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## **Grub/Kranawetberg and Ollersdorf/Heidenberg (Lower Austria) – two Gravettian camp Sites in Eastern Austria**

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### **Zusammenfassung**

Von 1993 bis 2007 wurden auf dem ca. 25.000 Jahre alten Gravettienfundplatz Grub/Kranawetberg bei Stillfried an der March im Nordosten Niederösterreichs ein mehrphasiger Siedlungsplatz mit Behausungsstrukturen wie Feuerstellen und Grübchen ausgegraben. Mehrere veriegelte Schichten zeigen, dass der Platz wiederholt genutzt wurde. Grub/Kranawetberg und Ollersdorf/Heidenberg sind zwei von 13 paläolithischen Fundplätzen in der Gegend von Stillfried.

### **Abstract**

From 1993 to 2007 excavations at the Gravettian 25 ka y BP site Grub/Kranawetberg in the March valley near Stillfried in the northeast of Lower Austria exposed a multilayered area with dwelling structures and an adjacent refuse disposal area. About 20 m from this refuse disposal to the east dwelling structures with hearths and pits which surround them were unearthed. Several phases of firing show that the site was used repeatedly. Grub Kranawetberg and Ollersdorf/Heidenberg are two of 13 palaeolithic sites in the microregion around Stillfried.

**Keywords:** Gravettian, multilayered site, settlement structures, ivory adornments, bird bone with red ochre

### **1. Introduction**

Palaeolithic remains from the area around Stillfried have been known for more than hundred years. Palaeolithic finds from Stillfried range among the first in Lower Austria which were attributed to the Ice Age without reserve. The number of Palaeolithic sites shows an intensive use of this region during the last glacial cycle. Most of the 13 palaeolithic sites (Fig. 1) are situated on soft hills with good to excellent view to the plain lying ahead. The majority of them are known from surface collections. Only Ollersdorf/Heidenberg, the so called flintknappers

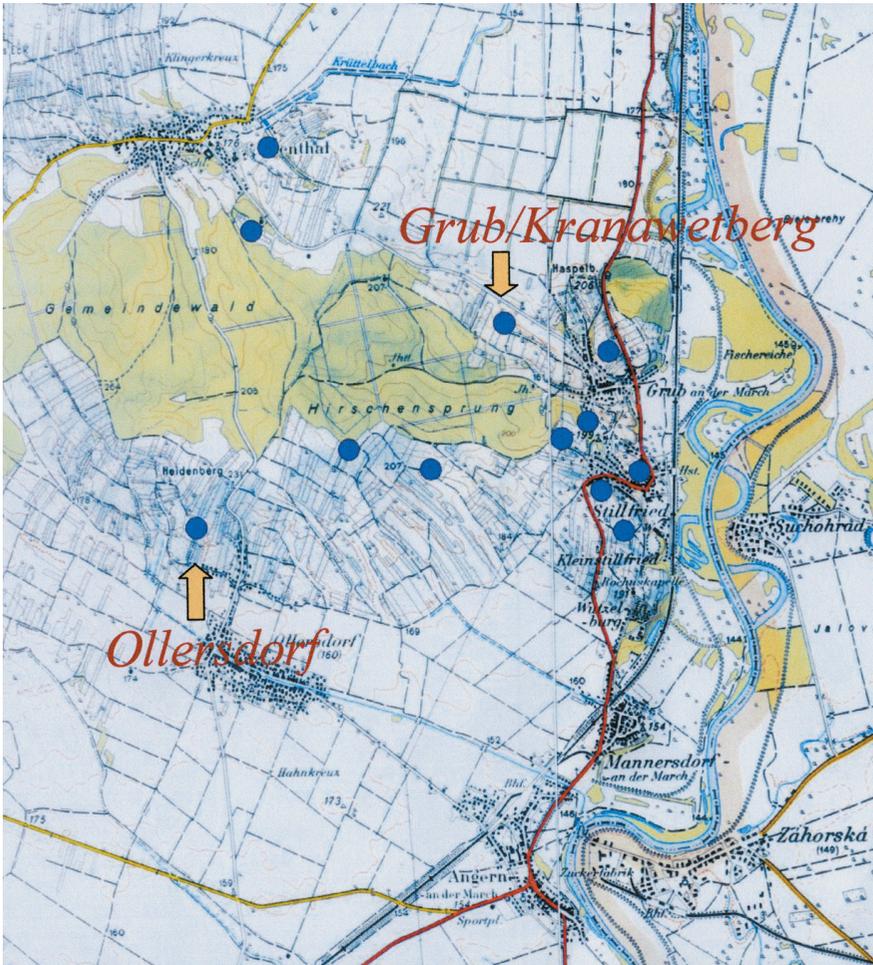


Fig. 1: Palaeolithic sites in the area of Stillfried

workshop in the area of the urnfield fortification in Stillfried and Grub/Kranawetberg are partly excavated. Radiocarbon dates are only available from Ollersdorf/Heidenberg and Grub/Kranawetberg.

