

Wiss. Mitt. Niederösterr. Landesmuseum	19	91-108	St. Pölten 2008
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## **Krems-Wachtberg – A Gravettian Settlement Site in the Middle Danube Region**

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### **Zusammenfassung**

1930 untersuchte Bayer am Wachtberg bei Krems einen Gravettienhorizont der im Zuge von Testbohrungen in der Nähe von Bayers Fundstelle in einer Tiefe von 5,5 m wieder aufgeschlossen wurde. Es werden auch erste Ergebnisse der Rohmaterialstudien und Untersuchungen zur chaîne opératoire vorgelegt. Abgesehen von interdisziplinären Untersuchungen wird in der Arbeit besonders auf die Kinderbestattungen, die in der Nähe der Feuerstelle gefunden wurden, eingegangen. Die sorgfältig bestatteten neugeborenen Kinder sind eine einzigartige Quelle was Überlegungen zu soziologischen Aspekten betrifft. Keramikplastiken wie Tierköpfe können mit ähnlichen Objekten von Fundstellen des Pavlovien in Mähren verglichen werden.

### **Summary**

In 1930 Josef Bayer already excavated a Gravettian layer at Krems/Wachtberg which was again found by several test drillings not far from the original place in a depth of 5,5 m. First results of raw material studies as well as studies concerning the chaîne opératoire are presented. Apart from interdisciplinary studies a main focus is put on the childrens burials found in the vicinity of the hearth. These carefully buried newborn babies are a unique source for considerations concerning sociological aspects. Ceramic artefacts like animal heads can be compared to similar objects known from Pavlovian sites in Moravia.

**Keywords:** Gravettian, chaîne opératoire, interdisciplinary studies, childrens burials, ceramic figurines

### The site

Wachtberg is the loess-covered southern slope of a promontory overlooking the Danube. It is situated above the right bank of the river Krems, which originally ran into the Danube at the foot of the Wachtberg. Today, as part of the city of Krems, it is largely occupied by a residential area. While focusing on the reinvestigation of Palaeolithic sites in Eastern Austria during the last decade, the Prehistoric Commission of the Austrian Academy of Sciences concentrated on the loess sequences of Krems (NEUGEBAUER-MARESCH 2000). Surveys, test trenches and drilling-cores provided a preliminary overview of Gravettian settlement patterns in this area. The excavations at Krems-Hundssteig 2000-2002 support this evidence and provide detailed information about spatial organization of camp sites and the repeated presence of modern man in the Middle Upper Palaeolithic (NEUGEBAUER-MARESCH 2003, 2008, FLADERER & SALCHER 2004).

During the excavations at Krems-Hundssteig, several test drillings were made on the last vacant plots in the Wachtberg area. Not far south from the place where Josef Bayer had already excavated in 1930 (EINWÖGERER 2000, FLADERER 2001, 2003), a clearly defined Palaeolithic archaeological layer with a high density of finds and very well preserved faunal remains was recorded in a depth of around 5.5 m extending to an area of about 250 m<sup>2</sup>. A detailed investigation of these deposits seemed very promising.<sup>1</sup>

### The excavations

Excavations commenced in 2005 and have since been carried out in the course of four campaigns until 2008 (Fig. 1). Modern excavation, documentation and data processing techniques were adapted and developed to cope with the expected findings (HÄNDEL, in press).

Already during the first excavation campaign at Krems-Wachtberg in 2005, an extraordinarily well developed Gravettian layer (archaeological horizon AH 4) – at its base to a great extent a living floor with distinct features (*structures évidentes*) – was recorded (EINWÖGERER 2005 a & b in press, HÄNDEL in press).

