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Willendorf II

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Zusammenfassung

Der Artikel führt durch 100 Jahre Forschungsgeschichte und bringt erste Ergebnisse der Ausgrabungen 2006 und 2007.

Eine detaillierte Diskussion der Stratigraphie gibt Einblick in die klimatischen Bedingungen und die Umwelt der Fundschichten von Willendorf II. Ein besonderes Augenmerk wird auf die Technologie der archäologischen Horizonte (AH) des frühen Jungpaläolithikums (2-4) gelegt.

Mithilfe der Ausgrabungen 2006 und 2007 konnten die früheren Grabungen Sombathys, Obermaiers, Bayers und Felgenhauers lokalisiert und neue Details der Schichtenfolge untersucht werden.

Abstract

The article presents an abstract of 100 years of research at Willendorf as well as first results of the excavations in 2006 and 2007.

A detailed discussion of the stratigraphy gives an insight into climatic and environmental conditions of the Willendorf II sequence. A special focus is made on the lithic technology of the Early Upper Palaeolithic archaeological horizons (AH) 2-4. The excavations of 2006 and 2007 helped to locate the previous excavations of Sombathy, Obermaier, Bayer and Felgenhauer and also provided new details of the archaeological sequence.

Keywords: Aurignacian, history of research, stratigraphy, Early Upper Palaeolithic lithic technology, typology

1. Site location

Willendorf II is located in the Danube valley, about 80 km west of Vienna (Fig. 1 and 2). The next towns are Melk, 12 km to the southwest, and Krems, 18 km to the northeast. This part of the Danube Valley is called Wachau. It is deeply cut into the Bohemian Massif, which dates back to the Paleozoic. The eastern bank of the Danube Valley is formed by cliffy and steep slopes. The western bank shows flatter slopes because of the loess accumulation in the lee of the dominating winds from the west. Further, large alluvial fans, formed by streams from the hinterland (e.g. Willendorfer Bach) transporting large amounts of material into the Danube Valley, are recognised on this western bank.

The deposits of the site Willendorf II are lying on top of a lower terrace of the Danube. The Palaeolithic layers are found in the upper half of the about 20 m thick deposits.

The site is part of the Willendorf site cluster, a total of 8 sites are known: Willendorf I, Willendorf I North, and Willendorf II to VII (Fig. 3).



Fig. 1: Map of Central Europe, location of Willendorf is indicated in red (Graphic: Philip R. Nigst)

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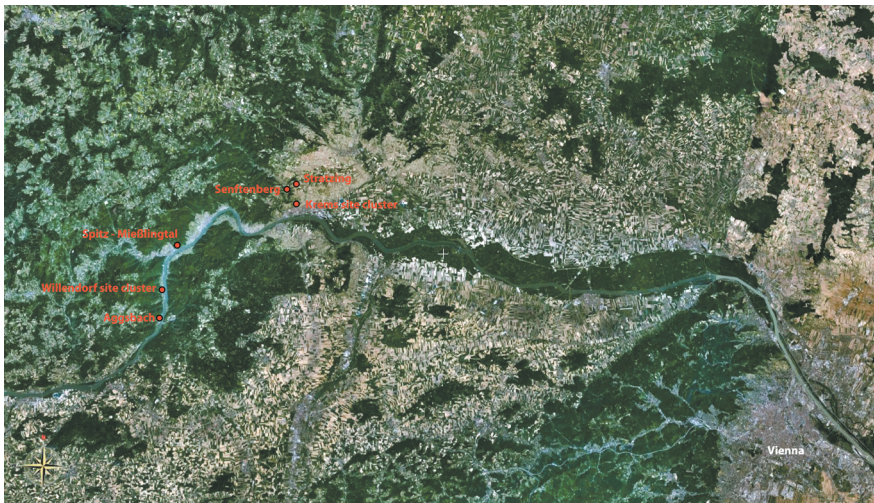


Fig. 2: Satellite image of Eastern Austria, selected Palaeolithic sites are marked (satellite image: NASA WorldWind; Graphic: Philip R. Nigst)

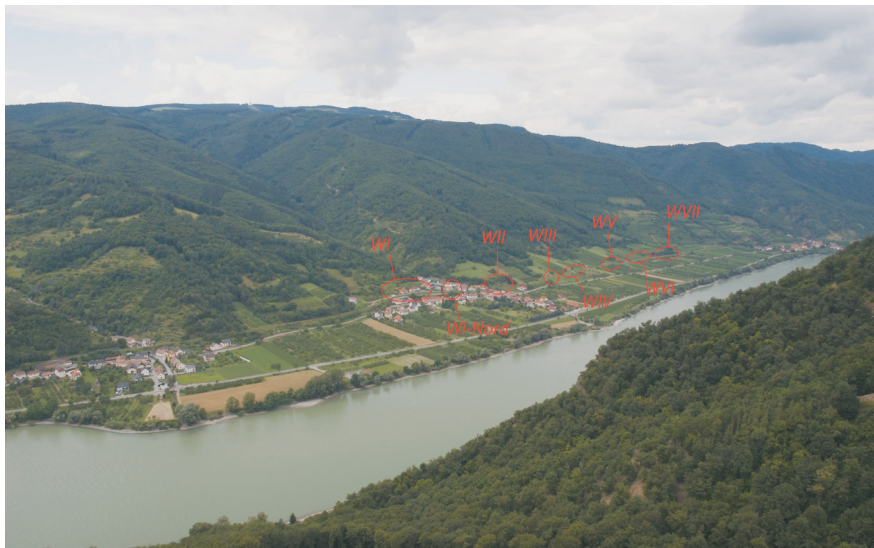


Fig. 3: View of Wachau valley in the Willendorf area, view from southeast. Indicated in red are the sites Willendorf I (WI), Willendorf I Nord (WI-Nord), Willendorf II (WII), Willendorf III (WIII), Willendorf IV (WIV), Willendorf V (WV), Willendorf VI (WVI), and Willendorf VII (WVII). (Photo: T. Bence Viola, Graphic: Philip R. Nigst)

2. History of research

2.1 Field work prior to 2005

The first mention of Willendorf II as an archaeological site goes back to 1889. Ferdinand Brun was the first to report archaeological finds from Willendorf II. At that time a brickyard (Ziegelei Ebner) was located on the eastern fringes of the site, slowly destroying the site from the east. In 1907, during more extensive work at the nearby site of Willendorf I, Matthäus Much excavated for a few days in the brickyard (at Willendorf II). The finds of this collection were not attributed to different layers and are nowadays a part of the study collection of the Institute for Pre- and Protohistory of the University of Vienna.

