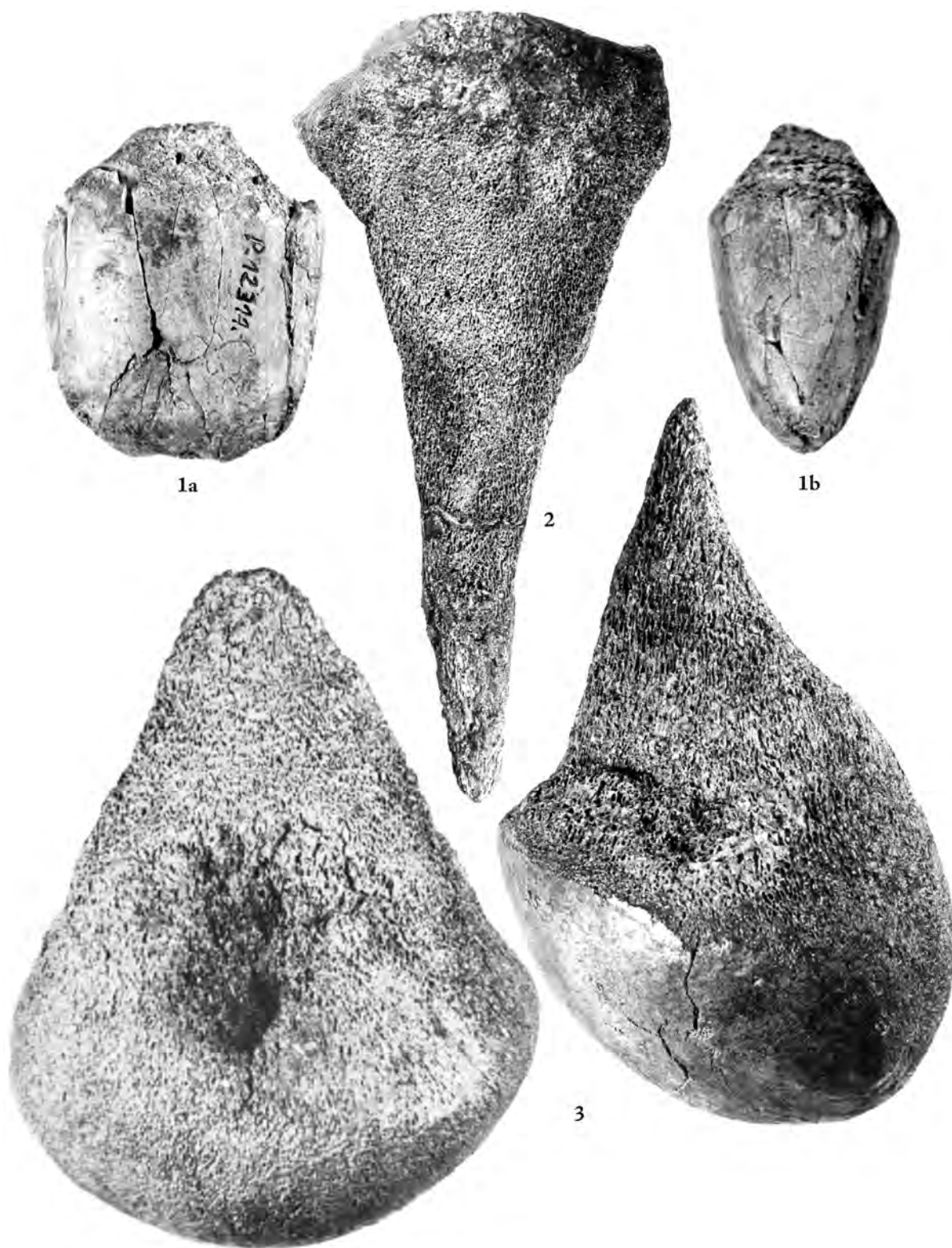


FIGURE 12. Předmostí. 1, ivory "wedge" (1/1 full size); 2, 3, spongy pointed tools (29 cm and 19 cm long).