The Gravettian site Grub Kranawetberg is situated on a south-facing slope above the March valley. This position may be regarded as a strategic outlook over animal migrations across the river plain to the Carpathian Mountains in the East. The Palaeolithic layers of Ollersdorf Heidenberg also lie on a south-facing slope on the descent of the Weinviertel hills to the Marchfeld plain. There is an open

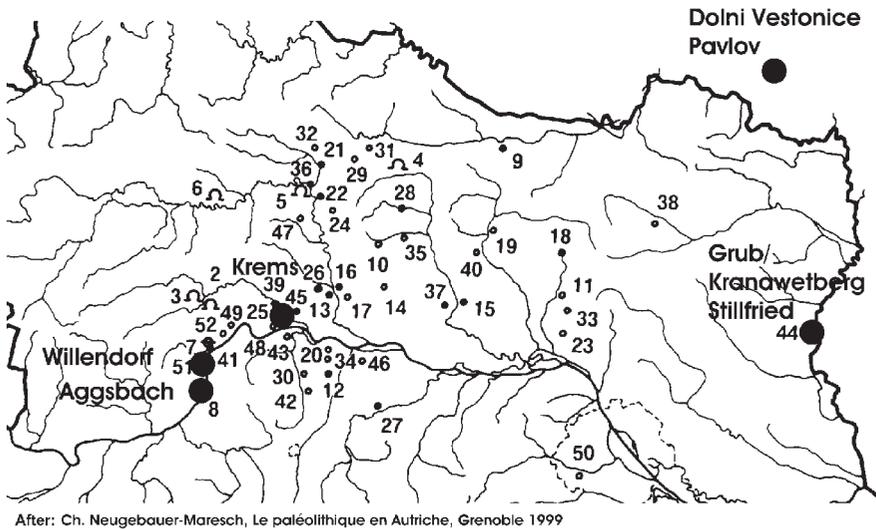


Fig. 2: The geographical position of the Stillfried area

view from the Carpathian Mountains in the east over Bratislava and Vienna to the southwest. From the site in the area of the urnfield rampart in Stillfried there is a good view to the east. It is situated a few hundred meters westwards from the precipice of the Weinviertel hills to the March valley. The geographical position of this area between the Southern Moravian sites in the north, Moravany in Slovakia in the East and the Gravettian sites in the Wachau valley is important for a comparison of the settlement structures in a bigger regional context (Fig. 2).

As to the climate at present there are only data from the excavation at Grub/Kranawetberg. The results of the analyses might also be applied to Ollersdorf/Heidenberg which seems to have been occupied during the same period according to first radiocarbon dates. Sediment samples from Grub/Kranawetberg contain predominantly mollusc species living in cold or preferably cold climate. This suggests a cold climate and an environment with some bushes and trees (ANTL-WEISER, FLADERER, PETICZKA, STADLER & VERGINIS 1997). Some species are adapted to warm as well as to cold climate. At present there is only one species from Grub/Kranawetberg which prefers warmer climate. According to F. Stadler (ANTL-WEISER, FLADERER, PETICZKA, STADLER & VERGINIS 1997) this might indicate warmer climatic conditions shortly before the deposition of the cultural layers or the beginning of warmer conditions. With regard to Pavlov P. Haesaerts suggests a warmer phase around 25,500 y BP (HAESAERTS, BORZIAK,

CHIRICA, DAMBLON, KOULAKOVSKA 2004). A similar situation could be observed at Willendorf II where more favourable climatic conditions are prevailing during the deposition of layer 8 (HAESAERTS, DAMBLON, BACHNER, TRNKA 1996) Applied to the situation at Grub/Kranawetberg we can therefore expect slightly warmer climatic conditions at the beginning or shortly before the occupations.

### **Grub/Kranawetberg**

The excavations of the Natural History Museum Vienna started in 1993, after a vineyard had been uprooted. From 1993-1995 an area of about 90 m<sup>2</sup> characterized by deposits of big bones from mammoth and rhino was excavated. As the Palaeolithic layer does not follow today's inclination of the slope, parts of the deposits are disturbed by ploughing. In 1995 the investigation started in an area located 20 m to the east of these bone clusters. This area is characterized by a very high find density. Two hearths and several pits seem to be an evidence of dwelling structures in this place.

