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Ivory artefacts from the Aurignacian site Alberndorf I in the Pulkau valley (Lower Austria) and their interpretation as tools.

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Zusammenfassung

Die Aurignacien-Station Alberndorf 1 ist trotz der umgelagerten Fundschichten eine Referenzfundstelle des späten Aurignacien in Niederösterreich. Zusammenpassungen lithischer Einheiten können durch die gesamte stratigraphische Sequenz belegt werden und beweisen die Kurzfristigkeit des menschlichen Aufenthaltes.

Neben kantenretuschierten Lamellen gehören Artefakte aus Elfenbein zu den herausragenden Fundstücken. Arbeitsspuren an den Basisflächen dieser Objekte geben Hinweise auf die Funktion der Geräte als Percuteure zum direkten Schlagen von Silex. Ähnliche Percuteure wurden in einer Reihe jungpaläolithischer Fundplätze Niederösterreichs und Mährens geborgen. Andere Elfenbeinartefakte aus Předmostí und Dolní Věstonice (Mähren) legen eine Interpretation als Punch nahe. Experimente mit Nachbildungen aus Elfenbein beweisen die gute Eignung des Materials entsprechend der vorgestellten archäologischen Interpretation.

Abstract

Although the archaeological layers are no longer in their original position the Aurignacian site Alberndorf 1 is a key site for the late Aurignacian in Lower Austria. Refits through the complete archaeological sequence give evidence of the rather short human presence. Apart from laterally modified bladelets, artefacts of ivory are the most important finds.

Working traces at the base of these objects indicate the use of these tools as percussor for the knapping of silex with direct punch. Similar percussors are known from a series of Upper Palaeolithic sites in Lower Austria and Moravia. Other ivory artefacts from Předmostí and Dolní Věstonice (Moravia) suggest an interpretation as a punch. Experiments with replicas from ivory show the high suitability of this material for the presented interpretation.

Keywords: Aurignacian, ivory, percussors, experiments, typology

Introduction

From 1990 to 1995 the Upper Palaeolithic site of Alberndorf 1 was investigated (Bachner et al. 1996, Trnka 2005). The site is situated on the southern slope of the Pulkau valley, which extends from West to East through the northernmost part of Lower Austria (Fig. 1). The river Pulkau flowing into the river Thaya, the Pulkau valley thus connects a valley system including the Moravian gates in Northern Moravia down to the Danube system in the South. This geomorphological unit must have played an important role for Palaeolithic large mammal hunters with their periodic migrations and exploitation of natural resources. The site Alberndorf 1 probably originates from a short butchery activity, which is reflected by the small number of hunted down individuals. Faunal remains and the anthracological determination represent a cold steppe environment, based on characteristic bones from reindeer, wild horse and mammoth. The site is interpreted as a seasonal kill site and butchering-place, occupied in autumn (Fladerer 1996, Fladerer & Frank 1997) with primary production of stone tools.

The extensive lithic blank and tool production including some pieces of wor-

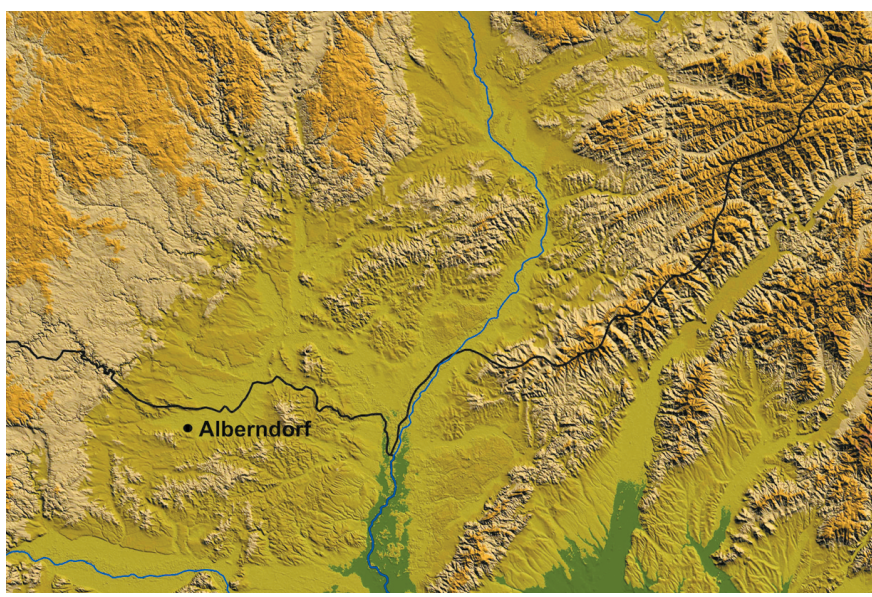


Fig. 1: Geomorphological map of Czech Republic. (author: Kurbjuhn, NESPOS Society)

ked antler and ivory is remarkable but not opposed to the assessment of a short term occupation (BACHNER et al. 1996, TRNKA 2005, STEGUWEIT 2005).