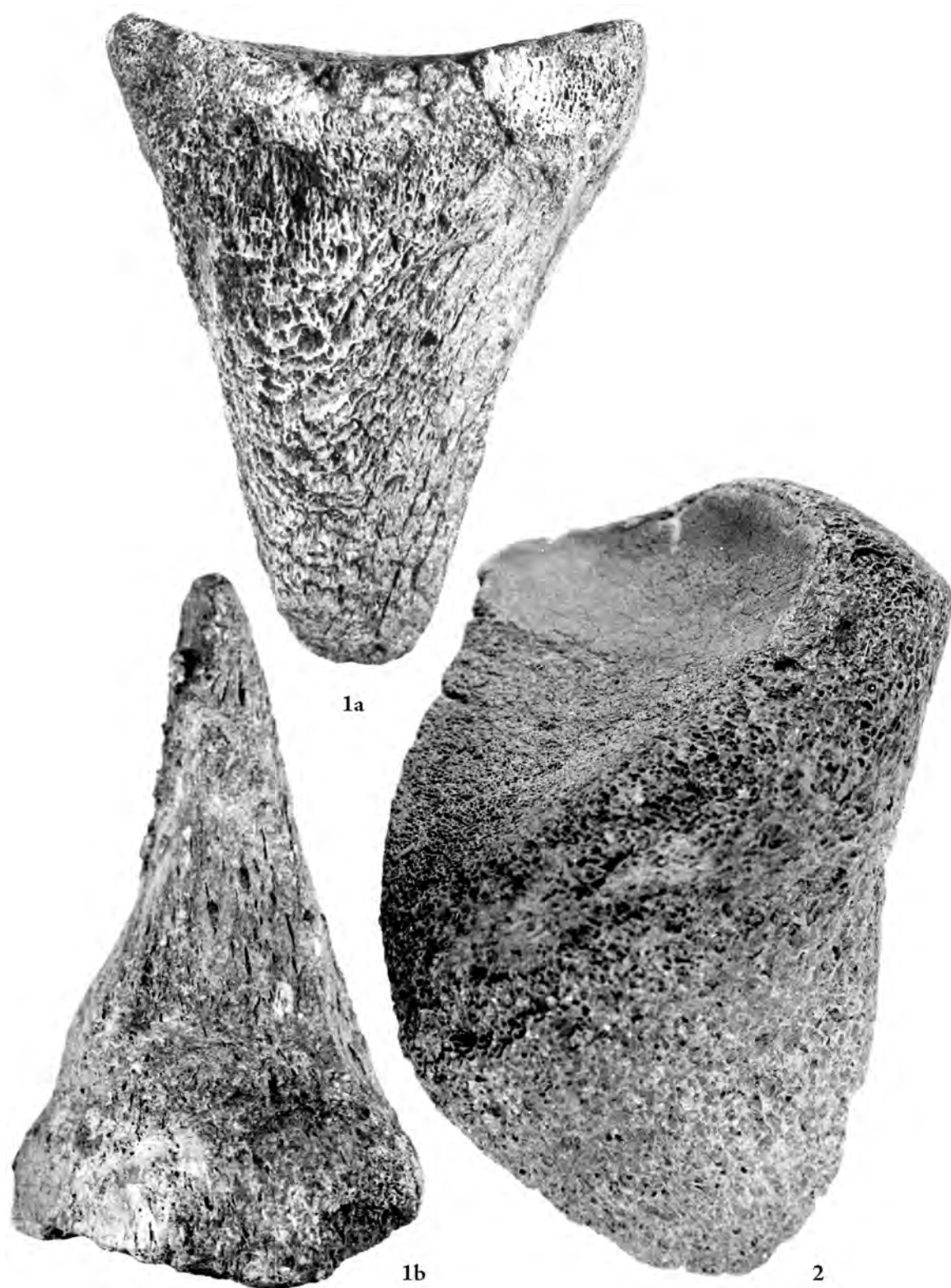


FIGURE 13. Předmostí. Spongy pointed tools (1, 14.5 cm long; 2, 1/1 full size).