After 1907 the construction of the railway in the Danube valley started. These earthworks resulted in a series of new sites in the Danube valley, among them Willendorf I Nord, Willendorf II, and Willendorf III to VII. From May to July 1908 Hugo Obermaier and Josef Bayer visited the railway construction sites almost daily and tried to document the layers and collect the artefacts.



Fig. 4: View of Willendorf I, I-North, and II from the eastern bank of the Danube. (Photo: J. Szombathy; © Archive of the Department of Prehistory, Museum of Natural History, Vienna; nr. 4777)

On 29th July 1908 the first excavation at the site Willendorf II was started. By this time a significant part of the site was already destroyed due to the brickyard and the railway construction, so that the excavation had to concentrate on the western, still preserved part of the site. The excavation was directed by Josef Szombathy (Museum of Natural History, Vienna). Hugo Obermaier and Josef Bayer served as site supervisors. During that first excavation more or less the whole sequence has been exposed and sampled for the first time. Archaeological horizons 1 to 7 (1, 2, 3, 4, 5, 6a, 6b, 6 and 7) have been identified. The whole excavated area was about 8 to 10 meters wide and about 20 meters long. As soon as they reached the archaeological layers so-called “Grabungsmesser” (excavation knives) were used instead of spades and shovels. The sediment was carefully scraped away with these Grabungsmesser in thin layers/horizons. The most important and most famous object ever found in Willendorf II is the Venus I figurine, which was found on 7th August 1908. This first excavation campaign at the site lasted until September 1908 (Fig. 6).



Fig. 6: Willendorf II, 7th August 1908: discovery of the Venus I of Willendorf. The standing person is J. Bayer, standing at the findspot of the figurine (Photo: J. Szombathy; © Archive of the Department of Prehistory, Museum of Natural History, Vienna; nr. 4796)



Fig. 7: Willendorf II: excavation 1908 viewed from the east (Photo: J. Szombathy; © Archive of the Department of Prehistory, Museum of Natural History, Vienna; nr. 4785)

The second excavation (19th April to 5th July 1909) was directed by Josef Szombathy. Josef Bayer was responsible for the site supervision. J. Szombathy's goal was to explore the lower levels and therefore the so-called deep-sounding was done during this excavation campaign. They also exposed further surface in AH 4 to 9.

In 1912 J. Szombathy excavated east of the railway tracks in the area of the old brickyard. He explored the potential for further excavations in this area of the site through three test trenches, reaching a maximum depth of 6 meters below the base of the brickyard.

J. Bayer continued the fieldwork in Willendorf II from 1913 onwards. In 1913 his team excavated north of the 1909 excavation area and additionally they placed two test trenches on the slope directly above the site to explore the potential to recover the intact AH further up on the slope.

After a break of some years J. Bayer started to continue his excavations in Willendorf with a small scale test trench in 1926. In 1927 he directed excavations in an area north of the 1913 trench. During this excavation campaign the Venus II figurine has been discovered.

In the 1950s new research at the site began with a test trench by Fritz Felgenhauer in May 1955. This test trench was located east of the railway tracks and the goal was to explore the potential to find undisturbed AH there. In September 1955 F. Felgenhauer excavated west of the railway tracks in the area of the 1909 to 1927 fieldwork (Fig 8). The first task during this campaign was to make a trench in order to get a long profile of the archaeological horizons. This trench was 25 meters long and up to 3 meters deep. It was located parallel to the old western section. It cut through several archaeological horizons (layer 3 to 5). No map published by Felgenhauer shows the exact location of the trench. After finishing the “profile trench” F. Felgenhauer’s team excavated an area of approx. 10 x 20 meters. There he excavated the remaining parts of AH 4 to 9, but only small parts of AH 3.

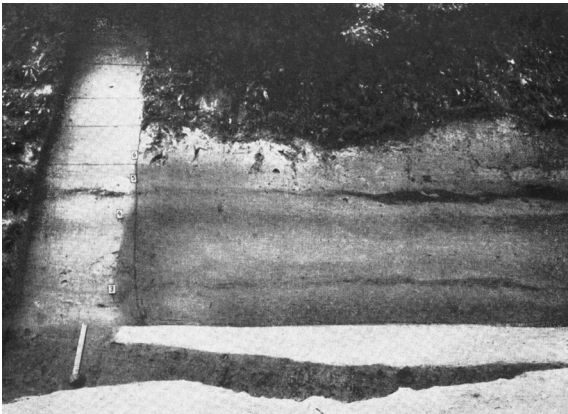


Fig. 8: Willendorf II: excavation 1955, main section (after: FELGENHAUER 1959)

After the end of Felgenhauer’s excavation severe destruction was done to the site through different agents (probably mainly playing and digging children).

In 1981 Paul Haesaerts (Royal Belgian Institute of Natural Sciences) started his work in Willendorf II. His team cleaned a small section and took a

number of samples. It was the first stratigraphic work on Willendorf II utilizing modern methods. The results including a first set of ^{14}C -dates of the whole sequence were published (HAESAERTS 1990b).

About 10 years later, in 1993, Paul Haesaerts, Freddy Damblon (Royal Belgian Institute of Natural Sciences), and Gerhard Trnka (University of Vienna) started a collaborative research program on Willendorf II in order to enlarge the 1981 section and to collect more well provenienced samples for dating and palaeo-environment reconstruction (Fig. 9). The results of this analysis form the basic description of the sequence up to now (for details see HAESAERTS, DAMBLON, BACHNER & TRNKA 1996).



Fig. 9: Willendorf II, section cleaning 1993 (Photo: G. Trnka)

In 1996 the local museum society wanted to protect the section left by Paul Haesaerts' team with a wooden roof construction and clean the section. The cleaning of the section was done by a team around Spyridon Verginis (University of Vienna). In the course of this work Verginis' team removed sediment between 5 and 30 cm from Paul Haesaerts' section and collected a number of samples. These results are not yet published.