#### **2. The bone clusters**

The western part of the excavated area is characterized by clusters of mostly large bones. Remains from mammoth are predominating but there are also some specimen representing woolly rhino, reindeer, wild horse, giant deer, and wolf. Many of the faunal remains in this area are longer than 30 cm; the majority ranges between 5 and 30 cm. The southern parts of this dump zone were disturbed by the plough whereas the north was covered with 60 to 80 cm of loess. On the western border of the bone accumulation (Fig. 3) – but also partly beneath the big bones – there are traces of fire as reddish burnt sediment, ashes, charcoal and burnt bones. Some of the bigger bones show traces of burning on the downward facing surface.

In this area were only 23 lithic artefacts comprising five tools and various flakes. Raw materials are radiolarite and white patinated flint. Near the bones a big piece of red ochre and a perforated snail shell have been found. The perforation of the snail shell was produced by cutting. A radiocarbon analysis taken from charcoal dates this area: GrA-9062, 25,220 +/- 250 y BP. Lithic artefacts are too few and not typical enough for a chronological classification.

According to F. Fladerer (ANTL & FLADERER 2003) the frequency of large bones could be interpreted either as a primary butchery area at the death locations

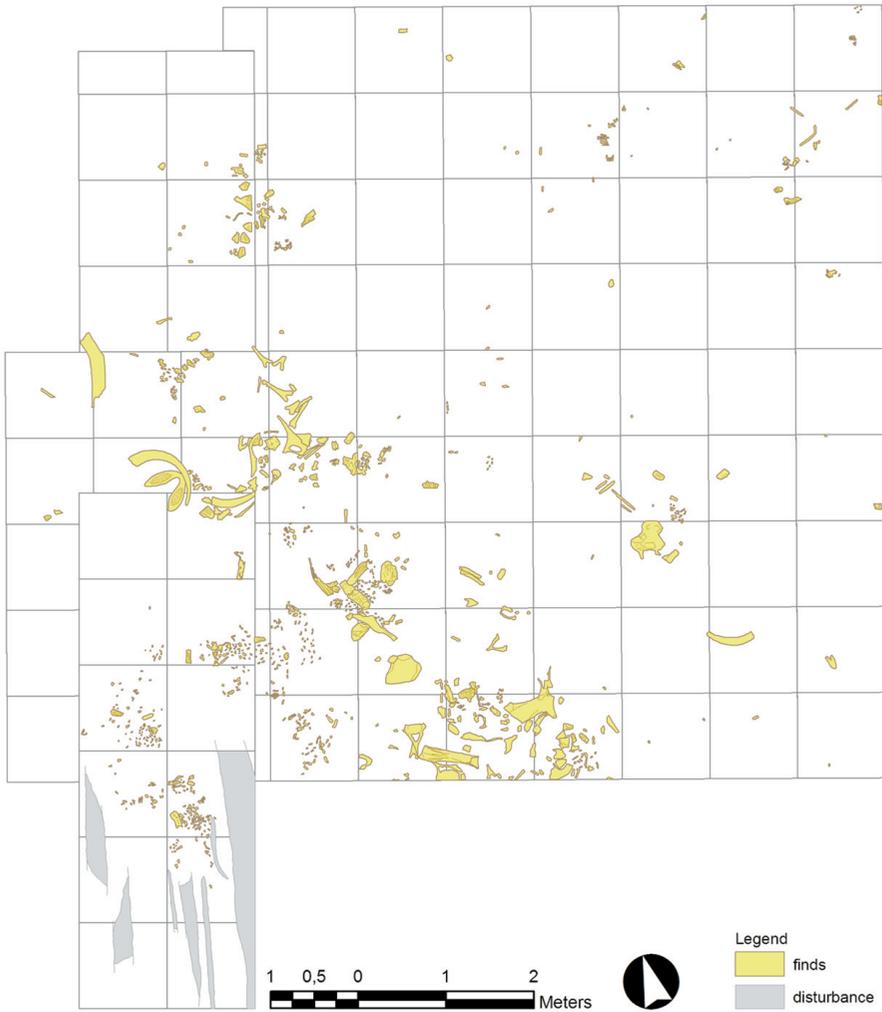


Fig. 3: Distribution of big bones in the dump zone, by Ph.R. Nigst

or as dumping area of transported parts of carcasses. Fladerer favours the second hypothesis where the carcass parts were deposited after advanced butchering. The crania of mammoths and woolly rhino and the pelvis parts indicate a near death location of these animals. The role of the fire in the formation of the bone clusters is still under investigation.