The chronological positioning of the inventory was uncertain until the end of the 1990's. While the solifluidal re-deposition of all archaeological finds within a Pleistocene erosion channel was obvious from the beginning, the first set of seven ^{14}C dates range between 28-19 ka y BP. Apart from the technical limitations of those data gained from very different samples of bone and antler, the high deviation seemed to reflect a chronological depth of the inventory due to a possibly more complex site formation. In contrast to that the short term character of the deposited sequence was clear from the sedimentological point of view and was also proved by the preservation, the fracture patterns and the refits of the faunal remains (BACHNER et al. 1996, 116-117). Although it was rather clear that more than one human occupation episodes could be excluded (BACHNER et al. 1996, 100), the ^{14}C data record was regarded as a representative mean value: six out of seven data are younger than the youngest Aurignacian *sensu stricto*, which is thought to be about 28 ka y BP in the area (BACHNER et al. 1996, 116). Based on the radiocarbon range beyond the Aurignacian *s. str*., the lithic inventory was discussed as "Epi-Aurignacian" like a number of poorly stratified Moravian sites (OLIVA 1996).

The apparently younger determination of the Alberndorf inventory was adopted by other authors, mainly because of the suggested age (Discussion see TRNKA 2005, 206). Only four new AMS datings on charcoal (G.A Groningen lab L see Fig. 2) could convince the team that the technically much more reliable age is between 27-29 ka y BP (TRNKA 2005, 205-206). If one argues that there is no evidence for a contemporaneity of the charcoal's burning process and the archaeological sequence (i.e. natural fire places…), there are more arguments for a relative synchrony: the preservation of the widely spread charcoals distributed in all stratigraphic layers (from spit 1 to 7) is very good. The 4 dated fragments also come from both the surface near sands and the basal erosion channel. They provided a practically identical radiometric age (TRNKA 2005, 205-206). In that way the charcoals at least can date the moment of re-deposition of the whole sequence. Plenty of burnt silicious artefacts indicate man made fireplaces directly connecting the charcoals and stone implements. Finally, two new AMS data on a bone and a reindeer antler tool (2007, with re-sampling) can confirm the authentic Aurignacian age (pers. comm. William Davies 2007 – see Fig. 2).

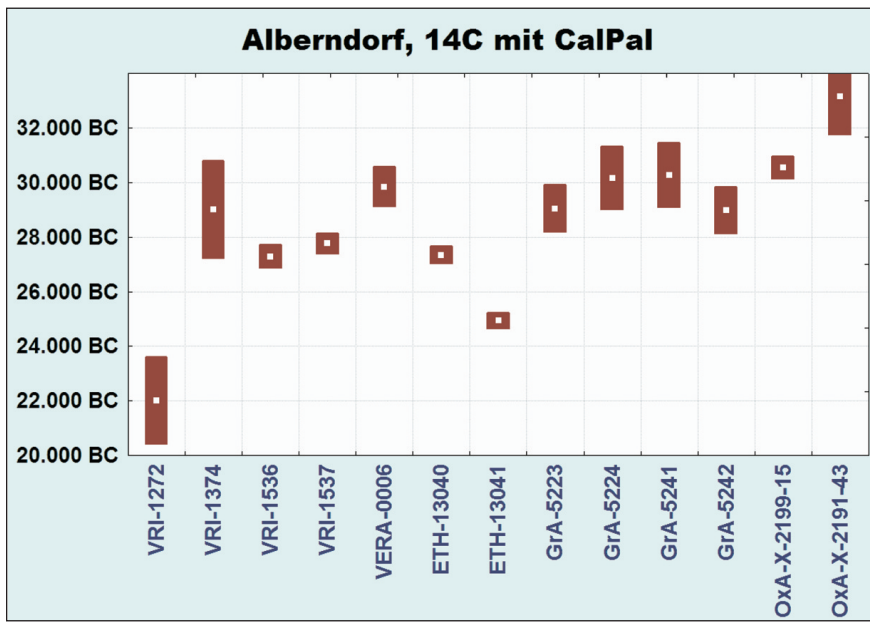


Fig. 2: ^{14}C-dates, OxA = Oxford dates, 2007

Site formation – reflected by refitted lithics

The lithic inventory of Alberndorf 1 contains about 20,000 artefacts (Trnka 2005, 198). The majority of the raw material (90 %) can be determined as cherts of the Krumlovský les type imported from southern Moravia. The region of the most important occurrence is the Krumlovský les upland, but there are also macroscopically similar cherts in the eastern part of Brno (Vinohrady - Stránská skála hill) and in the northeast of Brno (the village of Soběšice). The third area with occurrence of the Krumlovský les chert types was found in the surroundings of Uherské Hradiště in the Moravian part of the Vienna basin. Our present knowledge does not allow considerations which area was the source for the Alberndorf 1 material (Přichystal 2008).