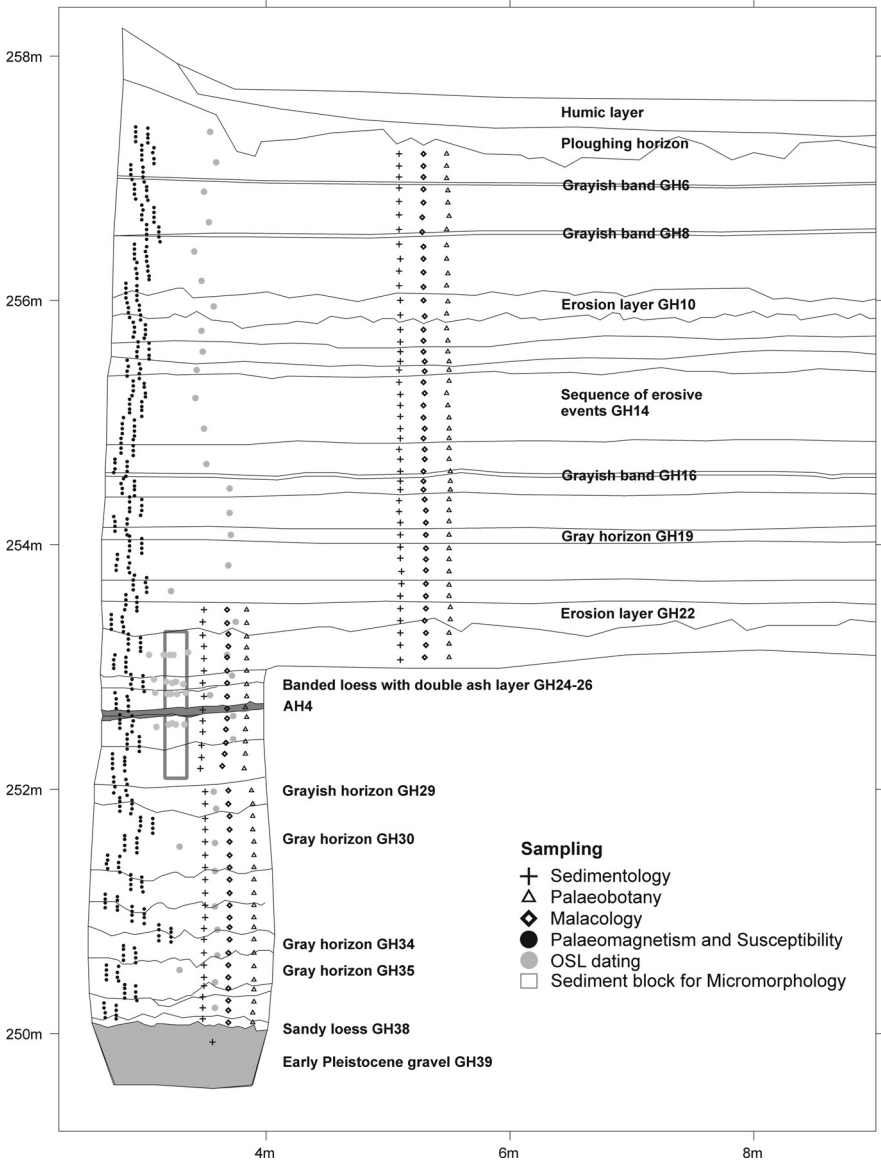
In the meantime 31 m<sup>2</sup> have been investigated, and a rich assemblage of more than 33,000 single finds and samples was recovered. Among these are around 15,500 burned and unburned faunal remains as well as about 12,000 lithic arte-

1) 2005-2006: FWF P-17258-G02: Gravettian Settlement Patterns in Krems, Lower Austria; since 2007: FWF P-19347-G02: Social structures of Gravettian hunter-gatherer societies. Project director: Ch. Neugebauer-Maresch



**Fig. 1:** Krems-Wachtberg 2005: Excavation trench seen from the northeast. (Photo: Prehistoric Commission, Austrian Academy of Sciences)