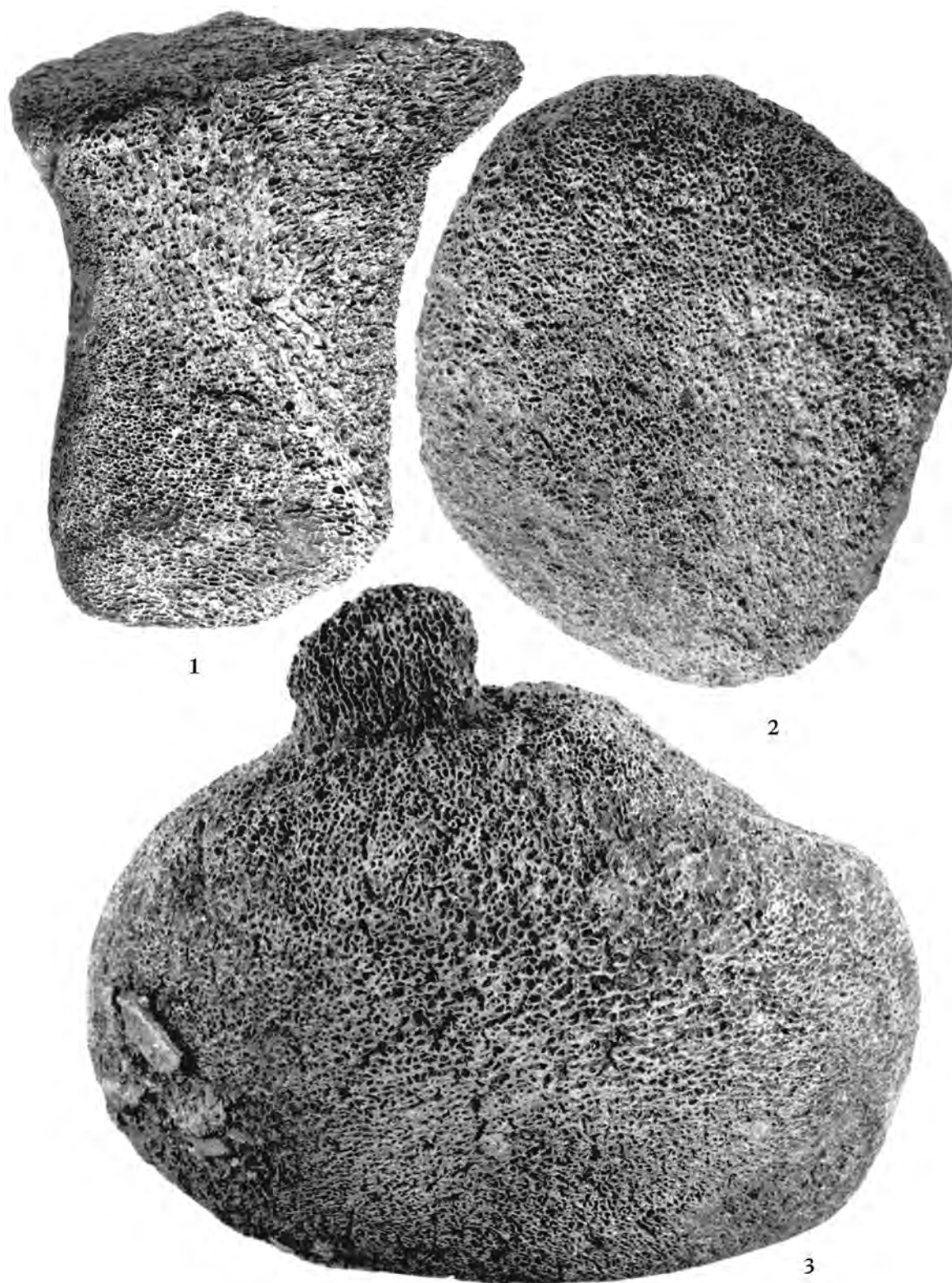


FIGURE 14. Předmostí. Spongyous artifacts (1/1 full size).



FIGURE 15. Předmostí. Hollowed bones (1, almost 1/1 full size; 2, about 2/3 of full size).

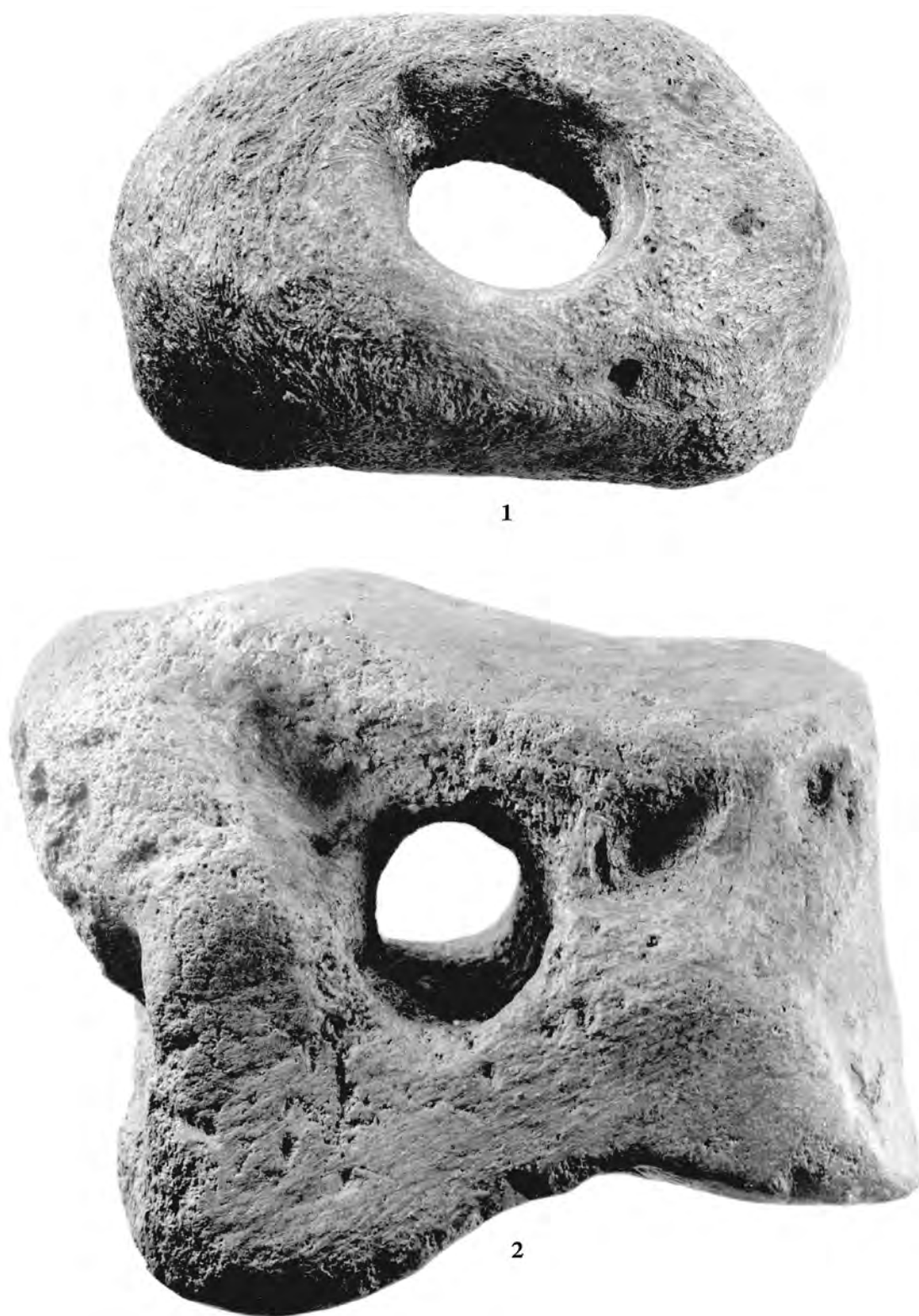


FIGURE 16. Předmostí. Perforated bones (1/1 full size).