From a geological point of view, Alberndorf is situated in the Carpathian foredeep which is filled by molasse rocks of Tertiary (Miocene) age. In some places these rocks are covered by Quaternary prevalently Würmian loess sheets or sandy gravels of the valley terraces. As long as no local sources of silicious rocks are known, all worked lithics are thought to having been imported to the site. A transport of the prevailing cherts (nodules and pre-cores) over a distance of about

45 km from the Krumlovský les upland is supposed (Bachner et al. 1996, 100, Trnka 2005, 198). The largest concentration of these cherts has been found in the Miocene (Ottnangian) sandy gravels in the Krumlovský les upland between the village of Vedrovice in the south and the Jihlava river valley in the north. The Krumlovský les cherts are divided into three main types: a coarse grained, dark grey "type 1", a fine grained light grey or brownish "type 2" and a fine grained, dark gray to black "type 3" with a black secondary cortex. The same kind of nodules like "type 3" can be found in the Middle Moravian region of Brno where the gravels are determined as Miocene (Badenien). Because of its rare occurrence in the Krumlovský les region but representing a significant fraction (30 %) of the Alberndorf inventory, G. Trnka recently labeled it "type Alberndorf" (Trnka 2005, 198-199). Of course it can be supposed that there existed more raw material deposits, if we consider a Jurassic or Cretaceous genesis of the "Krumlovský les types" and a secondary re-deposition into the Miocene molasse sands. Those sands are widely spread in Southern Moravia and northern Lower Austria. The majority of today's known spots have to do with excavations or accidental exposures rather than systematic prospection.

A random sample of 2761 artefacts from Alberndorf 1 provides the following determination (Trnka 2005, 198):

a) 90 % hornstone, type "Krumlovský les";
b) 5 % Moravian Jurassic hornstone, type "Stránská skála" (near Brno) or local type
c) 1.5 % radiolarite (source in the West Carpathians or Jurassic lime stones of the Eastern Alps near Vienna);
d) 0.5 % white-blue patinated flint (possibly Baltic flint from Northern gravels, sources in Northern Moravia or Silesia);
e) 3 % others, quartz not identifiable.

During technological investigation of the collection more than 100 units of 2 to 8 pieces have been refitted (Fig. 3). The most frequent lithic raw materials are represented in the refitted nodules, i.e. "Krumlovský les" chert, Moravian Jurassic chert and radiolarite. The refits strengthen the fact that basic production of blanks played an important role at the nearby site, where the activities of people originally took place. Secondly the horizontal re-deposition patterns follow exactly the south-north running fluvial erosion channel. It is even more important that several cores could be refitted between six excavation spits (in depth approximately 1.5 m), which confirms the sedimentological interpretation of a massive

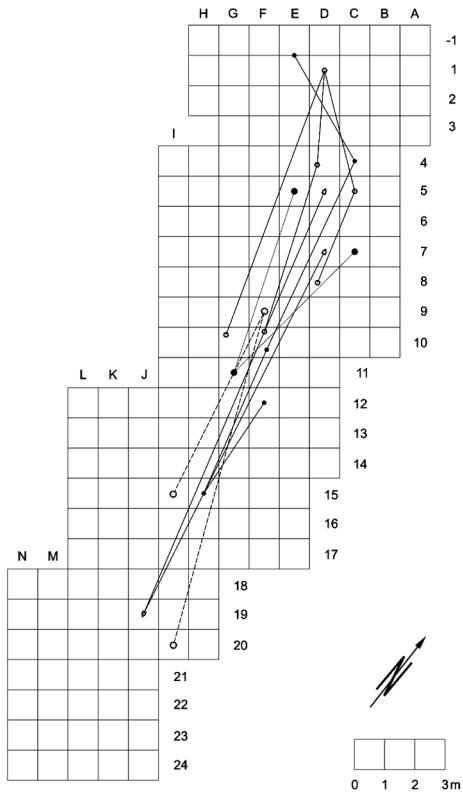


Fig. 3: Alberndorf 1 - Refit of 7 working pieces (nodules) according to the fluvial erosion channel, displaying the direction of re-deposition

debris flow in one single event. While all flint implements in the erosion channel are re-deposited, the refits between artefacts from the bottom to the top of the solifluidal sequence support the presumption of only one mass flow during or after heavy rains or a big melting of snow.

Technological and typological features of the inventory

The lithic assemblage was described before in some short notes by the excavator (TRNKA 1992, TRNKA 2005, 198) and in a first overview shortly after the end of the field work (BACHNER et al. 1996, 100-115). While a comprehensive description is still in process (STEGUWEIT, in prep.), some details can already serve as arguments for the truly Aurignacian character of the inventory:

From the start the tool assemblage clearly proved the Aurignacian character, given by carinated end scrapers, thick end scrapers, double scrapers, truncated blades, dihedral and multiple burins, angle dihedral burins and burin-scrapers. The raw material procurement (i.e. the main import of "Krumlovský les" chert) seems to be "Aurignacian-like" as well, because in the nearby Gravettian sites of the Pavlovian hills there was nearly no use of these sources but an extensive use of moraine flint imported from Northern Moravia and Southern Poland. "Krumlovský les" and other local flint sources are typical for the Moravian surface finds with Aurignacian character.