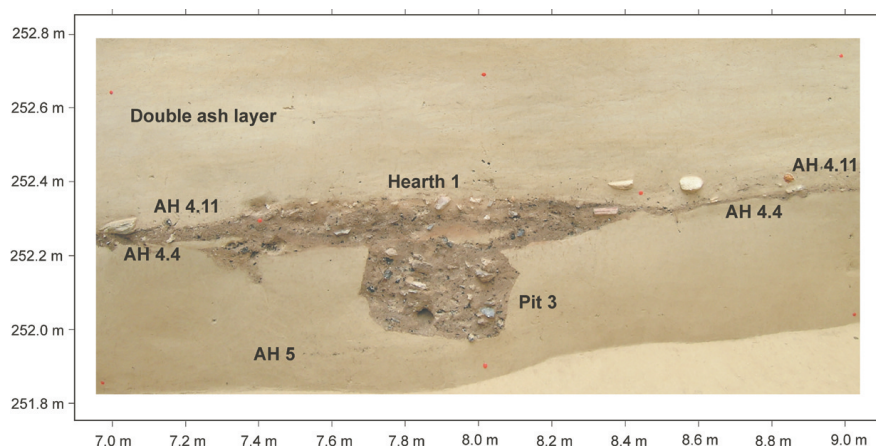
facts of over 1 cm in size. Besides many large and exceptionally well preserved pieces of charcoal, several kinds of colour material such as red and yellow ochre, haematite, graphite and weathered shell limestone (for white colour) were retrieved.



**Fig. 2:** Krems-Wachtberg 2005-2007: Sampling of the North Profile. (Graph: Prehistoric Commission, Austrian Academy of Sciences)

Various sampling strategies were applied both for sections and accompanying the excavation progress in the square metres. For the sampling of the complete loess sequence of 8 m we chose the North Profile of the excavation trench (Fig. 2). Samples were taken for sedimentological, palaeobotanical and malacological analysis, as well as for palaeomagnetism and magnetic susceptibility. The strategy also included samples for different methods of OSL dating and for micromorphology. Part of the sampling was repeated in the West Profile of the excavation trench for a higher resolution within the 1,5 m loess sequence around archaeological horizon AH 4 (geological horizons GH 22-28). Samples for radiocarbon and TL dating as well as for sedimentology and palaeobotany were recovered from all archaeological layers as well as from relevant stratigraphical subunits like the single filling layers of features such as pits, whenever relevant and possible. For a detailed examination of the embedment and microstratigraphy of AH 4, further samples for micromorphology were taken from sensitive contexts.

In general the loess stratigraphy of the site confirms a continuous sedimentation, which is already implied by the excellent state of preservation of at least the base of archaeological horizon AH 4 – namely living floor AH 4.4 with its well preserved features, despite the fact that several (sandier) horizons point at erosive events, which had also taken place after the Upper Palaeolithic occupation (HÄNDEL et al, in press). The Gravettian horizon AH 4 is situated at the base of finely banded loess in geological horizon GH 26 (Fig. 3). In the upper third of the



**Fig. 3:** Krems-Wachtberg 2005: West Profile in square metres G-H2. Stratigraphy of AH 4. (Planimetric photo: Prehistoric Commission, Austrian Academy of Sciences)

banded stratigraphical complex (GH 23-26) of (organic) ash spaced 2 cm apart without any associated archaeological material indicates natural burning events with relatively little biomass involved, suggesting a steppe fire. Even though the ash could also have been transported by wind or water, the regularity of its occurrence does point at an event which took place in situ. At Krems-Hundssteig 2000-2002 the same phenomenon was documented, where it was also found above the Gravettian horizons (NEUGEBAUER-MARESCH, Ch. 2008, pp. 72, 125). It is highly probable that it marks the same event.

The upper part of AH 4 – namely AH 4.1 and AH 4.11 – consists of loess with horizontally and vertically dislocated archaeological material, i.e. sediment with finds which had moved down the natural slope by solifluction took up material originally belonging to living floor AH 4.4 and mixed with it. We therefore presume that the upper part of AH 4.4 is missing. In contrast, its base is excellently preserved including the fillings and bases of a wide range of *structures évidentes* (Händel et al, in press). A radiocarbon date on charcoal of the living floor AH 4.4 confirms its Gravettian age with  $26,580 \pm 160$  y BP (Poz-1290). Located 30-40 cm underneath AH 4 there is an extensive scatter of mainly charcoal with some burned and unburned faunal remains and a few stone artefacts (AH 5). The loess sequence rests on Early Pleistocene gravels, which again are superimposed on the bedrock of the Bohemian Massif.