FIGURE 17. Předmostí. Perforated bones (1, ca. 1/2 of full size; 2, almost 1/1 full size; 3, ca. 2/3 of full size).



FIGURE 18. Předmostí. Mammoth pelvis with hollows (ca. 1/4 of full size).

of antler sporadically occurred as well at Dolní Věstonice. These artifacts were undoubtedly used as hafts for stone tools.

From this comparison follows that the bone inventory from Předmostí, Dolní Věstonice and Pavlov can be considered almost identical; the most important three groups of forms are present at all three sites, only their quantitative proportions are different. However, for a more precise evaluation of this aspect, which may be either chronologically conditioned or bound to particular activity, there is a lack of quantitative data from Dolní Věstonice and especially from Pavlov.

The present state of knowledge, however, allows us to regard this Předmostí-type inventory as characteristic of Pavlovian – the Moravian facies of the Gravettoid technocomplex. It represents one of the most important attributes of its classification and is probably the most distinctive criterion upon which Pavlovian can be distinguished from the Western European Périgordian complex.

The nearest related camp sites out of Moravia are situated in Wachau on the Danube in Lower Austria, in the Váh valley in Western Slovakia, and in Southern Poland. Unfortunately, they yielded almost no bone tools, which would enable a comparison. From Willendorf II, layer 7, comes a rib tool (Felgenhauer 1956–1959: III, Abb. 34:13) and from layer 9 two fragments of round ivory sticks (Felgenhauer 1956–1959: Abb. 45:6–7). In Moravany-Lopata and Moravany-Podkovic also occurred fragments of such projectile points (Bárta 1965). These elements are typical of Pavlovian, but they are not sufficient to give any detailed evidence.

For Krakow-Spadzista the absence of bone tools except some worn fragments of long bones is being emphasized; however, the authors mentioned man-made hollows at the ends of long bones, which are unfortunately not pictured but compared to Magdalenian lamps (Kozłowski, Sachse-Kozłowska 1974: 69). These artifacts probably resemble our bones with hollowed out spongy bone.

Within the Pavlovian also falls the Upper Palaeolithic from the Weinbergerhöhlen caves near Mauern (Freund 1963: 90 sq., Klíma 1967) where besides flint artifacts also a rib tool and an ivory point were found (Freund 1963: Abb. 47). It is worth noting also an over 0.5 m long ivory spatula from Abri I in Neuessing (Freund 1963: Abb. 50), which is similar to our spatulas.

Before the term Pavlovian was defined (Klíma 1967), the Moravian Gravettoid industries were classed among the unspecified "eastern Gravettian". With the help of

bone artifacts we will now try to elucidate in more detail these presumed eastern relations.

From the settlement area on the Middle Dniester, which is nearest to our territory, significant multi-layer settlements are known but their inventory of bone tools is very poor. Layer 7 from Molodova V yielded the most important analogies: an antler axe, fragments of four round-stick ivory projectile points and six perforated batons from reindeer antler. From layer 3 and 4 as well as from Molodova I come only cut pieces of antler and bone, among them an antler beam from Molodova I (Černyš 1959). From multiple layers of Korman IV comes a fragment of an ivory point, an ivory smoother and worked pieces of antler (Černyš 1977).

In Ukraine there are some localities, which yielded the well-known accumulations of mammoth skulls and bones coming from hut structures. Despite the huge amount of preserved faunal remains it is surprising how few bones were worked and modified into tools. The most interesting artifacts were found at the settlement site of Mezhirich, which was examined just a few years ago. In hut II two mammoth femurs were found, each of them hollowed in one of its joints where then a smaller femur was inserted; they were constructional parts of a probably quite complicated hearth (Pidopličko 1976: Figs. 42–44). The same hut also yielded a radius and a femoral fragment, both of them perforated slantwise in the joint (Pidopličko 1976: Fig. 78). From a second hut comes a spatula made of a splintered long bone interpreted as a "scraper", whose shaft is trimmed by retouch. The smoothed rounded working end as well as the overall shape leave no doubt that it is a tool similar to our spatulas (Pidopličko 1976: Fig. 64). In Mezhirich also occurred some rib tools, three perforated ivory batons, about four cylindrical ivory projectile points, multiple awls and even needles with eyes.