2.2 Field work since 2005 – The Willendorf Project

The discussion about timing and nature of the transition from Middle to Upper Palaeolithic and the replacement of Neanderthals by modern humans centres on the age of the early Aurignacian and its relationship to the transitional and Early Upper Palaeolithic industries. As a major contribution to this discussion, the Willendorf Project focuses on the dating and the depositional context of Willendorf II, one of the key sites of the Early Upper Palaeolithic in Central Europe. The project was initiated by Ph. R. Nigst and T. B. Viola in 2005. Today it is directed by Ph. R. Nigst, T. B. Viola and G. Trnka. The project is funded by the Leakey Foundation (San Francisco), the Hugo Obermaier Society (Erlangen), the Hochschuljubiläumsstiftung (City of Vienna), the Department of Human Evolution (Max-Planck-Institute for Evolutionary Anthropology, Leipzig), and the University of Vienna. It is supported with equipment by the Prähistorische

Abteilung (NHM Vienna). The Museumsverein Willendorf and the Marktgemeinde Aggsbach help in various ways.

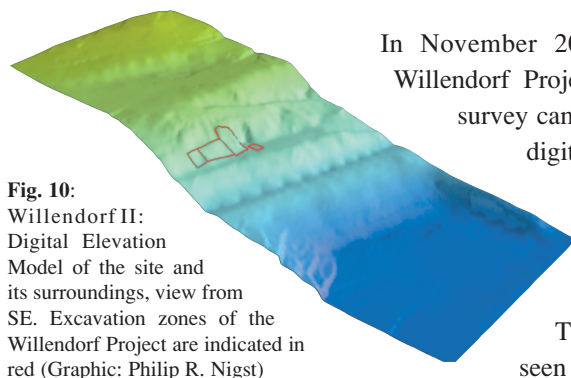


Fig. 10:
Willendorf II:
Digital Elevation
Model of the site and
its surroundings, view from
SE. Excavation zones of the
Willendorf Project are indicated in
red (Graphic: Philip R. Nigst)

In November 2005 the fieldwork of the Willendorf Project started with a geodetic survey campaign in order to produce a digital elevation model (DEM) of the central site area. Since then the DEM is enlarged during the excavation campaigns. The resulting DEM can be seen in Fig. 10.

In 2006 and 2007 three excavation campaigns were conducted. The first excavation campaign in 2006 (August to September 2006) had the general aim to sample the entire sequence of the site adjacent to the existing section which was produced during P. Haesaerts' and G. Trnka's fieldwork with excavation zone 01 and to test with two more zones (02 and 03) the preservation of the lower deposits at the site.

The August and September 2007 excavation continued work in the excavation zones 01 and 03, and connected them by starting to excavate in zone 04. The December 2007 excavation was necessary to install dosimeters at the site for the ongoing TL dating attempts.

2.3 Analyses and publications

The original excavators (Josef Szombathy, Hugo Obermaier and Josef Bayer) planned quite early a monographic publication of the Willendorf II site and their work (unpublished documents in the Document Archive of the Department of Prehistory, Museum of Natural History; see also FELGENHAUER 1959). This publication project has never been realized. Quite early first site reports were published (SZOMBATHY 1909). No one of the three excavators ever published a detailed analysis of the excavated materials.

In the 1950s Fritz Felgenhauer further excavated the northern part of the site. Subsequently he studied the lithics of his excavation and the old excavations.

Additionally E. Thenius analyzed the faunal remains and F. Brandtner conducted geological studies. The monography of F. Felgenhauer (1959) has been for long the reference publication of the site and its collection.

G. Laplace and A. Broglio studied the Willendorf II collection in the framework of their work on the Aurignacian and Gravettian of Central Europe (BROGLIO & LAPLACE 1966 a, 1966 b). J. Hahn studied the Aurignacian AH 3 and 4, as well as the EUP AH 2, and AH 1 in the framework of his PhD thesis research on the Aurignacian in Central and Eastern Europe (HAHN 1970). This work was published in 1977 (HAHN 1977). It is still the reference publication for the AH 1 to 4 of Willendorf II.

M. Otte analyzed the Gravettian layers 5 to 9 for his PhD on the Gravettian of Central Europe. This work (OTTE 1981) is the reference publication on the upper AH of Willendorf II.

The collections have been studied by numerous researchers and a number of interesting publications arose from these studies, but for a matter of space we can not list all of them here.

The geological work at the site was renewed by P. Haesaerts in the course of his field work. He published all new geological data and radiocarbon dates. Prior to the start of the Willendorf Project in 2005 all up-to-date stratigraphic, geological, and chronostratigraphic information rested on his publications (DAMBLON, HAESAERTS & VAN DER PLICHT 1996, HAESAERTS 1990 b, HAESAERTS et al. 1996, HAESAERTS & TEYSSANDIER 2003).

More recent work on the lithic collections includes N. Teyssandier's PhD thesis research (TEYSSANDIER 2003, 2005). The PhD thesis research of Ph. R. Nigst (NIGST 2004, 2006) includes much more objects than all previous studies, because additional lithic objects were found in the cellar of the Museum of Natural History (Vienna). These are mainly lithics originating from the 1908 and 1909 excavations, which have been stored in a wooden transport box of the 1908/09 excavations. For AH 3 the number of objects raised from 48 to 500 (NIGST 2006, 2004) (Table 1). A detailed analysis of AHs 2, 3, and 4 is in preparation (Ph. R. Nigst's PhD thesis). The Gravettian AHs 5 and 6 have been recently studied by L. Moreau in the framework of his PhD thesis research (MOREAU, 2007). Additional, unpublished lithic material from the 1908 and 1909 excavations from AH 5 (L. Moreau & Ph. R. Nigst) and AH 9 (W. Antl-Weiser) is currently being analyzed.

Table 1: Willendorf II-AH 3: number of objects per inventory

inventory	number
old inventory Museum of Nat. Hist., Vienna (1908/09 excavations)	48
Felgenhauer excavation 1955	100
Wooden box (1908/09 excavations)	352

The human remains of Willendorf, a femur fragment from Willendorf I and a mandibular symphysis fragment from Willendorf II-AH 9, were first described by W.