### 3. Dwelling Structures

In 1995 the western margin of a dwelling structure was found approximately 20 m east of the dump zone. The dwelling structures are part of the first occupation of the place, the so called main layer. Above the main layer there are three more periods of use. The main layer as well as the first upper layer was built by at least two phases of use. The second and the third upper layer contain only a few scattered lithic artefacts and bone fragments. The distance between the main layer and the third upper layer is about 50 cm. The frequency of finds within all layers increases from southwest to northeast. Apart from the cultural layers there is a horizon with big pieces of charcoal approximately 3,50 m below surface and 20cm beneath the main layer there are in some places bone fragments in a very bad condition.

#### 3.1. Stratigraphy

In the area of the so called “dwelling structures” we face a multi-layered stratigraphy (Fig.4). At the bottom of the main layer there are pits (Fig. 5) of various types and the two hearths. Above this there is a cultural layer which increases from 8 cm in the west to approximately 20 cm in the northeast. The colour of this layer, called “the main layer” is light brown in the west of hearth I and northeast of hearth II changing to dark brown between the two hearths. In some parts this layer is separated into two horizons. Although this separation is not evident throughout the whole main layer it shows that the main layer is the result of at



Fig. 4: The archaeological sequence of Grub Kranawetberg near hearth II



Fig. 5: Cut through one of the supposed post holes

least two utilizations of the place. Around hearth II the surface of the main layer is characterized by an accumulation of bigger bones which partly haven't been covered by the loess deposit separating the main layer and the first upper layer.

About 8 cm above the main layer there is a second one – “upper layer” – which again intensifies from southwest to northeast. In its western part there are only scattered artefacts whereas there is a well distinguishable brownish cultural layer north-east of J 15. Above hearth II and especially north of it, the thickness of the upper layer increases up to 16 cm. In this layer no pits or hearths have been excavated so far. This first upper layer differs clearly from the main layer not only by its lighter colour but also by the choice of raw materials and the adornments. In the area above hearth II the upper layer is partly separated into two horizons.

In 2002 another horizon – the second upper layer – with scattered artefacts and animal bones a few centimetres above the upper layer was first recognized mainly in the area above hearth II. Among the finds are bone fragments, lithics and even adornments. A few scattered lithics and bone fragments were discovered even 50 cm above the main layer. A fragment of a mammoth tusk from G 11 could already be part of this third upper layer. Above this horizon there is a marked change of the loess structure (Fig. 4). This change is visible in the whole area east of hearth I.

At present we have radiocarbon dates of the charcoal horizon, the main layer, the first upper layer and also the second upper layer. All dates are charcoal samples.

These data illustrate that the main layer and the first upper layer of Grub/Kranawetberg have been deposited shortly one after the other. They show big differences as far as the choice of lithic raw materials and personal adornments are concerned. Gaps and faults show that these cultural layers have been affected by permafrost after the deposition.

Grub/Kranawetberg:	Charcoal horizon:	VERA	26,700 +/- 120 y BP
	Main layer/hearth I:	GrA-9066	24,830 +/- 230 y BP
	Main layer/post hole:	GrA-9065	24,930 +/- 240 y BP
	Main layer:	GrA-9063	24,620 +/- 230 y BP
	Main layer:	VERA 36	25,300 +/- 90 y BP
	First upper layer:	GrA-28,183	24,780 +/- 140 y BP
	First upper layer:	GrA-28,184	25,640 +/- 160 y BP
	First upper layer:	GrA-28,185	25,010 +/- 150 y BP

A correlation of the sedimentological sequences in the northern periphery of the dump zone (B1/B2) and in the west of the dwelling structures (S3 East 1996) suggests that both dump zone and the main and upper layers of the dwelling area might belong to the same period of occupations (PETICZKA & RIEGLER 2004).

During thirteen excavation campaigns almost 60,000 objects have been documented. The cultural layer contains several hundred modified stone tools, hundreds of blades and bladelets, thousands of flakes and innumerable chips smaller than 1 cm. The highest density of finds exists around hearth II in the northeast with approximately 2,000 objects per m<sup>2</sup>.