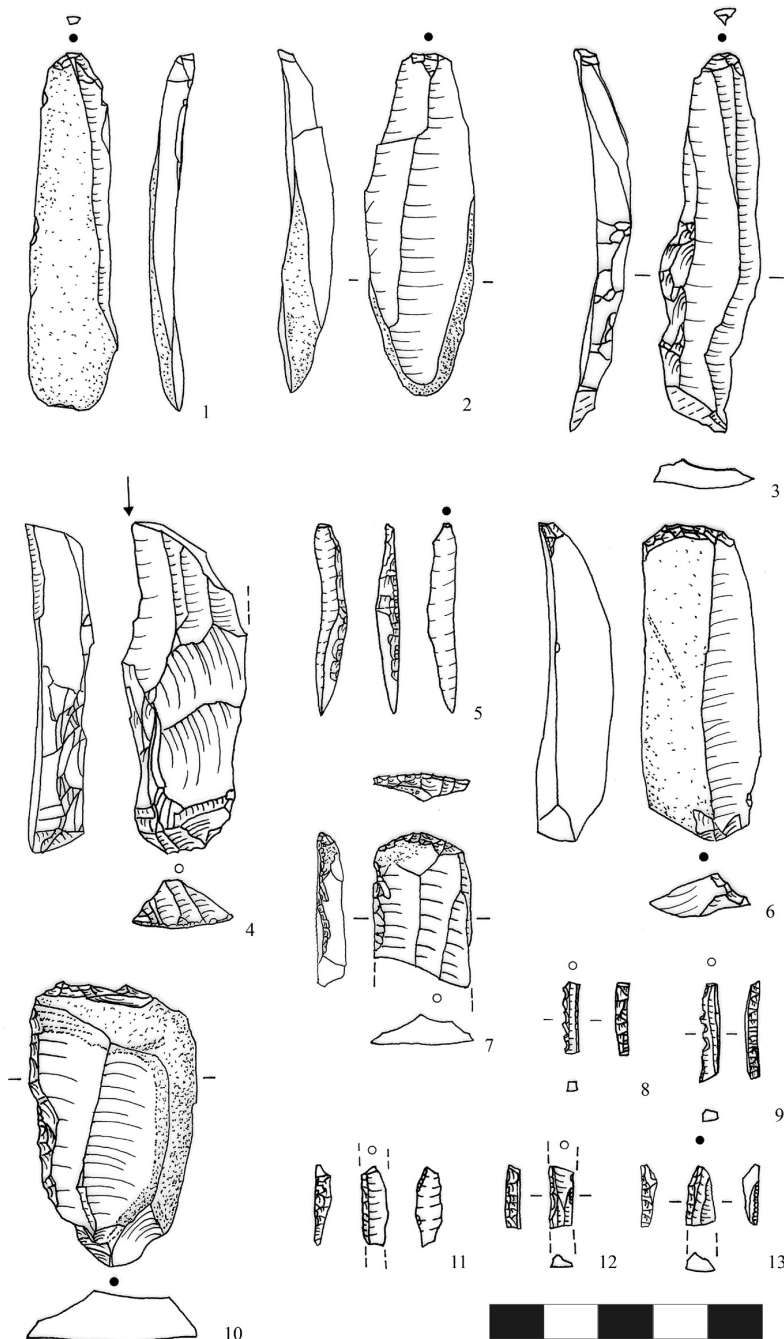
### The finds

The majority of the lithic raw material, mostly chert and siliceous limestone, was locally available from the gravels of the Danube. Besides, there are some raw materials which implicate anthropogenic transport from the Bohemian Massif (Waldviertel) and southern Moravia. A flint with a white patina possibly originates from glacial deposits of southern Poland.<sup>2</sup> The core technology aimed at the production of blades, and, in case of qualitatively better raw materials, also of bladelets (EINWÖGERER & SIMON 2008). Modified artefacts include endscrapers, burins, backed points, backed bladelets and microdenticulates (Fig. 4). The complete chaîne d'opérateur is represented in the lithic inventory.<sup>3</sup> Round hammer stones and elongated pebbles used as retouchers supplement the assemblage of recovered stone tools.