The 260 cores and nodules show the typical unidirectional reduction. Only very rare cases display turned platforms. When negatives are arranged in opposite direction, they result from core keel rejuvenation. Many of the cores are intensively exhausted, displayed by core tablets to rejuvenate the platform angle.

Obviously the main aim was to produce bladelets, if we assume the most common size index (length < 30 mm, width < 12 mm) for the classification in contrast to blades. The bladelets display a dorsal ridge achieved by a regular/serial production. A second interesting fact is the controlled knapping technique aiming at the production of blades. The majority of the platform remnants is not wider than 5 mm and not thicker than 2 mm. 325 out of 486 investigated blanks were reduced on the dorsal surface. None of them features a different way of platform preparation like edge rounding or faceting.

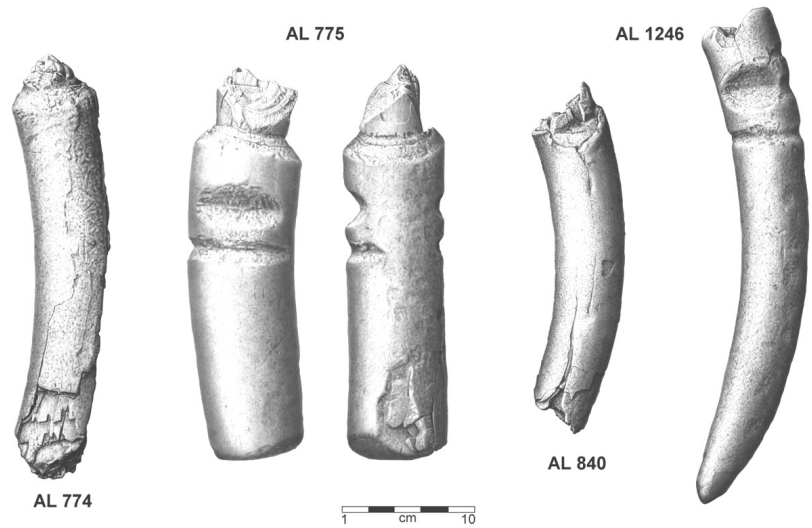
A special focus in the Alberndorf inventory is on 39 retouched microliths with a length < 30 mm. The retouches of the micro-bladelets vary: 26 specimens show unilateral dorsal, 11 pieces bilateral dorsal ("Font-Yves type") and two bladelets ventral retouches. With only three exceptions they are between 10 and 25 mm long, with a mean of about 20 mm. The average width is about 4 to 5 mm. The small medium size of the Alberndorf micro-bladelets (about 20 mm) is amazing but can nevertheless be seen as a typical case of an Evolved Aurignacian (s.str.). Taking into account the dry and relatively rough screening during the salvage excavations, a specialised bladelet production can be seen as the main aim of the knapping activities at the site.

The ivory artefacts from Alberndorf

Four ivory objects (AL 774, AL 775, AL 840 and AL 1246) from the tusks of juvenile mammoths (Bachner et al. 1996, Abb. 17-19, Trnka 2005, Abb. 5-7) recovered during excavation between 1990 and 1995 show clear traces of modification (Fig. 4). These are distal parts of tusks which are between 23 and 36 cm long. They have either circular (AL 774 and AL 775) or two lateral (AL 840) indentations respectively narrowings all around or partial (AL 775 und AL 1246).

The notching or ring notching technique for taking a tusk to pieces has been known in the Upper Palaeolithic of the Old World since the Aurignacian (Hahn et al. 1995, 30, Christensen 1999, 60-66, Khlopachev 2000-2001, 215-216, Fig. 1, Thiault 2001, Fig. 12-14).

First the four ivory objects from Alberndorf have been fragmented by the ring notching technique. As a preparation for the breakage two smaller opposite-standing notches have been made on object AL 774. With both variants the calculated site of fracture produces controlled breaks as it can be seen at the objects AL 774, AL 840 and AL 1246 with proximal breaks and at object AL 775 on both ends. On the contrary the distal ends of AL 774 and AL 840 are irregularly broken and



Airbrush graphics by F. Siegmeth

Fig. 4: Alberndorf 1 – Ivory objects AL 1246, AL 840, AL 774, AL 775 (from top to bottom)

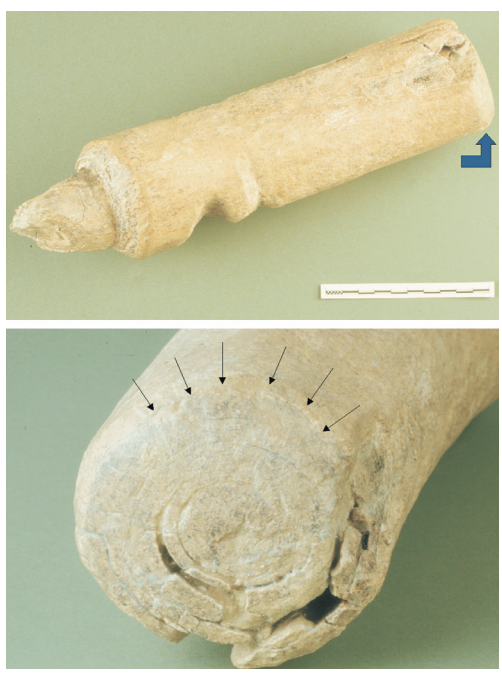


Fig. 5: Alberndorf 1 – Ivory hammer AL 775

splintery. It remains hypothetic if these objects are only marginal pieces which were waist resulting from systematic separation of proximal following cylindrical objects.