### 3.2 The main layer

The main layer is characterized by to hearths and a series of pits of different shape. Hearths and pits are dug into the ground from the bottom of the main layer. The main layer and the layers of both trough-shaped hearths show a repeated use of the site. Within this dwelling area we can distinguish areas of different activity. In the west there are traces of a dwelling structure, consisting of evident structures like small pits, the hearth and latent structures like the distribution of artefacts. The distribution of lithics west of hearth I shows a clear border effect (NIGST 2003). Outside of this border to the North, West and South there is not only an abrupt decrease of artefacts but also an end of the brown coloured cultural layer changing to a horizon with only scattered finds.

Inside the scatter of pits the cultural layer is light brown with plenty of red ochre, snail-shells collected as adornments, ivory beads and stone tools. There are only a few rather fragmented animal bones. The first hearth is surrounded by a series of pits. Between these structures in the west and a second hearth found in 2001/2002 we noticed a high density of stone tools, flakes and bone fragments

probably representing a central zone of activities. In this area there were no pits at all. Hearth II in the northeast is like the first one surrounded by small pits.

The majority of the lithics of the main layer are grey or white patinated. As to the raw material used for stone tools a certain quantity resembles material from Southern Moravian sources. There are also pieces of probably northern flint. Special raw materials are a piece of obsidian from Eastern Slovakia and some pieces of crystal rock. Ivory beads and pendants are exclusively found within this layer. But there are also perforated mollusc shells – mainly *Dentalium* a few items of *Melanopsis* and one piece of *Terebralium*.

The main layer is partly split into two horizons. All evident structures are found at the bottom of this layer. At the bottom of the pits frequently stones or bigger tools are found. The layer shows a clear inclination from southwest to northeast with a little depression around hearth II.

### 3.2.1 Settlement structure in the west around hearth I

The mould of hearth I in the west at the border of E9/E10/F9/F10 is 1,30 m long, 0,7 m wide and 10 cm deep. There are four layers of firing at that hearth: a red coloured bottom covered by a few centimetres of ashes followed by a horizon of charcoal and red horizons. These horizons are separated by thin layers of loess. The preserved ashes indicate that the hearth was protected from weathering, e.g. some sort of shelter or dwelling (NIGST 2003) existed. A bigger concentration of finds was documented around the hearth, then a slight decrease to the west followed by an increase of objects at a distance of 2 to 3 m from the centre of the hearth. The concentration of finds ends with a rather sudden decrease in density. Ph. Nigst showed in his analysis (NIGST 2003, 2004 a, 2004 b) that the distribution of artefacts suggests a barrier effect slightly outside the evident structures. At the periphery in the west 60 cm outside the suggested border of the dwelling the skull of a wolf was found.

### 3.2.2 Hearth II and surrounding pits

Hearth II at the border of M18/M19/N18/N19 is again a flat mould dug into the ground. Unlike hearth I the different phases of firing are not exactly one above the other but only overlapping to a great extent. In the area of the hearth II there were big bones of mammoth and rhino as well as worked pieces of antler. In this place main layer and upper layer come are very close. It is very likely that the bigger bones were still uncovered when the people from the occupations of the upper layers arrived.

The hearth is surrounded by many small pits. The first bigger pits have been documented in N17, N19, O18 and O19, M20. This area is characterized by many pieces of ivory, brown and red ochre, ivory beads and microgravettes – 28 microgravettes only in N17.

### 3.3. The upper layer

Concerning the raw material procurement a radical change took place between the occupation of the “main layer” and the “upper layer”. Within the upper layers most of the artefacts and flakes are made of brown to green radiolarites and hornstone. Radiolarites can be found in the Carpathian Mountains in the east or in the river gravels.

Rather thick pointed blades with steep Aurignacian retouching, end scrapers and retouched blades have been found. There are only few backed blades and bladelets. Tools from bone and antler are abundant in the northeast. The colour of the layer turns darker towards northeast. In this area the upper layer is partly split into two horizons which makes us think that the upper layer is also the result of at least two occupations.

Perforated shells of *Melanopsis* and shells of *Dentalium* were used as adornments. *Melanopsis* is more frequent in this layer than in the main layer. Finds are concentrated in the area above hearth II.