At other Ukrainian settlement sites with bone accumulations and hut structures, on the other hand, either none or only very sparse bone tools were found: in Kiev – Kirillovski none (Boriskovskij 1953, Pidopličko 1969), in Gontsy some fragments of ivory round sticks, awls, a needle and a peculiar perforated ivory baton (Boriskovskij 1953: 305 sq., Fig. 167), in Dobranichevka some antler hammers, a large rib tool and awls (Šovkopljás 1972). The finds from Mezin are a little more abundant and published in more detail (Šovkopljás 1965). Besides numerous pieces of bones with cut marks there are tusks, from which long sticks were detached in the fashion of Magdalenian reindeer antler, numerous awls, three antler beams, a fishhook (?), a perforated ivory baton and about six cylindrical ivory projectile points with

unilateral or bilateral longitudinal grooves. Another site with bone accumulations and hut remnants is Pushkari I which yielded only one entire specimen and a fragment of rib tools with flattened end, which have been interpreted as diggers (Boriskovskij 1953: 176 sq., Figs. 109–111).

From the northerly adjacent territory of Belarus we know of very important analogies to Předmostí. There also are sites with bone accumulations and hut remnants, which have been published in comprehensive works by K. M. Polikarpovič (1968) and V. D. Budko (1970). Among the finds from Elisyevichi were splintered long bones with worn and polished ends, a tusk used as an anvil, multiple rib tools (diggers) up to 50 cm long, fragments of round ivory sticks, awls, needles with eye and cut long bones of small animals (Polikarpovič 1968: 37 sq.). The find-bearing layer of Yurevichi was affected by washout in the late glacial period so that only large bones remained in situ; only a few flints were found but no bone tools (Polikarpovič 1968: 186 sq.). From the camp site of Yudinovo comes only a small collection of lithics but the bone artifacts are very important to us. Along with the usual forms such as ivory projectile points with longitudinal groove there are rib diggers, awls and worn fragments of large bones (Budko 1970: 31, Polikarpovič 1968: 166). Besides Mezhirich it is the second findspot with numerous perforated bones, which, according to find contexts, are quite clearly associated with the construction of huts. Mostly shoulder blades were perforated approximately in the middle; some of them have also a second hole in *spina scapulae*. The second most frequent were pelvic bones in which the hole is situated most often in the *os ilii*. The next are then long bones (mainly femurs) with holes at the proximal end. In one of the pelvic bones there was a rib inserted. (Polikarpovič 1968: 150 sq.).

There are only a few localities in the central region of the European part of USSR, which are interesting to us regarding this topic. From Suponevo on the Desna River near Bryansk there are two artifacts corresponding to ivory grinders from Předmostí and a "tusk nucleus", which is entirely analogous to an old find from Dolní Věstonice and to our *Figure 3:2* (Gvozdover 1953: Figs. 1, 3). Avdeevovo on the river Sejma near Kursk is world-known for its objects of art; among the bone tools are diggers and smoothers made of ribs, decorated awls, proximal parts of spoon-shaped objects and adze-like sharpened tusk splinters (Gvozdover 1953: Figs. 5–13). In Timonovka near Bryansk only rib tools (diggers?) shall be mentioned (Grechova 1977). From Gagarino on the upper Don comes a tool analogous to our spatulas (Tarasov 1979: Fig. 56:10).

Another find-bearing area, which is interesting to us is that of Kostenki on the Don River. Especially the uppermost layer of Kostenki I has generally been considered strongly linked with Moravian camp sites; the comprehensive publication by P. P. Jefimenko (1958) offers an insight into the inventory, from which only those forms are discussed which are interesting with regard to Předmostí. Adze-shaped tusk splinters (Jefimenko 1958: Figs. 106–109), the same as those in Avdeevovo, do not yet have, as far as I know, any analogies in Moravia. The same is the case with completely preserved thin and long spoon-like objects made of ribs with figural grip (Jefimenko 1958: Figs. 113–119). There are also four cylindrical projectile points, a perforated baton from reindeer antler, smoothers from thinned ribs, and awls.

Both layers of Kostenki IV yielded only awls and rib smoothers, the upper layer also multiple fragments of round ivory sticks (Rogačev 1955). Other important information can be found again in a work by A. N. Rogačev (1957), which is fundamental for the stratigraphy and topography of Kostenki-Borshevo. From the third layer of the Telman site (Kostenki VIII) come numerous fragments of round ivory sticks, in Kostenki XII-Volkovskaya we come across a spatula similar to those from Předmostí for the first time (Rogačev 1955: Fig. 32). More such tools analogous to Předmostí were found at Kostenki XV-Gorodtsovskaya, whose single find-bearing layer is embedded in the lower part of the upper humus zone of local stratigraphy. Rogačev pictured two entire spatulas, in which the blade is distinguished from the grip in a more distinct way than at Předmostí (Rogačev 1955: Figs. 58–59), and mentions also 9 fragments of other such tools, among them four grips and five blade fragments (Rogačev 1957: 116; we have seven specimens on photos which were provided to us by A. N. Rogačev for comparative purposes). Otherwise there were only fragments of awls, projectile points and needles.

The 2.42 m and 1.66 m long round ivory sticks (spears) found in a twin grave of children at Sungir (Bader 1970) are mentioned here rather as the exception and not as a direct analogy.