Our special attention is directed to the only surface which had been intensively worked after the separation – the distal surface from object AL 775 (Fig. 5). It shows an interesting detail: one part of the edge of the fracture front is rounded by striking. The rounding overlaps up to 1 cm from the surface to the cylindrical shaft. The irregular extend of the rounded edge gives evidence that this was not produced by

systematic grinding but by using the edge as a hammer. Neither deliberate grinding with a rubbing stone nor the use of the cylindrical piece as a pestle would cause such an irregular extend of the edge of the rounding. In contrast to that some impact scars within the rounded part indicate the use as hammer respectively the contact of the piece with a hard and angular material.

Discussion of Upper Palaeolithic ivory objects

As comparative studies show this pattern of use can be observed even more clearly on a series of other objects from other sites and support their interpretation as percussors. The first example of a cylindrical piece to be mentioned in the course of the history of research derives from Předmostí in Moravia and with a reference to ethnological parallels was considered by Jindřich Wankel as the weight of a bola (WANKEL 1884) (Fig. 6). 31 further ivory cylinders respectively fragments have been found in Předmostí up to 1930 (ABSOLON & KLÍMA 1977, VALOCH 1982). VALOCH (1982, 61) and KLÍMA (1990, 83) describe the whole group of artefacts from Předmostí as „Reiber“ (i.e. grinder) while Bohuslav Klíma also mentions a possible use as pestle. The new interpretation of a part of these objects from Předmostí as percussors has already been discussed in more detail (STEGUWEIT 2005) and will be shown only exemplarily in this place (Fig. 7). Despite the uncertain stratigraphy and the diversity of the lithic material the set of artefacts from bone and ivory gives a rather homogenous impression as far as the state of conservation and applied style is concerned. All cylinders known today display the same degree of weathering and patination. Among that group are 8 points of a tusk with rounded base as well as 2 bigger (>10 cm) and 3 smaller