Ehgartner (in: FELGENHAUER 1959). More recently, they have been described in detail by TESCHLER-NICOLA & TRINKAUS (2001).

3. Stratigraphy

After the first site descriptions by J. Szombathy, H. Obermaier and J. Bayer, the basic stratigraphic system has been established for Willendorf II by F. Brandtner (in: FELGENHAUER 1959) during the 1955 fieldwork directed by F. Felgenhauer. The system presented here is the one described by P. HAESAERTS et al. 1996. (See also HAESAERTS 1990 b, HAESAERTS, BORZIAK, CHIRICA, DAMBLON & KOULAKOVSKA 2004, HAESAERTS & CAHEN 1997, HAESAERTS & TEYSSANDIER 2003). Additional information comes from archaeological studies (FELGENHAUER 1959, HAHN 1977, NIGST 2004, 2006, NIGST et al. 2008, OTTE 1981, 1991). We are still working on the data and information from the new excavations, which will be presented during the meeting in November 2008 in Vienna.

The sequence (Fig. 11) consists of six loessic and loamy bodies lying on top of a low terrace of the Danube. The lower half of this sequence consists of two generations of pale yellowish loess (units G and E) separated by a reddish brown partly reworked paleosol (unit F). At the excavation area, only the upper half of the sequence corresponding to units D, C and B could be recognized, following up the loess of unit E, which represents the early pleniglacial.

Stratigraphic unit (SU) D consists of a 2,5 to 3,0 m thick stony heterogeneous brownish loam, characterized in its upper part (sub-SU D1) by a distinct polyhedral pedality, abundant biogalleries filled with carbonates and rather numerous scattered fragments of conifer charcoal. The latter was dated between 41,700 and 39,500 y BP (see table 2), the oldest age being the most probable as present day rootlets were observed.

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lithological unit	archaeological horizon	lab. no.	14C age	1 sigma	material	weight (in g)	literature
B1	9	GrN-21898	23860	270	long bone, brown part (fract. 1)	> 50.00	Haesaerts et al. 1996
B1	9	GrN-22208	24370	290	long bone, brown part (fract. 2)	> 50.00	Haesaerts et al. 1996
B1	9	GrA-5006	24910	150	long bone, white part	32.00	Haesaerts et al. 1996
B1	9	GrA-5005	23180	120	mammoth scapula	26.90	Haesaerts et al. 1996
B1	8a	GrA-893	23200	140		0.11	Haesaerts et al. 1996
B1	8a	GrA-493	23400	190		0.59	Haesaerts et al. 1996
B1	8a	GrA-494	23670	120		0.59	Haesaerts et al. 1996
B2	8	GrA-917	22180	190	collagen extr.	0.031	Haesaerts et al. 1996
B2	8	GrA-894	24710	180		0.84	Haesaerts et al. 1996
B2	8	GrN-17801	25230	320		3.67	Haesaerts et al. 1996
B2	8	GrN-17802	25660	350		3.35	Haesaerts et al. 1996
B2	8	GrN-21690	25400	170	bones	> 50.00	Haesaerts et al. 1996
B2	8	GrN-20767	25440	170	bones	> 50.00	Haesaerts et al. 1996
B2	8	GrN-11191	25800	800		-	Haesaerts 1990
B3	-	GrA-491	23830	200	charcoal	0.28	Haesaerts et al. 1996
B3	-	GrA-492	23990	130	charcoal	0.28	Haesaerts et al. 1996
B4	6	GrN-17803	27600	480	charcoal	2.28	Haesaerts et al. 1996
B4	6	GrN-20768	26500	480	charcoal	2.15	Haesaerts et al. 1996
B4	6	GrA-1016	26150	110	charcoal	2.15	Haesaerts et al. 1996
B4	6	GrA-895	27620	230	charcoal	0.90	Haesaerts et al. 1996
C1	-	GrN-17804	28560	520	charcoal	5.00	Haesaerts et al. 1996
C2	5	GrN-11194	23830	190	humus	-	Haesaerts 1990
C2	5	GrA-218	27270	290	charcoal	0.71	Haesaerts et al. 1996
C2	5	GrN-11193	30500	900-800	charcoal	-	Haesaerts 1990
C2	5	H-246/231	32000	3000	charcoal	-	Felgenhauer 1959
subunit C4	4	GrN-1273	32060	250	charcoal	-	Hahn 1977
subunit C4	4	GrA-501	31210	260	charcoal	0.74	Haesaerts et al. 1996
subunit C4	4	H-249/1276	31700	1800	charcoal	-	Felgenhauer 1959
subunit C8	3	GrN-17805	38880	1530/-1280	charcoal	5.94	Haesaerts et al. 1996
subunit C8	3	GrN-11192	34100	1200/-1000	charcoal	-	Haesaerts et al. 1996
subunit C8	3	GrA-896	37930	750	charcoal	0.32	Haesaerts et al. 1996
subunit D1 mid.	-	GrN-11195	41700	3700/-2500	charcoal	-	Haesaerts 1990
subunit D1 mid.	-	GrN-17807	> 36000	-	charcoal	2.07	Haesaerts et al. 1996
subunit D1 up.	-	GrN-17806	41600	4100/-2700	charcoal	3.53	Haesaerts et al. 1996
subunit D1 up.	-	GrN-11190	39500	1500/-1200	charcoal	-	Haesaerts 1990
subunit D3?	1?	GrN-1287	30530	250	charcoal	-	Haesaerts et al. 1996

Tab. 2: Willendorf II: radiocarbon dates

The abundant molluscs preserved in sub-SU D1 are indicative of a rather mild climatic environment with some wooded parts near the site (FRANK & RABEDER 1994), and pedosedimentary characteristics evoke a rather humid climate with drier conditions at the end. This well expressed climatic episode probably centered around 41,500 y BP, also recorded in a similar position at Schwallenbach, was named the Willendorf Interstadial (HAESAERTS et al. 1996). Within the stratigraphic unit D, archaeological horizon 2 has been described during the old fieldwork in 1909. Since 2006 the fieldwork has attempted to relocate this archaeological horizon. The lithics have been described by several authors as undiagnostic, most probably Early Upper Palaeolithic (HAESAERTS & TEYSSANDIER 2003, HAHN 1977, NIGST 2006, TEYSSANDIER 2003), although most authors stressed the very low number of lithic artifacts. Recently, Ph. R. Nigst opened a wooden box with abundant, up to now unpublished debitage, which raises the lithics count to more than 1000 pieces. The analysis is currently being conducted.