2) Lithic raw material: Michael Brandl, Austrian Academy of Sciences

3) Stone artefact morphology: Johanna Ziehaus, Austrian Academy of Sciences





**Fig. 4:** Krems-Wachtberg 2006: Lithic Artefacts. 1-2 blades, 3 ridge blade, 4 combination tool, 5 retouched burin spall, 6-7 endscrapers, 8-9 backed microdenticulates, 10 truncation, 11-13 backed blade-lets. (Graph: Prehistoric Commission, Austrian Academy of Sciences)

The faunal assemblage includes typical herbivores of the prevalent cold steppe environment (so-called “mammoth steppe”) such as mammoth, horse, reindeer, ibex and arctic hare. Carnivores are represented by remains of wolf, wolverine, fox, and, rare for Upper Palaeolithic sites in Central Europe, brown bear. Furthermore, the bones of several yet unidentified bird species as well as the remains of smaller rodent fauna were recovered.<sup>4</sup> Just as for the production of stone tools, the complete manufacturing process can also be reconstructed for organic artefacts. Apart from a few almost complete long bones and larger tusk fragments, medium to small bone flakes of mostly under 6 cm in size, are predominant among the mammoth remains. They most probably result from crushing bones to extract the marrow and from the manufacturing of bone tools. In the case of mammoth ivory, even small chips resulting from carving the material with stone tools were recorded. Recovered bone and antler tools include a polisher made from the rib of a mammoth, two awls, a long projectile point of mammoth ivory with a length of 15 cm and several fragments of smaller antler projectile points. Among ornaments like ivory beads, perforated teeth of wolf and polar fox, ivory pins are of particular interest (EINWÖGERER et al. 2006 b, 2008) (Fig. 5). A small fragment of burned mammoth ivory shows seven cut marks forming herring bone lines (EINWÖGERER et al. 2008).

Another outstanding find category is represented by small objects made of fired loess (“ceramic” objects). While an amorphous object shows imprints of human papillary lines and the impression of a fingernail (SVOBODA et al. 2004), the fragment of a zoomorphic figurine recovered from the lowermost layer of Hearth 1 (see below) provides a fine example for the objective of the “ceramic” production. Depending on its orientation, the figurine could either represent the proximal part of an animal’s body, e.g. a horse or cervid, or the head of a horned animal, in this case suggesting a saiga antelope (EINWÖGERER & SIMON 2008). This evidence together with the occurrence of several backed microdenticulates in the lithic inventory provides a direct connection to the site, which Josef Bayer excavated in 1930. Furthermore, these findings indicate a close relation to contemporaneous southern Moravian sites, like Dolní Věstonice, Pavlov and Předmostí (SVOBODA 2004). We can therefore refer the inventory to the Gravettian (Pavlovian).

4) Palaeontology: Florian Fladerer and Tina Salcher-Jedrasiak, University of Vienna





**Fig. 5:** Krems-Wachtberg 2005-2006: Organic artefacts. 1-2 awls, 3-4 perforated fox teeth, 5-6 perforated wolf teeth, 7-9 ivory pins, 10 ivory spatula. (Photo: Prehistoric Commission, Austrian Academy of Sciences)

### **The features (*structures évidentes*)**

The living floor AH 4.4 is characterized by a high density of charcoal, faunal remains, colour material and lithic artefacts which are compactly packed in an ash-coloured dark brown sediment matrix. A wide range of clearly definable features are stratigraphically connected with this living floor, including a hearth, numerous pits and indentations as well as two infant burials.