This overview of the Eastern European Upper Palaeolithic should still be supplemented with a remarkable find from the French Périgordian. Périgordian is generally poor in bone tools (cf. de Sonneville-Bordes 1960: 215), whereas in "Bayacian" of La Gravette we met with an assertion by F. Lacorre (1960: 44) that mammoth bones would be frequent there. The pictures surprised us insofar as both of the rib tools

(Lacorre 1960: Fig. XII: 1–2) exactly correspond to those from USSR described as diggers, and the other rib tools (Lacorre 1960: Fig. XIII: 11, 13, 15) fall within the variation range of those from Předmostí. Moreover, there is probably also a round ivory stick (fragment, Lacorre 1960: Fig. XII: 10); an entire specimen was allegedly found by Lacorre in La Cavaillé Cave.

CONCLUSIONS

Based on bone artifacts from Předmostí, we will finally try to put this site into the context of the Upper Palaeolithic. This has usually been done only with the help of lithic industries but the amount and above all character of bone artifacts from Předmostí can be instructive to these considerations as well. The typology of flint tools shall not be regarded; some associated questions will be treated later. As far as the objects of art are concerned, it is only to remark that most of them are specific and unique; the ivory-carved mammoth sculpture as well as the "sitting" or "pregnant" female figurines carved from mammoth metapodials have morphological analogies in Avdeev (Gvozdover 1953).

A look back at the Central and Eastern European localities revealed that only Dolní Věstonice and Pavlov exhibit the same variety of forms as Předmostí; that these three camp sites are part of one and the same cultural group is beyond question. All the other inventories comprise only sporadic, mostly quite indifferent elements. When individual morphological groups of tools are examined for their specificity, then as a result arises that some of them are widespread and therefore only little significant, whereas others are found only at a few sites; the special groups of Předmostí (daggers, abraded tusk) have no analogies.

From this point of view, awls represent an intercultural type within the whole European Upper Palaeolithic; if there would be enough quantitative data, it would maybe be possible to identify some differences in their occurrence. Worthy of attention are the awls decorated with rows of incisions (Předmostí, Dolní Věstonice, Avdeev).

The second most widespread type is round ivory sticks (projectile points). We regard them as a category of finds, which is common to the whole "eastern Gravettoid technocomplex" in the widest sense of the word. In the West, they are mostly replaced by antler sticks (Barandiarán 1967: Type 13.1, de Sonneville-Bordes 1960: Fig. 104). Their occurrence in Central Europe also can be safely linked with Gravettoid industries.

An intercultural type are also the perforated batons from reindeer antler, which appeared for the first time with Aurignacian I in France (e.g., in La Ferrassie; Peyrony 1934) and reached their bloom with Magdalenian. An eastern speciality seems to have been the perforated ivory batons, which in USSR are more frequent than those from reindeer antler. However, since the occurrence of perforated batons is generally only sporadic, these artifacts can hardly be considered an indicator of particular relations; they may rather be a product of local needs or customs.

The morphologically and perhaps also functionally differentiated rib tools seem again to be typical of the eastern Gravettoid complex, whereby those classified as diggers may be of special importance. It must be emphasized that these tools, except thin smoothers from e.g., Kostenki I, layer 1, were made of entire non-splintered ribs. From this perspective, the discovery of a typical digger in La Gravette is important not only for any suggested relations to Central and Eastern Europe but also with regard to possible occurrence of analogous artifacts in various facies of Périgordian.

The other groups of artifacts from Předmostí represented by multiple specimens have analogies only at individual localities in USSR. Grinders from tusk segments, for example, are known so far only from Suponevo and spatulas from Mezhirich, Kostenki XV, Kostenki XII, Gagarino (?) and exceptionally also from Neuessing in Southern Germany. Kostenki XV, however, is particularly important because its find-bearing layer is situated in the upper humus zone and yet it is relatively older than all the other (maybe except Molodova V, layer 7) sites used for comparison. The wedge-shaped artifact from Předmostí (*Figure 12:1*) is reminiscent in its design of the chisel-like modified tusk segments which, anyway, are much larger. Perforated and hollowed bones were described so far only from Mezhirich and more frequently from Yudinovo; but they are probably also present in Krakow-Spadzista. The finds from Mezhirich and Yudinovo as well as the pelvic bone from Předmostí suggest that these peculiar objects were constructional parts of huts or hearths respectively. To both the groups of spongy artifacts we did not yet find any analogies in the available literature.

There are still the non-typed but worn bone and ivory splinters to which Šovkopljás also turned attention in Mezin. These objects best demonstrate the failures, which accompany the attempt of an evaluation of bone industry with the aim of identifying cultural relations. Such tools were surely used wherever the appropriate raw material (bone, ivory, antler) was available in sufficient amount. It

depends, however, on each individual researcher whether or not they are singled out from osteological material. As an example of this the spongy artifacts from Předmostí were not recognized in older collections until recently. In publications only attractive and conspicuous bone tools are usually pictured while the others are mentioned only in brief and since they do not yet have any clearly defined names, it is often hard to identify what kind of artifact is hidden under particular term.

That is why also the absence of some tools (spongy artifacts, perforated and hollowed bones, worn splinters, etc.) should be regarded with some reservation, because even the truly immense bone deposits at several localities have probably not been examined for such artifacts at all.