Stratigraphic unit C is about 1,5 to 2 m thick and comprises a complex set of stratified pale yellowish, sandy loess (sub-SUs C3, C5 and C7), of bleached light grey horizons (sub-SUs C1, C6 and C9) and of three humiferous horizons (sub-SUs C2, C4 and C8).

The sub-SU C8 occurs in parts as brownish grey lenses stretched by solifluction and contains ash stripes with high concentration of charcoal. It contains the lithics and bones of archaeological horizon 3, which were described as Early Aurignacian (HAESAERTS et al. 1996, HAHN 1977, NIGST 2004, 2006, NIGST et al. 2008, TEYSSANDIER 2003). The second horizon (sub-SU C4) is less developed but almost in situ (in contrast to the sub-SU C8). Archaeological horizon 4 is located in SU C4. It was described as an Aurignacian with numerous carinated and nosed endscrapers. The upper humiferous horizon (sub-SU C2) is best expressed and occurs as a decimetric, dark brown layer slightly stretched by solifluction. The archaeological horizon 5 is located in this SU. The correlation of the archaeological horizons 3, 4 and 5 and these three distinct, dark coloured stratigraphic units has been observed by several excavators at the site (FELGENHAUER 1959, HAESAERTS et al. 1996, NIGST et al. 2008).

Altogether, stratigraphic unit C represents the upper part of the middle pleniglacial (between ca. 39,000 and ca. 26,000 y BP) and records a complex succession of climatic episodes. Sandy loess layers (subunits C7, C5, C3 and C1 pro parte) represent cold episodes, while bleached horizons (subunits C9, C6 and C1 pro parte) show characteristics of tundra gley indicating deep frost or permafrost conditions. The tundra gley of sub-SU C1 pro parte is most developed and occurs

as a marker at the boundary between the middle and the late pleniglacial (HAESAERTS 1990a). Moreover, the three humiferous horizons (subunits C8, C4 and C2) with archaeological horizons 3, 4, and 5 are related to interstadial episodes. This interpretation is in good agreement with the pedological characteristics and the malacological content (FRANK & RABEDER 1994). Taking into consideration the neighbouring section of Schwallenbach, where three well developed humiferous soils are preserved in a similar stratigraphic and chronological background, these three interstadial episodes were named Schwallenbach I (between 39,000 and 37,400 y BP), Schwallenbach II (around 32,000 y BP) and Schwallenbach III (around 30,500 y BP) (HAESAERTS et al. 1996).

Stratigraphical unit B represents the late pleniglacial loess cover, which shows evidence of a progressive trend towards a cold and dry climate (FRANK & RABEDER 1994, HAESAERTS et al. 1996). This loess caps the thick tundra gley C1 posterior to 28,560 y BP, overlain by Gravettian archaeological horizon 6, reworked by solifluction and dated to 26,500 and 26,100 y BP. On the other hand, Gravettian archaeological horizon 8, which occurs in the middle part of stratigraphic unit B in association with an incipient humiferous horizon (sub-SU B2), provided consistent ages between 25,800 and 25,230 y BP. Archaeological horizon 9 has no longer been observed in the fieldwork since 1981 (HAESAERTS, P. 1981, HAESAERTS, P. & TRNKA, G. 1993, NIGST, Ph.R., VIOLA, T.B. & TRNKA, G. 2006, 2007).

THE ARCHAEOLOGICAL SEQUENCE

(FELGENHAUER 1959, HAHN 1977, OTTE 1981, HAESAERTS et al. 1996, NIGST 2006, NIGST et al. 2008)

AH 9 | GRAVETTIAN (WILLENDORF-KOSTENKIAN)

Not present in 2006 excavation area and 19981/1993 section cleaning (excavated during pre-WWII field work)

AH 8a | GRAVETTIAN

This archaeological horizon was first recognized as a horizon of charcoals during the 1993 section cleaning (HAESAERTS et al. 1996). In the course of section cleaning and stabilization of the western section in 2006 we were able to collect a small lithic and faunal assemblage from this horizon.

Scattered finds forming a horizon in the upper loess cover (B1: pale yellowish

homogeneous loess).

AH 8 | GRAVETTIAN

Since 1908 AH8 has been excavated during several phases of fieldwork. In 2006 it was sampled during section cleaning and stabilization of western section in zone 01. The new collection consists of lithics, fauna, and charcoal.

This archaeological horizon is located in the SU B2, an approximately 5 cm thick continuous light brownish horizon, underlined by abundant traces of root-lets.

AH 7 | GRAVETTIAN

Not present in 2006 excavation area and in 1993 section (only documented during pre-WWII field work); the position is assumed in SU B3 (horizon of scattered charcoal in 1993 fieldwork).

AH 6 | GRAVETTIAN

Since 1908 AH6 has been excavated during several phases of fieldwork. In 2006 excavations sampled during section cleaning and stabilization of western section in zone 01. The new collection consists of lithics, fauna, and charcoal.

The archaeological horizon 6 is located in SU B4, comprising several thin lenses of pale grey loess.

AH 5 | GRAVETTIAN

Since 1908 AH5 has been excavated during several phases of fieldwork. In 2006 and 2007 fieldwork of the Willendorf Project the archaeological horizon 5 has been excavated in the excavation zones 01, 03 and 04, although the correlation between zones 01/04 and zone 03 is not without doubts due to the bad resolution and severe bioturbation in zone 03. Future fieldwork is necessary to clarify this issue. The new collection consists of lithics, some bones and charcoal.

Archaeological horizon 5 in zone 01 is documented in SU C2, which are dark brownish humiferous horizons with charcoal concentrations. They are up to 15 cm thick and partly stretched by solifluction and locally split in two subunits. In zone 03 and southern part of zone 04 the pedological/sedimentological characteristics are much less developed; lithics are more abundant in zone 03 than in zones 01/04.