### 3.4. Lithic artefacts

Approximately 50% of the lithic artefacts from Grub Kranawetberg are already classified. A first list of types contains 630 modified pieces, 1180 unmodified blades and 821 unmodified bladelets. Most of the blades and bladelets are fragmented. There are also 22 cores and 58 burins spalls. As to the modified pieces the mentioned number certainly represents more than 50% of the modified material because tools especially backed bladelets and microgravettes have partly been selected during the excavation campaign for demonstrations. Among the stone tools backed pieces with 350 items are dominant. 281 are microgravettes, 22 microliths, a triangle and 46 backed bladelets. The microgravettes are between 2 and 4,5 cm long (Fig. 6). Due to their big number a division into different subtypes seems possible. Although analysis concerning the distribution of microgravettes and microliths has not yet been finished, a big concentration of backed pieces around hearth II is evident. The next big group of tools are blades and bladelets with late-

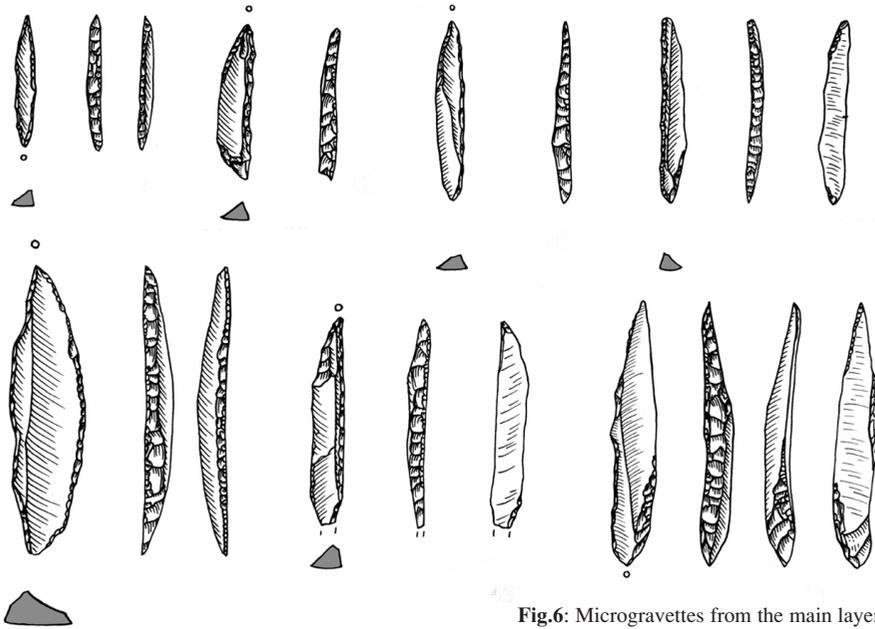


Fig.6: Microgravettes from the main layer

ral modification – 130 pieces. 14 blades show truncations combined with lateral modifications. End scrapers, burins and borers are distinctively less frequent. Apart from these there are several thousand flakes, cortical flakes, crested flakes, rejuvenation flakes and countless chips smaller than 1 cm.

### 3.5. Faunal remains

First results of zooarchaeological studies show remains from mammoth, rhino, reindeer, wild horse, arctic fox, arctic hare, wolf and wing parts of birds (ANTL & FLADERER 2003). Eggshells could also be identified at the periphery of the dwelling in the north and south. The faunal remains are dominated by fragments between 3 and 5 cm or smaller. On top of the main layer there are also bigger pieces especially above and around hearth II as a big limb bone fragment of rhino in M19 demonstrates. Mammoth specimens are dominating, followed by reindeer and wild horse. The most remarkable group of faunal remains are mammoth cortical splinters and rib fragments with spiral fractures and transverse stepped breaks. Arctic hare is especially frequent around the second hearth in the northeast. Faunal remains in the area of the dwelling structures are primary waste from

meals and handicraft, as well as secondary refuse from advanced butchery phases within a home base area (ANTL & FLADERER 2003).

### **3.5.1. Artefacts**

Despite many modified pieces there are only a few bone and ivory tools. The variety is also limited – points, spatulas, awls, fragments of pins and modified antler of reindeer. A series of ivory fragments show clear marks of modification. They are very frequent in the area of hearth II.

#### **3.5.1.1 Bone**

Clear tools made of bone are rare. Most of them are pointed instruments or fragments of spatulas. Fragments with cut marks some of them suggesting a use as support for cutting are more frequent. In the upper layer worked pieces of bone are especially concentrated in an area above hearth II.

#### **3.5.1.2 Antler**

Near hearth II there are many pieces of modified antler. Within the upper layer we found a haft made of antler in the same area. In both layers there are pieces of antler with cut marks: a notched piece of antler from the upper layer of M17, antler points in the main layer of M18 and N19 as well as an antler fragment in the main layer of N17.

#### **3.5.1.3 Ivory – beads, pendants, points, pins**

More than 170 beads and pendants of ivory have been selected from the remains got by wet sieving the sediment or have been documented in situ. Ivory beads and pendants never occur in the periphery of the living floor, but always in high density areas. They are exclusively distributed within the main layer. According to microscopic studies comparing ivory, antler and bone all carved adornments are made of ivory.