The role of bone industry in the life of Palaeolithic humans in general seems to be quite unclear. There are Upper Palaeolithic camp sites, for example in Eastern Europe, where faunal remains are well preserved but no tools from organic materials were found, except the usual awls at most. Shall we perhaps suppose that these humans did not make any weapons and other tools from bones, ivory and antler? Or is their absence among the finds caused by some other reasons? These questions must remain unanswered. The morphological exceptionality of bone artifacts could be regarded from two diametrically different points of view and both of them appear logical:

- a) The regional or local specificity based on location and ecology is linked to particular activities more than lithic industry;
- b) or the specificity helps to express the traditional character of a human group more distinctly than it is the case with rather uniform lithic industry.

The Central European and most of the Eastern European inventories comprise typical products of mammoth hunters from open steppe landscapes, who have often built complicated huts on a framework of mammoth bones at their camp sites. These settlements have thus been used over a longer period of time, at least a season, which means that there must have been conducted all the activities necessary for everyday subsistence of a particular human group including adults and children. Therefore it is less likely that the specific bone artifacts were ecologically conditioned or linked with particular activity.

Thus, what can be concluded from these detections considering the limitations? As was already indicated above, outside of Moravia there is no assemblage of finds which would encompass all or at least most of the morphological groups from Předmostí. Particularly

important is that even Kostenki I, layer 1, which is most often being linked with our Pavlovian (the so-called Kostenki-Avdeev culture), significantly differs from Předmostí by its own specific forms as well as by the absence of spatulas, which represent the most important form in Moravia. These phenomena are undoubtedly related with each other within a widespread technocomplex, which included Pavlovian as an independent regional facies on the one hand, and the Kostenki-Avdeev and other facies spread in Eastern and Southern Europe on the other hand. There are two reasons why we currently can say only very little about their mutual contacts and genetic relations.

Chronological position of the most Eastern European localities is caught in regional stratigraphic-geological sequences at best only relatively; any comparison to distant regions is still very vague, particularly in view of the fact that individual radiocarbon dates may also be burdened with errors due to which they could be underdetermined. In both Eastern and Central Europe, there is a lack of any detailed evaluation and statistic recording of lithic assemblages which are often published only in a selective mode whereby, the same way as with bones, some less conspicuous forms can remain unnoticed.

A detailed division of the manifold Eastern European Upper Palaeolithic can only be done by local researchers (cf. Valoch 1968), whereby the basis for definition of individual cultures or facies will not be established until the quantitative data are calculated (indexes). This goal cannot be achieved using only a "presence/absence method" (Lucius 1969–1970) because in this case the whole Eastern European Upper Palaeolithic appears more or less unified. The overall picture of every single culture must involve both bone tools and objects of art and types of dwellings, since all of these characteristics undoubtedly reflect the tradition of each particular human group and a part of its cultural assets.

REFERENCES

- ABSOLON K., 1922: Předmostí, eine Mammutjäger-Station in Mähren. In: H. Klaatsch, A. Heilborn (Eds.): *Der Werdegang der Menschheit und die Entstehung der Kultur*. Pp. 357–373. Berlin.
- ABSOLON K., 1938a: *Die Erforschung der diluvialen Mammutjäger – Station von Unter-Wisternitz an den Pollauer Bergen. Arbeitsbericht für das erste Jahr 1924*. Brno.
- ABSOLON K., 1938b: *Die Erforschung der diluvialen Mammutjäger – Station von Unter-Wisternitz an den Pollauer Bergen. Arbeitsbericht für das zweite Jahr 1925*. Brno.