AH 4 | AURIGNACIAN

The archaeological horizon 4 has been first described in 1908. The last exca-

vation in this horizon was done as part of F. Felgenhauer's fieldwork in 1955. In 2006 and 2007 this horizon has been excavated in zones 01, 03 and 04. The correlation of zone 01 and zone 03/04 is preliminary due to the bad resolution and severe bioturbation in zone 03. Charcoal is abundant and well preserved in AH 4.

Archaeological horizon 4 is documented in the SU C4, corresponding to a distinct period of soil development.

AH 3a | AURIGNACIAN ?

The archaeological horizon 3a is a new horizon, first described during the 2006 fieldwork and excavated on about one square metre on the border of zones 01 and 04 in 2007. If it corresponds to find horizons between the main AHs described in the 1908/1909 excavations, cannot be verified at the moment. The finds (abundant charcoal and one lithic) are undiagnostic.

AH 3 | AURIGNACIAN

Archaeological horizon 3 has been excavated for the first time during the 1908 and 1909 field work. Further excavation is documented for 1955, but only in a small area of the test trench (for details on the test trench see next chapter). In 2006 and 2007 the archaeological horizon 3 has been excavated in zones 01, 02, 03 and 04. The presence of the marker horizon of the border of Unit C (lower loess cover) and Unit D (loam) in all zones (01 to 04) is important for correlating the four zones.

Archaeological horizon 3 is documented in the SU C8. The new material includes abundant charcoal and a small number of lithics.

AH 2 ?

AH2 has been described during the 1909 fieldwork. It has not been excavated during the 2006 excavation. Its stratigraphic position has been identified during the 2007 excavations.

AH 1 ?

AH1 has been described during the 1909 fieldwork. It has not been reached during the 2006 and 2007 excavations.

4. The archaeological material from the archaeological horizons 1, 2, 3 and 4

4.1 Archaeological horizon 1

Archaeological horizon (AH) 1 was excavated in 1908 and 1909 and yielded three lithic artefacts and a certain number of unworked stones (manuports). The three artefacts are undiagnostic, so the exact chrono-cultural attribution remains questionable. For this part of the Willendorf II sequence, no radiometric or TL dates exist. AH 1 was not present in the new section and sedimentological analysis of P. HAESAERTS et al. 1996.

4.2 Archaeological horizon 2

AH 2, excavated in 1908 and 1909, contained more artifacts (fig. 12), but still too few for a secure chrono-cultural attribution. This assemblage was at times attributed to the Aurignacian (BROGLIO & LAPLACE 1966), the Bacho-Kirian (KOZLOWSKI & OTTE 2000) and the Early Upper Palaeolithic (TEYSSANDIER 2003, HAESAERTS & TEYSSANDIER 2003). As mentioned above, undiagnostic tools and a small assemblage make it difficult to verify the various attributions. Currently, P. Nigst is conducting a technological analysis of up to now unpublished lithics from the 1908/1909 excavations.

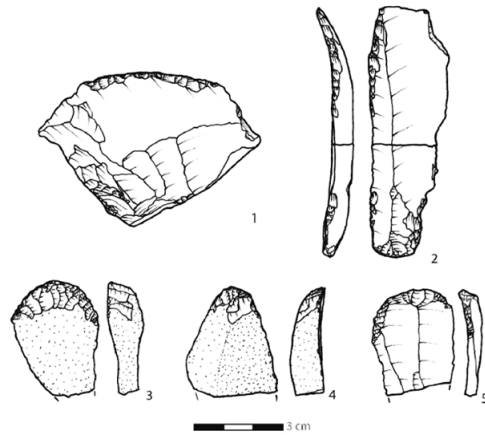


Fig. 12: Willendorf II, AH 2: Selected lithics. 1 side-scraper. – 2 retouched blade. – 3-5 end scraper. (redrawn after Nigst 2006)

4.3 Archaeological horizon 3

The assemblage of AH 3 was excavated in 1908, 1909, and 1955. The radiocarbon dates for this AH are in the range of 37/39 ka y BP. The lithics are interpreted as Aurignacian by most scholars (BROGLIO & LAPLACE 1966a, FELGENHAUER 1959, HAHN 1977, KOZLOWSKI & OTTE 2000a, 2000b, TEYSSANDIER 2003), although recently ZILHÃO & D'ERRICO (1999) have criticized this attribution. New analysis and additional lithics (see below) show that the assemblage can be attributed to the Early Aurignacian (NIGST 2006).

In the collection of the Prehistoric Department of the Museum of Natural History in Vienna, only 43 artefacts from AH 3 are in the inventories and published by F. FELGENHAUER (1959). These finds are the well-known assemblage of AH 3 that most scholars have attributed to the Aurignacian (BROGLIO & LAPLACE 1966, FELGENHAUER 1959, HAHN 1977, KOZLOWSKI & OTTE 2000). Additional finds were stored in a wooden transport box of the 1908/09 excavations in the cellar of the department. On 15th October 2003 the wooden box of the 1908/09 excavations was opened by the first author together with Walpurga Antl-Weiser. It contained abundant lithic debitage. In the inventories are additional finds originating from F. Felgenhauer's 1955 excavations, which are not analyzed. In total, there are now 500 stone objects and some bone fragments. Among the 500 stone objects, we can distinguish 490 lithics and 10 other worked or used stones/gravels, such as hammerstones (NIGST 2004, 2006).

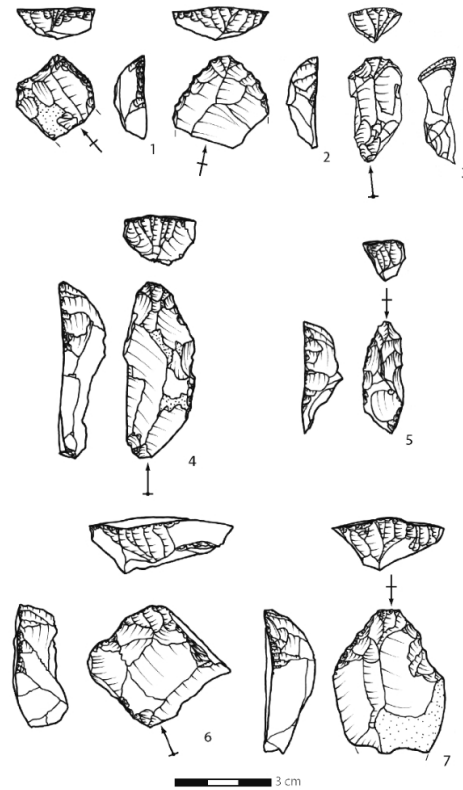


Fig. 13: Willendorf II, AH 3: Endscrapers. 1, 6, 7 nosed endscraper. – 2 single endscraper. – 3-5 carinated endscraper. (redrawn after Nigst 2006).