#### **Beads**

The assemblage of carved ivory objects from Grub Kranawetberg comprises different types of beads and pendants (ANTL-WEISER 1999) like beads with two heads, cylindrical beads with a notch all around the centre of the bead, beads with two heart-shaped heads, different varieties of perforated beads, and pendants shaped like the canine tooth of deer, or basket shaped pendants, a big perforated spherical pendant and another one resembling a pin (Fig. 7).



Fig. 7: The variety of adornments at Grub Kranawetberg

Up to now there are no remains which can undoubtedly be attributed to the production of beads. Therefore only the traces on the beads itself can be analyzed. A certain number of cylindrical beads (diameter of 2 to 2,5 mm) show clear traces of separation possibly from a notched bar.

Most of the perforated beads probably parts of drop shaped beads are fragmented. In general only the upper part is preserved. The length of these perforated heads varies from 4 to 5 mm. The perforation was carried out from both sides of the piece. There exists only one lower part of a perforated drop shaped ivory bead. It can be compared to beads from Southern Moravia (KLIMA 1997) and Germany (SCHEER 1985).

There are also a few complete perforated beads with central perforation and a curved longitudinal section. As they are clearly different from most of the perforated fragments it is rather unlikely that the fragments are parts of this type of perforated beads.

### Pendants

The pendants are single pieces of entirely different types. One pendant (length 22 mm) possibly used as a sort of button resembles the beads with two heads but is distinctly bigger than all of these. Another pendant is similar to basket shaped beads although its corpus is thinner than that of the typical basket shaped beads.

The perforated part shows clear traces of use.

The pendant shaped like the canine tooth of a deer is almost complete. There are clear traces of use at its back. A comparison between a real canine tooth from Gudenushöhle, Lower Austria (Magdalenian) and the pendant from Grub/Kranawetberg lets us think that this pendant might be an intentional copy of a canine tooth of a deer.

Another type of adornment is a pointed pendant with perforation (length 25,5 mm). Near the perforation this unique flat pendant (thickness 1 mm) is 6 mm wide. In 2005 one half of a spherical pendant with central perforation was found near hearth II.

Apart from the adornments there are also 35 fragments of pins which have been found in areas with a high density of finds. Their thickness varies from 1 to 4 mm but 40% of them are between 2 and 2,5 mm thick. Other artefacts made of ivory are a few points and a small plate. Within the main layer there are many small ivory fragments but also bigger pieces of ivory with cut marks. Many of them are located around hearth II but there are also bigger pieces at the periphery.



Fig. 8: Modified mollusc shells



Fig. 9: Perforation achieved by abrasion on a shell of *Melanopsis*



Fig. 10: Perforation achieved by cutting on a shell of *Terebralium*

#### 3.5.1.4. Mollusc adornments

Approximately 100 pieces of *Dentalium* and perforated shells of molluscs were used as adornments. *Dentalium* is wide spread in both layers. Shells of *Melanopsis* with holes are more frequent in the upper layer. As the pieces are often in a poor condition it is difficult to decide whether the holes are natural or artificial. On some mollusc shells clear cut marks (Fig. 8) have been detected. In some cases holes seem to have been achieved by abrasion (Fig. 9). One piece of *Terebratium* shows a hole achieved by cutting (Fig. 10). The mollusc shells are supposed to have been collected from old marine sediments of the region.

#### 3.5.1.5. Bird bone filled with red ochre

Red and brown ochre are abundant in the main layer. There are special concentrations near the hearths and in the area M12, M13 and N13. The size of the pieces varies from small grains of 1 mm to pieces of 6 cm. Graphite is rather rare, bigger pieces like those of red ochre haven't been found yet.

In 2005 a tubular bone filled with red ochre was detected in N13. According to F. Fladerer it is a tubular bone of a bird. The concentration of red ochre inside this bone cannot be explained by the partly high concentration of red ochre in this area. Although the tubular bone was full of red ochre inside there were no traces of red ochre outside (Fig. 11).



Fig. 11: Tubular bone with traces of red ochre inside

### 3.6. Human remains

Apart from the fauna and the remains of human activities we found two heavily eroded human tooth fragments. Both were found during wet screening of sediment taken from an area near hearth I and can be clearly classified as tooth fragments of early *Homo sapiens*. One of the fragments is a deciduous left lateral upper incisor and the other a deciduous right first lower molar. Due to the characteristic shape and size, as well as the degree of abrasion, both teeth could have belonged to one single individual, a 5 to 6 year old child. This interpretation is also consistent with their stratigraphical position (ANTL-WEISER & TESCHLER-NIKOLA 2000-2001).