#### **Hearth 1 and connected features (Fig. 6)**

Situated in the centre of the finds' distribution is a multi-phased hearth with a diameter of almost 1,5 m (EINWÖGERER et al. 2008). Alternating layers of burned loess, stone plates and different fillings visualize that Hearth 1 was in use at least five times. Even though originally constructed in a shallow pit, the later fillings form a heap exceeding living floor AH 4.4 in height by up to 15 cm. Whereas mainly wood had been fired during its earlier phases, which is proven by large amounts of charcoal, of which some pieces are so well preserved that they exceed 15 cm in size, firing of animal bones dominated its final phase leaving behind a deposit consisting of thousands of charred bone fragments. Besides the zoomorphic figurine (see above), the fillings of the earlier phases contain dozens of small fragments of “ceramics”, presumably production debris.



**Fig. 6:** Krems-Wachtberg 2007: Excavation of Hearth 1 and connected features, i.e. living floor AH 4.4 and Pit 3 (see also Fig. 3). (Photo: Prehistoric Commission, Austrian Academy of Sciences)

More than 20 small pits with diameters between 5 and 20 cm and depths between 10 and 25 cm are scattered around Hearth 1. Their fillings differ broadly, ranging from a composition equivalent to AH 4.4 or the earlier phases of the hearth, to one large burned pebble at its base or a more than 10 cm long charcoal with a diameter of 2 cm, pointing at a posthole. In one case a 20 cm long bone fragment was found in a vertical position, suggesting a similar function. In another case an ivory pin was recovered. Whereas only one pit may in fact be a cro-tovina and another might have been formed or expanded by cryo-activity, the majority seems anthropogenic in origin. The function of many, however, is still unclear. Similar structures associated with a hearth were documented at the Gravettian site of Grub/Kranawetberg (personal communication ANTL-WEISER 2007).

In addition, three larger pits were situated underneath Hearth 1. In the north-east with a depth of 25 cm and a trapezoid profile, Pit 3 contained mostly charcoal and burned faunal remains, but included some unburned material such as stone artefacts and animal bones as well. Pit 6 was located in the south and contained a deposit of similar composition. Pit 7 was possibly a part of Pit 3; the current excavation of the recovered block will answer this question. Presumably the larger pits were primarily used for cooking. A similar situation was documented by Josef Bayer in 1930 (EINWÖGERER 2000).

With the excavation of Hearth 1 still in progress, thus making its exact relationship to the pits not yet clear, we cannot completely interpret this complex structure for the time being. However, it may be assumed that its function may not have been limited to cooking and heating, but could also have been technical, e.g. in terms of “ceramic” production.

### **A lithic workshop? – “Mulde 5”**

Another flat depression (“Mulde 5”) with a diameter of approximately 1 m is located in a peripheral position about 5 m east of the hearth. Here, the living floor AH 4.4 is not well developed any more but only a few mm thick.<sup>5</sup> Several nodules and cores as well as larger faunal remains were uncovered among other finds at the base of “Mulde 5”. The lithic assemblage suggests an interpretation of this area as a workshop.

5) We therefore named the horizon AH 4.3, even though it represents a continuation of and is therefore stratigraphically equivalent to AH 4.4.

### Infant burials

In September 2005 respectively in July 2006 two infant burials, (Double-) Burial 1 and Burial 2, were discovered in a peripheral position east of the area with the highest concentration of finds (EINWÖGERER in press). The grave pits descend vertically from the base of the living floor and belong to the oldest features within the archaeological horizon AH 4.

#### Burial 1

At the base of a flat depression, which had been re-filled in two phases with loess mixed with archaeological material from AH 4, the horizontally placed scapula of an adult mammoth was uncovered. The bone was nearly complete, but showed clear traces of artificial alterations. The joint (cavitas glenoidalis) had been exposed to fire and the *spina scapulae*, pointing to the bottom of the pit, had been intentionally removed by regular flaking. The mammoth scapula sealed the grave pit and was supported by a piece of mammoth tusk lying inside the pit.