Typology

The modified lithics of the “old” assemblage were analyzed by several researchers (e.g., BROGLIO & LAPLACE 1966; FELGENHAUER 1959, HAHN 1977, TEYSSANDIER 2003, NIGST 2006). Among the “new” finds only a few, undiagnostic modified pieces are present, which hints at a selection during the old excavations in 1908/09. Typological studies show that the modified pieces consist of

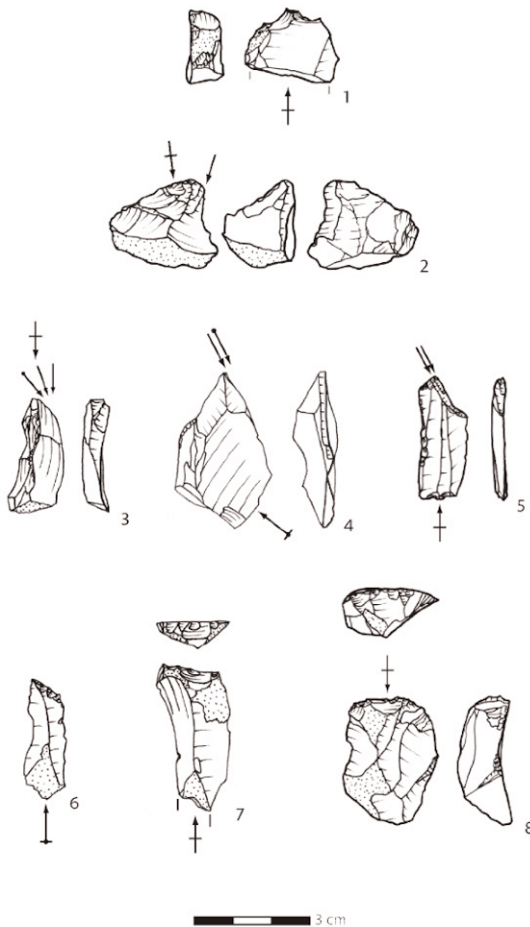


Fig. 14: Willendorf II, AH 3: 1 borer/bec. – 2-5 burin. – 6-8 truncated piece. (redrawn after Nigst 2006).

blanks are the second largest tool type group. They consist of partially retouched flakes and blades, as well as bilaterally retouched blanks. Among the burins (fig. 14/2-5), no chronologically significant types are present. Two dihedral burins and one burin on a flake were recognized. The only borer/bec among the finds was made on a flake blank (fig. 14/1). The three truncated pieces (fig. 14/6-8) were made on a flake, a blade, and a bladelet. Furthermore, there are two scrapers, for which a flake blank was utilized. The combination tool is a burin-truncation-lateral retouch combination.

single endscrapers, carinated endscrapers, nosed endscrapers, retouched blades and flakes, truncated pieces, burins, scrapers, one borer/bec and one combination tool (burin-truncation-edge retouch). The assemblage is dominated by endscrapers and laterally retouched pieces. The endscrapers (fig. 13) consist of single (n=5), carinated (n=4) and nosed endscrapers (n=4). Most of them were made on flake blanks. Especially carinated and nosed endscrapers were made on generally thicker flake blanks. The carinated and thick nosed endscrapers can be regarded as cores for bladelet production, although no bladelets from carinates are present. Laterally retouched

Technology

The technological signature (see NIGST 2006 for more details) of the assemblage shows three different reduction sequences for the production of (1) blades, (2) bladelets, and (3) thick flakes. The blade production is characterized by a unidirectional core exploitation. The cores are prismatic cores. Core preparation is evident from crested pieces, but also unprepared cores have been utilized, as “natural crests” on pieces with 100% cortex on the dorsal surface show. The unidirectional exploitation is evident from the dorsal scar patterning and the refitted sequences (see Fig. 15). The bladelet production is represented by the carinated and thick nosed endscrapper-cores. Unfortunately, there are none of these small bladelets (smaller than 20 mm in length) represented, which might be due to the excavation method in 1908. The third reduction sequence for the production of thick flakes cannot be demonstrated without any doubt, but some thick flakes show the utilization of hard hammer for detaching them. Some of these flakes have been used as blanks for the carinated and thick nosed endscrapers.



Fig. 15: Willendorf II, AH 3: refittend balde sequence. (Photographs: Ph. R. Nigst, © Prähistorische Abteilung, Naturhistorisches Museum, Vienna)

4.4 Archaeological horizon 4

The assemblage of AH 4 (excavated in 1908, 1909, 1913, 1927 and 1955) is larger than the rest of the assemblages from the “lower” AH’s with more than 2000 lithics. Additional lithics from the 1908/1909 excavations are currently being studied in the framework of P. Nigst’s PhD thesis. Radiocarbon dates are available and around 32–31 ka y BP. The lithic assemblage can be labeled as Aurignacian with abundant carinated and nosed endscrapers, most of them made on flake blanks (Fig. 16). Technologically, the inventory seems to be concentrated on the production of small bladelets (smaller than 20 mm in length) from the carinates as indicated by the majority of tools (see HAHN 1977, TEYSSANDIER 2003). Amongst the finds are also bladelets from carinated and nosed endscrapers. The organic artifacts consist of 6 bone points, about 20 fragments of ivory batons, 5 bone awls and one fragment of a long bone with crossing lines (Fig. 17).

