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# Krems-Hundssteig: New excavations and their relationship to the old known site

Christine Neugebauer-Maresch[1]

**Zusammenfassung**

In den Jahren 2000-2002 wurden von der Prähistorischen Kommission der ÖAW, mit Unterstützung durch den FWF und dem Bauträger Gedesag großflächige Grabungen durchgeführt. Das untersuchte Areal schloss unmittelbar südlich an den Bereich der alten Abbauarbeiten von 1900–1904 an, der unter dem Namen Krems-Hundssteig international bekannt wurde (Strobl & Obermaier 1909). Entsprechend dem klar fassbaren Hauptbestand der Funde wurde diese Freilandstation zu den wichtigsten Fundplätzen für die Anfänge des Aurignaciens gezählt. Ein aufmerksames Studium der alten Aufzeichnungen sowie die Ergebnisse der neuen, durch ein Bauprojekt verursachten Ausgrabungen zeigen auf, dass dieser topographisch und klimatisch begünstigte Siedlungsplatz zumindest zwischen 41.000 und 27.000 y BP wiederholt aufgesucht wurde.

**Abstract**

Between 2000 and 2002 extensive excavations were carried out by the Prehistoric Commission of the Austrian Academy of Sciences (ÖAW), with the support of the Austrian Science Fund (FWF) and the building contractor Gedesag. To the north, the investigated area bordered on the site where excavations, internationally known as Krems-Hundsteig, had taken place between 1900 and 1904 (Fig. 1: Strobl & Obermaier 1909). The open air site was recognized as one of the most important find spots of the early Aurignacian on the basis of the clear majority of the artefacts. A close examination of the old records, together with the results of recent excavations prompted by a construction project, shows that this topographically and climatically favoured settlement location was repeatedly visited between 41,000 and 27,000 y BP.

**Keywords:** Aurignacian, Gravettian

1) Shortened summary of Neugebauer-Maresch (Ed.) 2008


**Fig. 1**: Excavation areas at the Wachtberg of Krems (photo Aerial Archive Institute of Prehistory and Protohistory of the University of Vienna)

## The excavations 2000-2002

The excavations of 2000-2002 (Fig. 1 and 2) revealed an up to 8m deep loess stratigraphy, the lower half of which covered the archaeologically relevant period between 41,000 and 27,000 y BP. The Ice Age layers in the upper half of the loess sequence show only scattered signs of human presence, which cannot be defined in detail. The site is relatively homogenously structured in sedimentological terms. Malacological analysis demonstrated a repeated fluctuation between a damp-moderate and a damp-cool climate corresponding to a change from a constricted, shrub-covered area with deciduous trees to a predominantly open, grassy landscape.

The main find horizon (AH 3.2) accumulated during that part of the stratigraphic sequence with the least favourable climate. A first profile was comprehensively documented and sampled down to A H4 in a depth of ca. 6 m, where the oldest anthropogenic evidence was found. The oldest dated layer A H5 could only be reached by drilling and therefore did not bear any finds besides charcoal, which is why it cannot be postulated a cultural layer. The test holes revealed a light accumulation of loam with charcoal datable to 41,000 y BP.

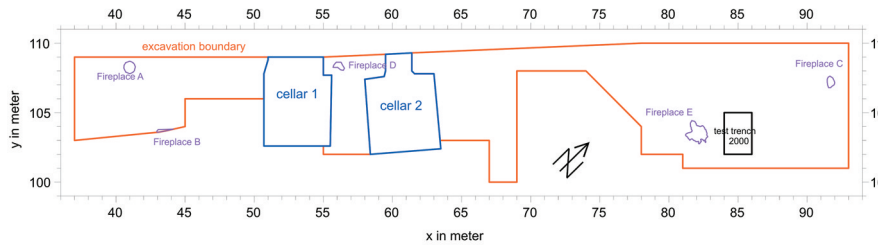


**Fig. 2**: Krems-Hundssteig 2000-2002: excavation area with the localization of the hearths A-E

Aurignacian levels (AH 4) were reached only twice – once in the eastern and once in the western areas of the excavations. AH 4 stood out clearly in the east as a stratum darkened by charcoal, but in the west only a weakly pedologically-influenced loess could be found. The microscopic analysis of the pollen samples (Poacae, *Pinus*) from this area revealed a very high proportion of charcoal particles and implies an improvement in the climate. The malacological analysis which took place in the eastern part of the excavation indicates a loess tundra landscape rich in herbs and grasses and with scattered undemanding bushes and/or tree species. A large pebble showing the effects of fire (boiling stone) and the shed antler of a red deer were found in the test trench U-W39/40. Despite the small sample they represent, they are proof of anthropogenic activity at around 32,180 y BP (Fig. 3).