- ABSOLON K., 1957: Dokumente und Beweise der Fähigkeit des fossilen Menschen zu zählen im mährischen Paläolithikum. *Artibus Asiae* 20, 2–3: 123–150.
- ABSOLON K., KLÍMA B., 1977: *Předmostí, ein Mammutjägerplatz in Mähren*. Fontes Archaeologiae Moraviae 8. Praha.
- BADER O., 1970: Das zweite Grab in der paläolithischen Siedlung Sungir im mittleren Rußland. *Quartär* 21: 103–104.
- BARANDIARÁN I., 1967: *El Paleomesolítico del Pirineo Occidental*. Monografías Arqueológicas 3. Zaragoza.
- BÁRTA J., 1965: Slovensko v staršej a strednej dobe kamennej. *Pravěk Slovenska* 1. Bratislava.
- BORISKOVSII P. I., 1953: Paleolit Ukrajiny. *Materialy i issledovanija po archeologii SSSR* 40. Moskva, Leningrad.
- BREUIL H., 1924: Notes de voyage paléolithique en Europe Centrale 2. Les industries paléolithiques du loess de Moravie et Bohême. *L'Anthropologie* 34: 515–552.
- BUDKO V. D., 1970: Paleolit. In: *Očerki po archeologii Belorussiji*. Pp. 9–45. Minsk.
- ČERNÝŠ A. P., 1959: Pozdní paleolit srednego Pridnjestrov'ja. *Trudy Komissiji po izuč. četvert. perioda* 15: 5–214.
- ČERNÝŠ A. P., 1977: Mnogoslojnaja paleolitičeskaja stojanka Kormaň IV i jeho město v paleolitě. In: *The multilayer palaeolithic site Korman IV on the middle Dniestr*. Pp. 7–77. Moskva.
- DE SONNEVILLE-BORDES D., 1960: *Le Paléolithique supérieur en Périgord* 1/2. Delmas, Bordeaux.
- FELGENHAUER F., 1956–1959: *Willendorf in der Wachau*. Monographie der Paläolith-Fundstellen I–VII. Mitteilungen der Prähistorischen Kommission der Österreichischen Akademie der Wissenschaften 8–9. R. M. Rohrer, Wien.
- FREUND G., 1963: Die ältere und mittlere Steinzeit in Bayern. *Jahresberichte d. Bayerischen Bodendenkmalpflege* 4: 9–167.
- GRECHOVA L. V., 1977: Obrabotannaja kost timonovskoj stojanki. In: N. D. Praslov (Ed.): *Problemy paleolita Vostočnoj i Centralnoj Evropy*. Pp. 83–93. Leningrad.
- GVOZDOVER M. D., 1953: Obrabotka kosti i kostjanyje izdělja avdějevskoj stojanki. *Materialy i issledovanija po archeologii SSSR* 39: 192–226.
- HÖRMANN K., 1923: Die Petershöhle bei Velden in Mittelfranken. *Abhandlungen d. Naturhist. Ges. Nürnberg* 21, 4: 123–154.
- JEFIMENKO P. P., 1958: *Kostěnki I*. Moskva, Leningrad.
- KLÍMA B., 1955: Přínos paleolitičské stanice v Pavlově k problematice nejstarších zemědělských nástrojů. *Památky archeologické* 46: 7–29.
- KLÍMA B., 1963: *Dolní Věstonice. Výzkum tábořiště lovců mamutů v letech 1947–1952*. Academia, Praha.
- KLÍMA B., 1967: Pavlovien a jeho vztahy ve střední Evropě. *Archeologické rozhledy* 19, 5: 558–566.
- KLÍMA B., 1970: Tábořiště lovců mamutů v Předmostí u Přerova. In: *Dějiny města Přerova I*. Pp. 9–77. Přerov.
- KLÍMA B., 1971: Výzkum paleolitičských stanic pod Pavlovskými kopci. *Přehled výzkumů* 1969: 5–6.
- KOZŁOWSKI J. K., SACHSE-KOZŁOWSKA E., 1974: Archaeological finds. In: Upper Palaeolithic site with dwellings of mammoth bones – Kraków-Spadzista Street B. *Folia Quaternaria* 44: 23–76.
- KŘÍŽ M., 1903: *Beiträge zur Kenntnis der Quartärzeit in Mähren*. Steinitz, Kremsier.
- LACORRE F., 1960: *La Gravette. Le Gravettien et le Bayacien*. Laval.
- LUCIUS E., 1969–1970: Das Problem der Chronologie jungpaläolithischer Stationen im Bereiche der europäischen UdSSR. *Mitteilungen der Prähistorischen Kommission der Österreichischen Akademie der Wissenschaften* 8–9. R. M. Rohrer, Wien.
- MARTIN H., 1907–1910: *Recherches sur l'Evolution du Moustérien dans le gisement de la Quina (Charente)*. Schleicher Frères, Paris.
- OBERMAIER H., 1912: *Der Mensch der Vorzeit*. Berlin.
- PEYRONY D., 1934: La Ferrassie. *Préhistoire* 3: 1–92.
- PIDOPLIČKO I. G., 1969: *Pozdněpaleolitičeskije žilisa iz kostej mamonta na Ukrajině*. Kijev.
- PIDOPLIČKO I. G., 1976: *Meziričeskije zilišča iz kostej mamonta*. Kijev.
- POLIKARPOVIČ K. M., 1968: *Paleolit věrchněgo Podněstrov'ja*. Minsk.
- ROGAČEV A. N., 1955: *Kostěnki IV – posselenije drevněkamennogo veka na Donu*. Materialy i issledovanija po archeologii SSSR 45, Moskva, Leningrad.
- ROGAČEV A. N., 1957: Mnogoslojnyje stojanki kostěnkovskoborševskogo rajona na Donu i problema razvitija kul'tury v epochu věrchněgo paleolita na Russkoj ravnině. *Materialy i issledovanija po archeologii SSSR* 59: 9–134.
- ŠOVKOPLJAS I. G., 1965: *Mezinskaja stojanka*. Naukova dumka, Kijev.
- ŠOVKOPLJAS I. G., 1972: Dobraničevskaja stojanka na Kijevščině. *Materialy i issledovanija po archeologii SSSR* 185: 177–188.
- TARASOV L. M., 1979: *Gagarinskaja stojanka i jeho město v paleolitě Evropy*. Nauka, Leningrad.
- VALOCH K., 1960: Bemerkenswerte jungpaläolithische Steingeräte aus Předmostí in Mähren. *Časopis Moravského muzea, Sci. Soc.* 45: 21–26.
- VALOCH K., 1968: Evolution of the Palaeolithic in Central and Eastern Europe. *Current Anthropology* 9, 5: 351–391.
- VALOCH K., 1969: Darstellungen von Menschen und Tier in Předmostí in Mähren. *Jahrbuch für prähistorische und ethnographische Kunst (IPEK)* 22: 1–6.
- VALOCH K., 1975: Ornamentale Gravierungen und Ziergegenstände von Předmostí bei Přerov in Mähren. *Anthropologie* 13, 1–2: 81–91.

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