Fig. 6: Předmostí – Ivory object

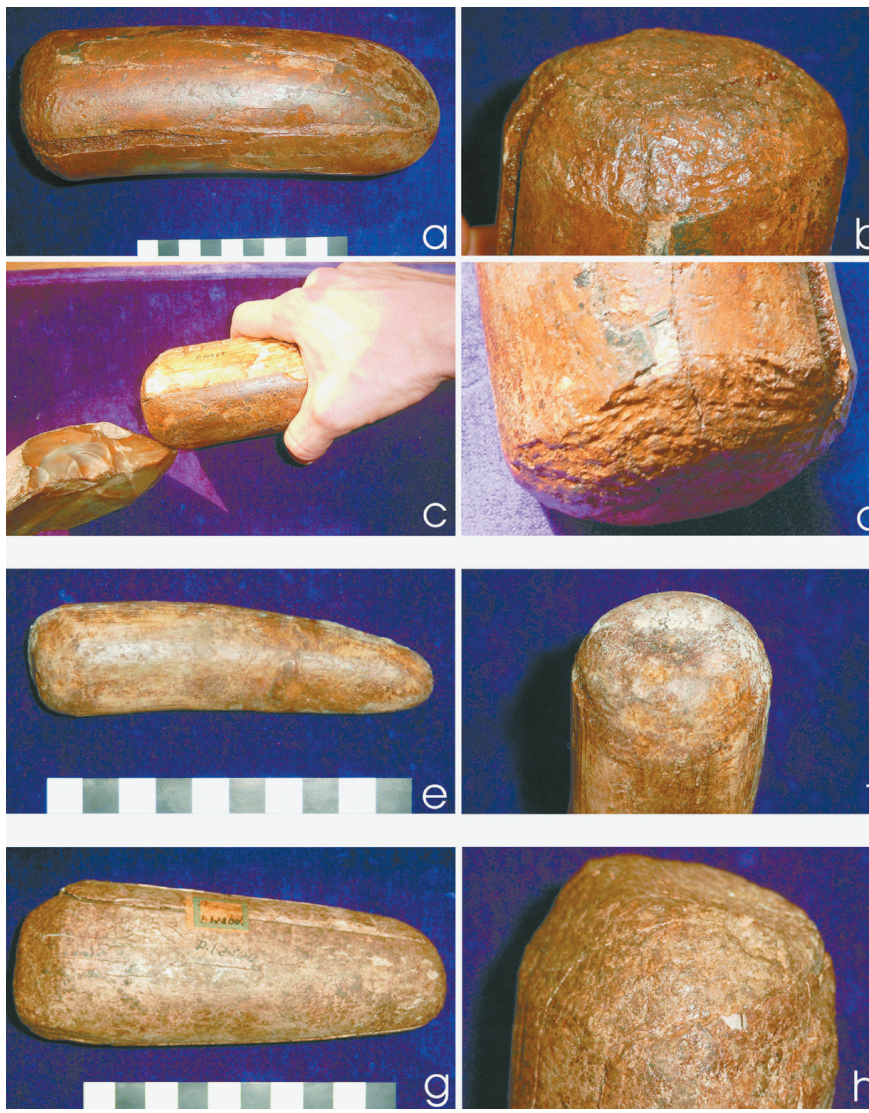


Fig. 7: Předmostí – Ivory object

(<10 cm) cylinders with modification from both sides of the base.

Found between 1957 and 58 in Pavlov as "grinders" four cylinders also belong to this spectrum of objects (KLÍMA 1997, 242, 264: Fig. 17/ 11-12, 277, 284: Fig. 6/ 8-9). These are thick points of tusks with a base rounded by many impact scars.

They can be distinguished from other tusk points because their base was left unmodified after the break (for instance KLÍMA 1997, 285: Fig. 7/1). Ivory fragments with narrowings achieved by notches or small depressions from Pavlov have been interpreted by Klíma as stylized anthropomorphic representations (1989, 82: Fig.1 d-e). There exist for instance analogues from the Russian site Avdeevo (DOLUKHANOV et al. 2001, 707). In this place a spectrum from only slightly narrowed tusk points and half products with a clear relief to completely finished statuettes was left behind (GVOSDOVER 1953, 214-217; 1995).

Jiři Svoboda sees a functional connection between the weight with a lug from Předmostí and the two ivory objects with narrowings from Pavlov from the excavations of 1960 to 1962 (SVOBODA 2001a, 187). Because of the obviously functional handled cylinder he doubts the interpretation of the Pavlov fragments as statuettes and is in favour of an interpretation as loom weights. Taking into account the textiles from Pavlov this interpretation is imaginable. Moreover such loom weights have been demonstrated in a reconstruction (SVOBODA 2001a, 188). Groove like narrowings as seen on similar objects from Kostenki, Mezin, Willendorf and Alberndorf are regarded as typical for these objects (SVOBODA 2001a, 186-188).

Fig. 8: Replica of an ivory hammer (recent elephant), flint knapping experiment Erlangen 2006

The type and the number of impact scars on object AL 1246 from Alberndorf (Fig. 4) as well as on all pieces from Předmostí suggest a use as "soft hammer" or percussor for the reduction of flints. Percussors from ivory as well as from antler are used for the modification of big facially retouched tools (BACHNER et al. 1996, 111: Fig. 16). The special form of the percussor with a rounded surface was successfully tested during experiments by means of a percussor made of the tusk of an elephant (Fig. 8). The weight and the indestructible hardness of ivory have to be especially mentioned. Fresh ivory has a very dense structure and is resistant to breaks so the once rounded surface is extremely long lasting. The flaking according to the concentric structure of the tusks resulting from their ring like annual growth is a decomposition process which starts at the death of the animal but doesn't influence the way of breaking fresh material (HAHN et al. 1995, 29).

How can the observation of clear traces of use at percussors be brought into connection with the common spectrum of ivory artefacts? First of all it is necessary to mention that the function of Upper Palaeolithic ivory cylinders is obviously rather heterogeneous. The separation from pieces of art is difficult. Apart from statuettes and their half products clearly recognizable as such – for instance from Avdeevo (GVOSDOVER 1995) or Pavlov (KLÍMA 1989, 82: Fig. 1a) – there is certainly quite a number of figurative representations we would not recognize. The same applies to grooved surfaces of tusks, i.e. two points of tusks from Předmostí decorated with groups of lines but lacking further modification on the base or traces of use (KLÍMA 1990, 73: Fig. 22 below middle, VALOCH 1975, 85: Fig. 1 li.). At Kirilovskaja (ABRAMOVA 1962, Fig. 38/ 2) a cylindrical shaft was decorated with a rather simple set of grooved lines. On the other hand there are decorated points of ivory from Předmostí which have also impact scars resulting from profane use. The ivory objects can be united into the four following groups according to their modification:

1. Percussors (mainly points of tusks, rarely cylinders) with a modified and rounded base, without ring notches upon the shaft:

Frequently strong modifications caused by use. Examples: Předmostí – 13 described objects + 1 (VALOCH 1982, 65: Fig. 3-6), Pavlov – 5 objekts (SVOBODA 2001a, 187: Fig. 3-2, KLÍMA 1997, 242, 264: Fig. 17/ 11-12, 277, 284: Fig. 6/8-9), Dolní Věstonice – 1 object, unpublished so far; Avdeevo – 4 objects (GVOSDOVER 1953, 199: Fig. 6a,b, 200: Fig. 7 a,b). GVOSDOVER (1953, 199-201) describes for the last mentioned objects all impact scars on the base in detail and favours a use as hammers.