**Fig. 7:** Krems-Wachtberg 2005: Burial 1. (Photo: Prehistoric Commission, Austrian Academy of Sciences)

Underneath there was a 3-5 cm deep hollow space between scapula and a very thin alluvial layer of Loess, which covered the skeletons of two babies deposited at the base of the pit and embedded in red ochre (Fig. 7). The newborns were buried in a strongly crouched position with their heads to the north and their faces towards the east. A sequence of at least 35 drop shaped ivory beads, which had been placed around the pelvis of the baby to the west (Individual 1), is to be considered as personal adornment or offering.

Surprisingly, the crania

of both individuals were preserved three-dimensionally and showed considerable empty spaces even after 27,000 years. The same observation was made in the case of the thorax of Individual 1, where hollow spaces between spine and ribs were documented (EINWÖGERER et al. in print).

The developmental stage of a deciduous incisor of Individual 2 allowed a determination of the age at death as perinatal (9th-10<sup>th</sup> lunar month).<sup>6</sup> The equal lengths of both right femora indicate the same age at death of both newborns. The contemporaneous burial may suggest that they were twins (EINWÖGERER et al. 2006a).

Burial 1 was recovered as a block and brought to the General Hospital of Vienna, where a computer tomography was taken. In the Natural History Museum Vienna, Department of Anthropology, the recovered block was first stored in a climate chamber until 3D laser scanning had been carried out. This non-invasive procedure was an obligatory step, primarily for three-dimensional documentation of the superficial features and bone contours and secondarily to obtain a virtual mould for the production of scaled copies for exhibition purposes. Only then the consolidation of the fragile bones and a careful excavation, documentation and anthropological examination could proceed.

## **Burial 2**

In 2006 a second burial was uncovered approximately 1,5 m north of the double burial, but in the same stratigraphic position and also at the base of a vertically descending pit. However, this burial pit lacked an elaborate grave architecture comparable to Burial 1, as it had not been covered by a protective shoulder blade. It contained only a single individual which was unlike Burial 1 lying with the head to the south. Just like the newborns of the double burial, Individual 3 had also been buried in a flexed position, facing the east and embedded in red ochre. The sharp boundaries of the red pigment suggest that at least this individual had possibly been wrapped in fur or leather, which had decayed in the sediment. It could have been secured with the ivory pin lying only 2 cm above the skull pointing to the north. Since Burial 2 was missing the protection of an object like the mammoth scapula, this skeleton is less well preserved than those of the double burial (EINWÖGERER et al. in print).

This time 3D-laserscanning was carried out in situ. Like the double burial, Burial 2 was also recovered as a block and brought to the General Hospital of Vienna for computer tomography. Afterwards it was transported to the laboratory of the Department of Anthropology at the Natural History Museum in Vienna for

6) Anthropology: Maria Teschler-Nicola, Natural History Museum Vienna



further excavation and special analysis. Based on the mineralization degree of the upper incisors and the length of the left femur (approximately 85 mm), the age at death can be estimated as 0-3 months (EINWÖGERER et al. 2006a).

The rituals involved in the burials confirm the close relation to the contemporaneous south Moravian sites, like Dolní Věstonice, Pavlov and Předmostí, as evidenced by the use of red ochre, grave goods as ivory beads and the practice of covering the grave with a mammoth shoulder blade (TRINKAUS & SVOBODA 2006). Moreover, the burials demonstrate that newborns and very young infants were not treated differently than adults, adolescents and older children. This had previously been discussed due to an absence of samples (ZILHÃO & TRINKAUS 2002).