The Gravettian horizons (AH 3.1–AH 3.8) can be divided into six different levels. The archaeological horizon AH 3.8 is a period in which a moderate-damp climate in an open loess tundra/steppe led to a richer development of shrubs and undemanding tree species, as shown by malacological and pollen-analytic evidence. Among the microfossils, mosses and ferns were associated with these isolated copses. Extensive traces of lime forming a thick, shapeless layer were thought be the remains of “puddles”. No anthropogenic or faunal remains were found at this depth due to the limited extent of the excavated area.

Another period in which a climatic improvement took place is represented by the bleached horizon AH 3.7 (and the associated AH 3.64). Slight oxidation and charcoal enrichment can be identified in places at the base of this layer. The malacological findings support the interpretation of a loess steppe vegetation. The largest number of individuals and species of the entire sampled profile R–W84 were found in this horizon. Evidence of a thrush indicates a woody environment in the immediate vicinity, which can be expected in a river valley landscape. Indeed many calcified pieces of wood, which appear to come from trunks and branches

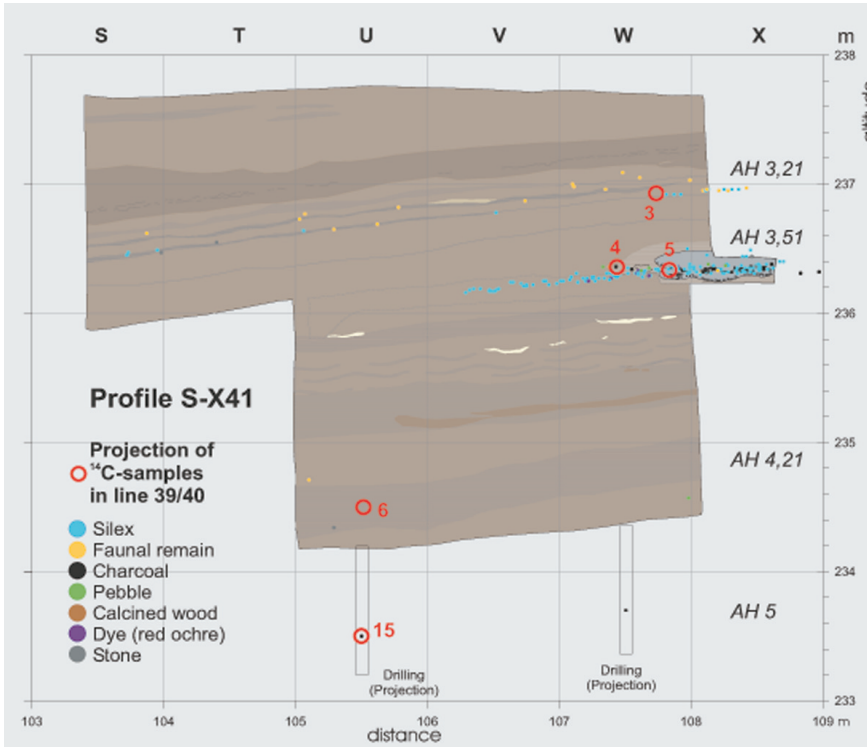


**Fig 3**: Profile (coordinates S-X41) displaying the sediment stratigraphy AH 3.21 to AH 5.11, the hearth A and the location of the $^{14}C$ samples (graphic: PK OEAW)

as well as roots, were discovered at this level. Red deer, reindeer, mammoth and alpine ibex were also shown to be present if only through very few remains. Articulated carpal bones from the left foreleg of a red deer and a skullcap fragment with the base of a horncore from an alpine ibex indicate anthropogenic influence.