### **3.7. Current state of analysis**

As the analysis is still in progress we can only present first results concerning the character of the site. The geographical position near the river is typical for base camps of the Early Gravettian (Pavlovian) (SVOBODA 2000). As far as the main layer is concerned the choice of raw material indicates relations to the Pavlovian sites in Southern Moravia. The settlement structures with numerous pits have also parallels in Southern Moravia and at Krems Wachtberg (EINWÖGERER, HAENDEL 2008). Contacts to the east become evident through the piece of obsidian from Slovakian resources. Settlement structures and the intensity of finds indicate a longer period of use of the site.

The large assemblage of pendants and beads from Grub/Kranawetberg shows a great variety with 10 different types. When we try to find similarities to the adornments of Grub/Kranawetberg the closest parallels to the double headed beads are among the material of the Pavlovian sites of Southern Moravia. Double headed beads are also known from Kostenki IV (ABRAMOVA 1995) which leads us more to the east. There are no parallels to the beads from Kranawetberg in Austrian sites so far. The ivory beads from Willendorf and Krems/Wachtberg are different types.

If we have a look at the tools the current type list from Grub/Kranawetberg showing a big quantity of microgravettes and microliths this seems to correspond to the microlithic facies of Gravettian stade II according to Otte and Noiret (OTTE & NOIRET 2004). Chronologically the radiocarbon dates from Grub/Kranawetberg overlap the very end of stade II (Pavlovian) and the beginning of stade III (Willendorf-Kostenkian) of the Gravettian evolution in Central Europe after M. Otte. From surface collections we have a single notched backed point indicating that we can expect occupations at Grub/Kranawetberg which can be attributed to the Willendorf-Kostenkian.

## **4. Ollersdorf/Heidenberg**

In 1997 a series of hearths and a big quantity of well preserved faunal remains have been detected during salvage excavations at Ollersdorf/Heidenberg. A flat mould in the north of the cultural layer was packed with bones. Among them reindeer and pieces of antler were dominant. Like at Grub/Kranawetberg there seems to be at least a second occupation (Fig. 12). The raw material of stone tools resembles the main layer of Grub/Kranawetberg whereas the stone industry is domina-

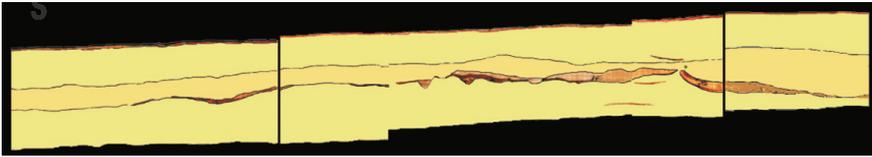


Fig. 12: The archaeological layers at Ollersdorf/Heidenberg 1997



Fig. 13: Rescue excavation at the site Ollersdorf/Heidenberg



Fig. 14: The archaeological layers of Ollersdorf/Heidenberg, rescue excavation 2007

ted by unretouched blades and bladelets, burins and borers. From the chronological point of view the dates for the occupation at Ollersdorf/Heidenberg lies within the scattering of the Kranawetberg dates.

Cultural layer: VERA 366 – 25,450 +/- 90 y BP.

In 2007 another salvage excavation was carried out only a few metres to the east of the 1997 excavation. As the earthwork was already finished when the layers had been detected by a local collector we could only document the stratigraphy as well as two small stripes parallel to the pipeline (Fig. 13). This time two clear separate layers with 10 to 15 cm of loess between them could be observed (Fig. 14). Within

the lower layer which showed a soft elevation in the middle of the excavated part declining to the north as well as to the south from this point there were numerous bone fragments from wild horse, reindeer and a few pieces of mammoth. We also found there a modified piece of the antler of a reindeer, many stone tools, most of them unmodified bladelets, a series of cores and burins and again not a single

backed piece. The biggest concentration of finds could be observed at the soft elevation.

Within the upper layer there were only few artefacts. The whole layer was characterized by traces of firing, charcoal and red colour of



Fig. 15: Perforated shell of glycymeris

the sediment. Among the finds there was a perforated mollusc shell (Fig. 15).

About 60 m to the south at the precipice to the Marchfeld a second concentration of finds could be observed. There were only a few artefacts and traces of fire. The layer was situated only half a metre below the surface.

Altogether the sites in this region promise interesting insights into cultural processes at the beginning of a period with changing climatic conditions possibly leading to changes concerning subsistence strategies and finally to a shift of population towards the East of Europe.

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