2. Ivory artefacts (mainly points of tusks, rarely cylinders) with unmodified man made breaks with one or more ring notches upon the shaft:

These objects show now traces of use. Their interpretation as stylized statuettes is as speculative as their use as weights. The production of multiple ring notches like at the piece Alberndorf AL 775 (Fig. 4-5) or Pavlov (KLÍMA 1989, 82: Fig. 1 e) rather indicates two separate steps of modification – the making of the ring notches on the one hand and the breaking of the tusk on the other. Examples: Alberndorf – 1 object (AL 775); Pavlov – 4 objects (KLÍMA 1989, 82: Fig. 1 d,g); Willendorf II/ 9 – 2 objects, the so called Venus II and an "unfinished Venus" (FELGENHAUER 1959, Fig. 96); Kostenki IV – 2 objects (ABRAMOVA 1962, plate 19); Mezin – 2 objects (SHOVKOPLJAS 1965); Avdeevo – at least 1 object (ABRAMOVA 1962, plate 30).

3. Ivory artefacts (points of tusks as well as cylinders) with unmodified man made breaks without any notches upon the shaft:

These objects have no visible modifications caused by use. The reason for discarding the pieces is unclear. Examples: Alberndorf – 2 objects AL 774 and AL 840 (Fig. 4); Suponevo – 2 objects (GVOSDOVER 1953, 195); Sungir – 2 objects, possibly percussors with impact scars on the shaft (ABRAMOVA 1962, plate 24); Timonovka – 2 objects with grooved lines (ABRAMOVA 1962, Taf. 36, 17-18); Eliseevichi – 1 object (ABRAMOVA 1962, plate 35, 4).

4. Single pieces/exceptions:

Předmostí – 1 cylinder with a lugged handle and a modified base without traces of use; Alberndorf – 1 object (AL 1246, Fig. 4) with additional notches and traces of use as a percussor. Another speciality are two fragments of a tusk from Předmostí (VALOCH 1975, 84, 86: plate 2, 1-2). One piece – obviously a modified point of a tusk – shows a lateral flaking at the base as well as a regularly rounded point (Fig. 9). According to size, weight and form this is a punch for the production of blades similar to the punches from antler of deer, reindeer or elk used in experiments today. This interpretation is supported by a second punch from Dolní Věstonice which equally displays a flaking produced by a hammer (Fig. 10). During a series of tests good results could be achieved by the production of blades with two punches from ivory of an elephant (points of a tusk) (Fig. 11). Indeed the point is harder as a comparable point of antler which leads more likely to proximal breakage patterns at the bulbs of blades than by use of antler punch.

The reason for the preferred use of ivory punches during the Upper

Fig. 9: Předmostí – Ivory punch

Palaeolithic need not be simply utilitarian but could also be associated with the special mythological or religious meaning of the mammoth. Elaborate grooved patterns on the punch of Předmostí support this opinion. (Fig. 9).

Conclusion

It could be demonstrated that among the objects from ivory a certain number of tools with rounded bases and impact scars can be determined as percussors. Their main use can be observed from the late Aurignacian to the evolved Willendorf-Kostenkien.

Fig. 10: Dolní Věstonice. Ivory punch

Fig. 11: Replica of an ivory punch (recent elephant), flint knapping experiment Federsee Museum 2008

References

ABRAMOVA, Z. A. (1962): Paleolititscheskoje Iskusstvo na territorji SSSR. (Isdatelstvo Ak. Nauk SSSR), Moskau/Leningrad

ABSOLON, K. & KLÍMA, B. (1977): Předmostí, ein Mammutjägerplatz in Mähren. (Arch. Ústav ČSAV), Brno

BACHNER, M., MATEICIUCOVÁ, I. & TRNKA, G. (1996): Die Spätaurignacien-Station Alberndorf im Pulkautal, NÖ. In: SVOBODA, J. (ed.), Palaeolithic in the Middle Danube Region, Anniversary volume to Bohuslav Klíma, Spisy archeologického ústavu AV ČR v Brně 5, 93-120, (Archeologické ústav AV ČR v Brně), Brno

CHRISTENSEN, M. (1999): Technologie de l'ivoire au Paléolithique supérieur. Caractérisation physico-chimique du matériau et analyse fonctionnelle des outils de transformation. – British Archaeological Reports, International Series 751, 1-201, Oxford

DOLUKHANOV, P., SOKOLOFF, D., SHUKUROV, A. (2001): Radiocarbon Chronology of Upper Palaeolithic Sites in Eastern Europe at Improved Resolution. – Journal of Archaeological Science 28: 699-712

FELGENHAUER, F. (1959): Willendorf in der Wachau. – Mitt. d. Prähist. Komm. Wien 8/9: 1-217. Wien

FLADERER, F.A. (1996): Die Tierreste von Alberndorf in Niederösterreich. Vorläufige Ergebnisse und Bemerkungen zur Subsistenz spätaurignacienzeitlicher Wildbeuter. In: Svoboda, J. (ed.), Palaeolithic in the Middle Danube Region, Anniversary volume to Bohuslav Klíma, Spisy archeologického ústavu AV ČR v Brně 5, 247-272, (Archeologické ústav AV ČR v Brně), Brno