AH 3.8 produced no radiocarbon dates, but four uncalibrated dates, around 28,000 y BP (CALPAL 2005: >30,000), were established for AH 3.7 and AH 3.64. The radiocarbon age of the layers above these (with a single exception in the uppermost layer) ranges between 27,600 and 28,000 y BP. The more than a metre thick sequence of the Gravettian layers varies only relatively little in date and is proof of a high rate of sedimentation. The layers sweep towards the southeast for the most part, though not exclusively. Unevenness in the former palaeo-relief has led to different rates of sedimentation and erosion here. This may help to explain

the divergent location in which AH 3.51 was found in relation to AH 3.54. Above and underneath AH 3.51 are sterile loess layers which separate it from AH 3.31 and AH 3.71 respectively. AH 3.54 lies directly above AH 3.74 in the east and is also directly covered by the next youngest find horizons, which for their part are easier to follow in greater detail in the east. The radiocarbon dates also show small, but not necessarily significant, differences, between both hearths.

The 'middle wood horizon' (AH 3.42, 3.43 and 3.44) also seems to represent a slight climatic improvement. Pine and fir were identified among the very many, large fragments of charcoal, which were found in clusters. The faunal remains, now present in numbers for the first time, are from reindeer and mammoth, but also from wild horse, hare, artic fox, red deer, rhinoceros, stoat and hamster. Noteworthy is also the repeated evidence of different birds such as capercaillie, willow grouse (willow ptarmigan) and brent goose, which in some cases could be recovered in anatomically connected skeleton parts. Egg shells, probably belonging to the capercaillie, were also found, another indication of extensive forest cover.

The 'upper wood horizon' (AH 3.31 and 3.34) was tangible in the east first and foremost. Alongside calcified wood (see below), molluscs once again indicate a damp to mid-damp habitat. Reindeer dominates among the faunal remains, mammoth, hare and rhinoceros are also found.

The 'main find horizon' AH 3.2 is the only level that could be excavated over the entire area. Detailed analysis of the palaeontological material, which was plentiful in this layer, showed that remains of the same individuals were probably scattered across the entire excavated area. Unfortunately, similar results could not be obtained for the stone artefact material: hearth areas B and D could not be linked by refits, neither to each other nor to the few stone implements from the eastern part of the excavation area.

Remains of mammoth formed the most common part of the palaeontological material in this main find horizon, which in turn contained 88% of the faunal remains recovered. Seven individuals can be reconstructed, including four calves or subadult individuals. The next most common animal is the reindeer. Red deer, alpine ibex, wild horse, rhinoceros, wolf, artic fox, artic hare, beaver and hamster were also found. A part of the bones from large herbivores bears the gnawing marks of carnivores, indicating a significant non-anthropogenic impact.

The results of the malacological analysis showed that AH 3.2 was the climatically most unfavourable part of the entire profile; an extremely high concentration of charcoal traces in the palynological samples also indicated an open landsca-

pe. The many articulated finds without gnawing marks indicate that the embedding of the faunal remains took place rapidly.

## The significance of the calcified traces

One of the most important results of the excavations is the extensive observation of tenuous calcareous traces. The shapes of the mostly only 1mm thick structures were interpreted as the remains of wood, a finding at least partly substantiated by microscopic analysis. On the basis of a specific climatic situation, the wood embedded rapidly in the loess and was either covered by lime or its cell cavities were filled with this material. The wood concerned is represented by numerous remains including root, branch and trunk parts. The cell structure of coniferous wood could be determined in some cases, the species *pinus* (pine in the furthest sense of the term) was found in one case.

It proved possible to associate the former wood structures with three different subhorizons. In all three levels both substantial and delicate/intricate structures remain, if in different intensity, which are in all probability parts of roots or upright wood. They are evidence for the in-situ preservation of the layers; movement would definitely have led to a destruction of the delicate remains.

## Traces of Ice Age hunter-gatherers – features, subsistence and seasonality

Within the Krems-Hundsteig excavation area of 2000-2002, anthropogenic-influenced remains can be identified in those layers placed by uncalibrated $^{14}$C-dates between on average 32,700 and 27,200 y BP.

The oldest remains, a boiling stone and the shed antler of a red deer, found in the western part of the examined area, are very important in assessing the open air site of Krems-Hundsteig as a whole. They confirm the presence of Aurignacian levels and allow comparisons with the finds from the older excavations.