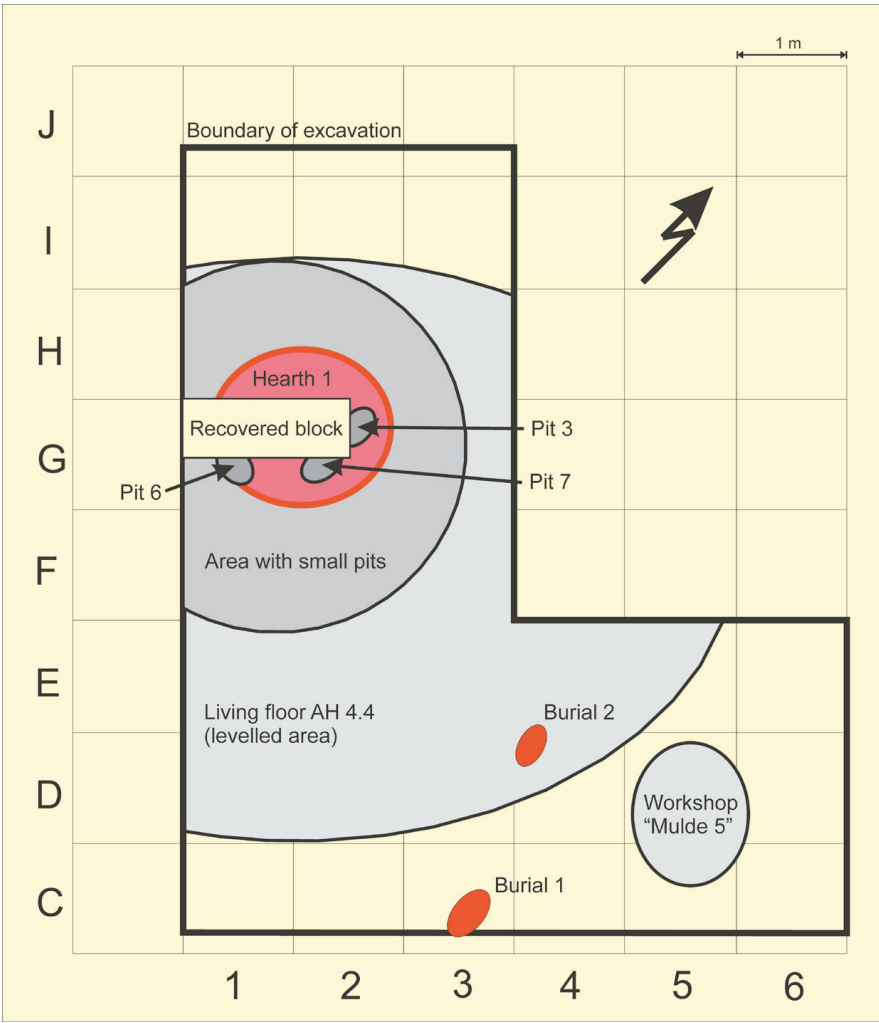
In 2007, the rib of an adolescent was recovered from the dislocated part of the main archaeological horizon in AH 4.11. The rib could have originally belonged to another burial further uphill (EINWÖGERER et al. 2008). Proof of four individuals of Early Modern Humans has therefore been established so far at Krems-Wachtberg. This enlarges the sparse sample of Upper Palaeolithic human fossil remains in Austria considerably (TESCHLER-NICOLA & TRINKAUS 2001, TESCHLER-NICOLA et al. 2004).

## Discussion

Living floor AH 4.4 and its continuation AH 4.3 with the connected structures évidentes show a pattern of different activity zones in the excavated area (Fig. 8). Hearth 1 and the connected pits represent the centre of the main finds' distribution, situated in the northwest. The living floor is best developed east and southeast of the hearth, where the palaeo-surface is more horizontal, presumably because it had been intentionally levelled (personal communication TERHORST, B. 2007), whereas it slopes up towards the north. Burial 2 is still located within a well-developed AH 4.4, whereas Burial 1 and "Mulde 5" are located in peripheral positions at the fringes of the living floor, documented as AH 4.3. There can be no doubt that the duration and intensity of the site's occupation goes beyond the function of a hunting camp. This is supported by the graves and the presence of mobile art.

Because excavation and processing of finds and data are still in progress, we could not yet conclude a systematic spatial analysis and evaluation aimed at identifying possible structures latentes, e.g. the outline of a dwelling, be it a tent or a hut, which is likely to have existed. This will therefore enhance our understanding of the relationship between the documented findings and the spatial organisation of the Gravettian settlement.





**Fig. 8:** Krems-Wachtberg 2005-2007: Organisation of the Palaeolithic settlement. (Graph: Prehistoric Commission, Austrian Academy of Sciences)

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