FLADERER, F. A., FRANK, CHR. (1997): Alberndorf, in: DÖPPES, D. & RABEDER, G. (eds.). Pliozäne und pleistozäne Faunen Österreichs, Mitt. d. Komm. f. Quartärforschung d. Österr. Akademie d. Wissenschaften 10, 1997, 75-78, Wien

GVOZDOVER, M. D. (1953): Obrabotka Kosti i Kostjanye isdelja Avdeevskoj Stojanki. In: Materialy i Issledovanija po Archeologii SSSR 39: 192-226

GVOZDOVER, M. D. (1995): Art of the mammoth hunters. The finds from Avdeevo. (Oxbow Monograph 49), Oxford

HAHN, J., SCHEER, A. & WAIBEL, O. (1995): Gold der Eiszeit – Experimente zur Elfenbeinbearbeitung. In: SCHEER, A. (Hrsg.), Eiszeitwerkstatt – Experimentelle Archäologie. Museumsheft 2: 29-37, Blaubeuren

KHLOPACHEV, G. A. (2000-2001): Les techniques de débitage de l'ivoire dans les sites de la plaine russe au Paléolithique supérieur (25000 - 13000 av. J.-C.). – Préhistoire Européene 16-17, 215-230, Liège

KLÍMA, B. (1997): Die Knochenindustrie, Zier- und Kunstgegenstände. In: SVOBODA, J. (Hrsg.), Pavlov I – Northwest. 227-286, (Dolnověstonické studie 4), Brno

KLÍMA, B. (1989): Figürliche Plastiken aus der paläolithischen Siedlung von Pavlov (ČSSR). In: SCHLETTE, F. & KAUFMANN, D. (Hrsg.), Religion und Kult in ur- und frühgeschichtlicher Zeit. 81-90, (Akademie-Verlag), Berlin

KLÍMA, B. (1990): Lovci mamutů z Předmostí. – Památnkíy naší minulosti 14. Praha

OLIVA, M. (1996): Epiaurignacien en Moravie: le changement économique pendant le deuxième interpleniglaciaire wurmien. In: XIII Int. Congress of prehist. and protohist. sciences, Colloquia, 6 – The Upper Palaeolithic, edited by A. Palma die Cesnola, A. Montet-White and K. Valoch, 69-81

PŘICHYSTAL, A. (2008): Lithic raw materials in prehistoric times of Eastern Central Europe / Kamenné suroviny v pravěku východní a střední Evropy, Masaryk University Brno; in print

SHOVKOPLJAS, I. G. (1965): Mezinskaja stojanka. (Naukova dumka), Kiev

STEGUWEIT, L. (2005): Gebrauchsmuster an „Elfenbein-Zylindern" aus jungpaläolithischen Fundstellen in Niederösterreich und Mähren. – Mitt. Komm. Quartärforsch. Österr. Akad. Wiss. 14, 177-193

SVOBODA, J. (2001 a): Závaží z mamutoviny v Předmostí a Pavlově. In: HAŠEK, V., NEKUDA, R. & UNGER, J. (Hrsg.), Ve službách archeologie III. (Festschrift für Jan Jelínek). 184-189, (AÚAV ČR), Brno

SVOBODA, J. (2001 b): Analysis of the large hunter´s settlements: Excavation at Předmostí in 1992 - Archeologické rozhledy 53, 431-443.

THIAULT, M. H. (2001): L'exploitation et la transformation de l'ivoire de mammoth: une étude technologique d'objects gravettiens de la grotte du Pape (Brassempouy, Landes). – Gallia Préhistoire 43, 153-174, Paris

TRNKA, G. (1992): Eine Station des Epi-Aurignacien in Alberndorf. – Archäologie Österreichs 3/1, 30-31

TRNKA, G. (2005): Die jungpaläolithischen Stationen von Alberndorf im Pulkautal im nördlichen Niederösterreich (Weinviertel). – Mitt. Komm. Quartärforsch. Österr. Akad. Wiss. 14, 195-212

VALOCH, K. (1975): Ornamentale Gravierungen und Ziergegenstände von Předmostí bei Perov in Mähren. – Anthropologie 13/1,2, 81-91

VALOCH, K. (1982): Die Beingeräte bei Předmostí in Mähren. – Anthropologie 20/1, 57-69

WANKEL, J. (1884): První stopy lidské na Moravě. Časopis Muzejního spolku olomouckého 1/ 3: 89-100, Olomouc

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Buschinger, A. (2003): Soziale Insekten. – In: K. Dettner, W. Peters (Hrsg.), Lehrbuch der Entomologie, 465-498, Spektrum Akademischer Verlag: Heidelberg Berlin

Leisler, B. & Winkler, H. (1991): Ergebnisse und Konzepte ökomorphologischer Untersuchungen an Vögeln. – Journal für Ornithologie 132: 373-425

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