All other proven human activity zones belong to the thick sequence of cultural layer AH3 and can be divided into several horizons between 27,200 and 28,750 y BP. In the horizon AH 3.7 (and the attached AH 3.64) the presence of humans can be shown in several ways. The fire structure E is difficult to interpret, but a nucleus and modified animal bones are present, the remains of butchered animal parts, which were carried to this spot and further processed there. The most interesting feature are the rod-shaped calcareous traces, which were found bundled together and can be interpreted as the calcified remains of modified wood. The

two largest pieces are 230 and 170 cm long with an unvarying width of 2 cm, one of the ends tapers to a point. The evenness of the pieces and the absence of branches breaking away from the wood, identified as pine, lend weight to the theory that the objects are either modified wooden rods or even spears, as the proportions of the larger pieces suggest.

The find horizon closest to the 'lower wood layer' at the Krems-Hundsteig excavations, AH 3.5, is also the deepest layer, which could be excavated on a large scale. Two clearly defined hearths with matching activity areas were found in this layer, one in the west (AH 3.51) and one in the east (AH 3.54).

Hearth A (AH 3.51) is a central, originally ground level hearth with a diameter of around 90 cm and a find radius of around 2 m. The base of the hearth shows only faint signs of scorching. Large pieces of charcoal (pine, in one case spruce/larch) survived the firing. The find area produced the greatest number of stone artefacts of the excavation. A high refitting rate of almost 15 % indicates a napping area; the production of blanks from local raw materials and a preferred manufacture of narrow blades can be shown.

**Fig. 4**: Krems-Hundssteig 2000-2002: Gravettian stone artefacts (denticulated blade and scrapers) (photo: PK OEAW)

Hearth C (AH 3.54) is relatively small with a diameter of 40 cm and the radius of the find scatter also averages only 1 m. Branches from pine trees were used as firewood. The limited number of flints, the almost exclusive use of one raw material and the high refitting rate at 19%, imply a hearth used only briefly with a knapping area, where reduction without further preparation of the cores took place. A unique notched blade, probably the point of a projectile (Fig. 4), was found at the edge of this area.

Clear traces of heat on finds in the stratigraphically next layer upwards, the climatically more favoured 'middle wood horizon' (AH 3.4), imply the proximity of an anthropogenic feature. The presence of the extremities of reindeer for the most part also indicates human selection. There is proof of butchering to obtain transportable units, de-fleshing and the extraction of bone marrow. Small pieces of primary waste are presumably indicators of consumption in the immediate vicinity. In AH 3.44 there are important signs of seasonality in the form of remains of wild horse and artic fox, which tend to indicate summer hunting activity. To what extent the bird remains and egg shells from this AH are the result of human activity, will have to remain an open question.

In the layer immediately above, AH 3.3, remains of reindeer and rhinoceros also indicate summer activity. Only very few silex artefacts and modified or burnt faunal remains are associated with this horizon. The calcified remains, here represented by very large pieces in some cases, are probably from tree trunks, but cannot with certainty be said to have been anthropogenically used.

AH 3.2 can be called the main find horizon, because of its generally high find density. The hearth areas B in the west and D in finds zone 2 on the one hand, contrast to the loess layer in the east with for the most part palaeontological finds on the other. In the lower layers reindeer was the most common animal, but now mammoth clearly dominates. Numerous anatomically connected skeleton parts prove that butchered portions were taken to this spot. Not only deliberate destruction (bone marrow extraction), but also the influence of large predators can be diagnosed from the debris. Remains of reindeer and of a wolf point to summer activity for the most part, but another wolf may have died in late winter or spring.

Unfortunately only the peripheral area of Hearth B in AH 3.21 could be examined because of the demands of the building site. Three find areas were defined in its surroundings, including a waste area. It proved possible to identify the decortification of nodules and also the import of finished blanks of chalcedony and quartz. Mammoth dominated among the present animal remains. It is possible that ribs were filleted in this area.

Hearth D, which belonged to the same stratigraphic level, was uncovered between two cellars and the street and was only partially preserved for that reason. A dark colouration, with a concentration of charcoal at its centre, was found at the northwest edge of the excavated area. This spread down the slope in a southwestern direction for almost 2 metres. The import of finished blanks of the raw materials chalcedony and quartz again took place here, while blank production in local materials could also be shown. The consumption of reindeer, represented by a very large amount of small pieces of bone, was very apparent. The absence of larger mammoth parts here is noteworthy, an exception being the 77 cm long fragment of a tusk.

## The Krems-Hundsteig site: the relationship to the older excavations

The general impression created by the artefact types from the older find material led to the acceptance of an Aurignacian context and was dominant despite all evidence of a difficult stratigraphy. The modern studies by LAPLACE (1958), BROGLIO & LAPLACE (1966) and J. HAHN (1977) concentrated entirely on the older finds, which were available in the permanent exhibition and depot of Krems Historical Museum[2]. The large amount of artefacts designated by J. Bayer his "second choice", left in the lapidarium and walled up in the 1950s, was not taken into consideration. This material was "rediscovered" during renovation work in 1993. The $^{14}C$ date of 35,500 y BP, which was obtained around 1970, seemed to corroborate the identification of the Early Aurignacian. Before the beginning of the new excavations a new date was established from charcoal from the previous excavations stored in the "Weinstadtmuseum" Krems. Surprisingly its age was merely 27,000 years. The presence of Gravettian layers in Krems-Hundsteig was then confirmed by the new excavations. The superficial collection and deposition of the finds by J. Strobl around 1900 led to a mixing of Aurignacian and Gravettian material. However it must be said that by far the largest part of the material does belong to the Early and not the Middle Upper Palaeolithic (Fig. 5).

The uppermost Palaeolithic layers at Krems-Hundssteig date to the Gravettian; the occurrence of relatively large animal bones as well as fewer and simpler stone artefacts towards the south can be confirmed for this horizon within the excavated area (above all AH 3.1 and 3.2).

2) And also in the Natural History Museum Vienna and the "Niederösterreichisches Landesmuseum".

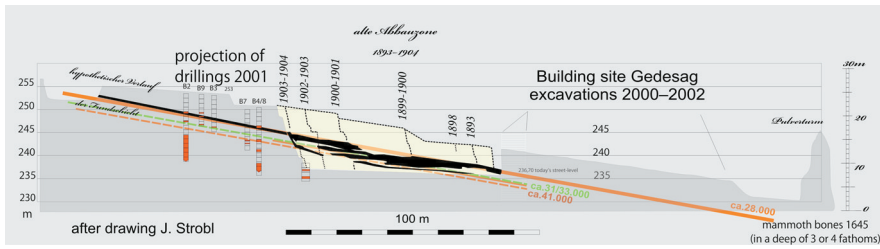


**Fig. 5**: Krems-Hundssteig: stratigraphic results of the excavations 2000-2002 and a suggestion to the correlation with the old excavations (graphic: PK OEAW)

The sequence of cultural layers (AH 3) is structured internally by scarcely discernible ribbon layers, which represent several horizons with a fine chronological scale. Centres of density or hearths are found at different points in the stratigraphy.

Aurignacian layers were encountered around 1.5-2 m under the Gravettian find horizons, but could not be excavated because of the demands of the building site. The section drawings from the older excavations also show this difference in elevation. The Aurignacian layers are presumably also chronologically finely differentiated with significant zonal differences as were the Gravettian layers.

Another horizon (AH 5: 41,000 y BP) was identified a further metre down, but this could unfortunately only be recorded in drilling holes. It appears to have lain in increasingly wet surroundings and can be described as a light browning or loam accumulation. This layer can be paralleled with the loess exploitation profile. A clear-cut loam accumulation lying horizontally above the crystalline was identified several times in the test boring behind the loess exploitation section. This was identified by J. Bayer as the "Göttweig loam accumulation zone" and was the foundation of the old explanatory model. Whatever the actual age of this level may be, it probably marks the base of the possible find horizons in the loess exploitation profile.

All in all it has to be said that the presence of even Middle Palaeolithic layers cannot be ruled out. As was the case at Willendorf II the profile began with a relatively warm climate phase at the turn to the Upper Palaeolithic and enclosed roughly three layers of both the Aurignacian and the Gravettian within its 12 meter thick loess layers.

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author's adress:

Christine Neugebauer-Maresch
Austrian Academy of Sciences
Prehistoric Commission
Fleischmarkt 22
A-1010 Vienna
Austria