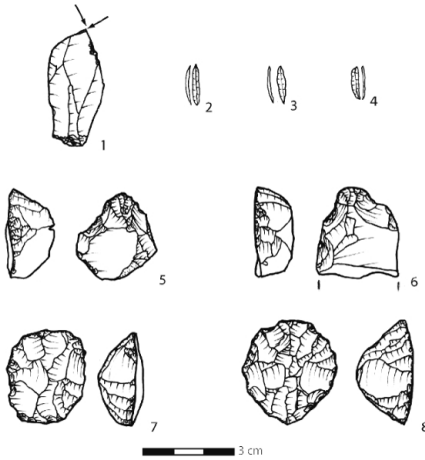


Fig. 16: Willendorf II, AH 4: Selected lithics. 1 burin. – 2-4 bladelet. – 5-6 nosed endscraper. – 7-8 carinated endscraper. (redrawn after Hahn 1977 and Teyssandier 2003)

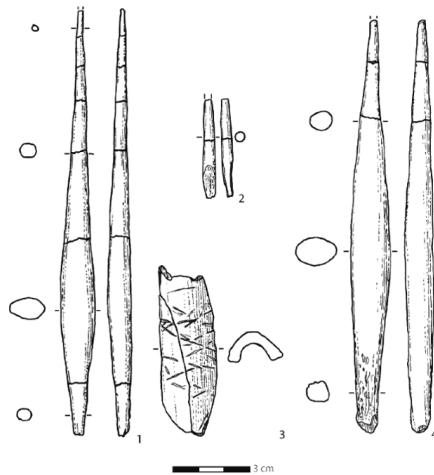


Fig. 17: Willendorf II, AH 4: Selected bone/antler/ivory tools. 1, 4 bone point. – 2 fragment of an ivory stick. – 3 bone fragment with crossing lines. (redrawn after Hahn 1977)

5. The new excavations – some first results of the 2006 fieldwork

Here we want to highlight and summarize some of the results of the 2006 fieldwork (see also NIGST et al. 2008); various analyses are in progress and more results will be presented during the meeting.

5.1 The northwestern corner of the 1908/1909 excavations

During our fieldwork in 2006 we were able to locate 1955-cleaning of the northwestern corner of the 1909 excavations in our excavation zone 01. After removing the backfill of the old excavations the 1955 cleaning of the surface at the end of the 1909 excavations has been exposed. The preservation is quite good and in sharp contrast to all other “disturbing features” of rectangular shape. The wall faces are not straight, which matches with old field photographs (1908/1909 and 1955). Due to the regulations of the railway company the slopes had to have an angle of about 50°. Fig. 18 (left upper in set) shows a photograph of zone 01, just

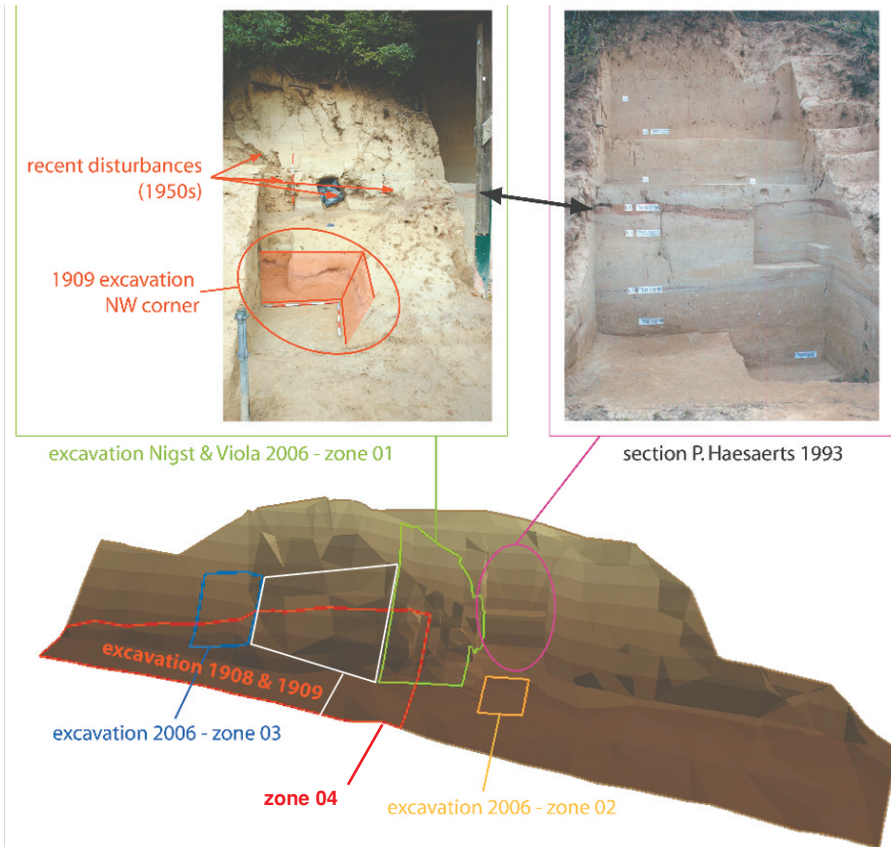


Fig. 18: Willendorf II: Digital elevation model of the site showing the location of the previous and the three trenches of the 2006 campaign. Upper right inset shows P. Haesaerts’ section from 1993. Upper left inset shows part of the 2006 excavation after removing the backfill of the previous fieldwork. (after: NIGST et al. 2008; Graphic: Philip R. Nigst, Photos: Gerhard Trnka and T. Bence Viola).

after removing the backfill and cleaning the exposed surface and the location of the 1955-cleaning of the northwestern corner of the 1909 excavation.

In 2007 we discovered in the adjacent zone 04 the reference section of F. Felgenhauer's 1955 excavation. Further, we were able to identify a disturbing feature originally observed during the 2006 fieldwork as a test trench of F. Felgenhauer. He describes this test trench in his monograph (FELGENHAUER 1959), but no map shows the exact location of the feature. A photograph of the 1955 excavation, provided by S. and F. Felgenhauer to G. Trnka in late spring 2007, confirms the identification of this feature as the test trench.

The identification of both features – the 1909 nw-corner and the test trench of 1955 – are of major importance for the correlation of the old fieldwork with the new work at the site.

5.2 The archaeological horizon 8a

The archaeological horizon 8a is a new archaeological horizon and was first recognized as a horizon of charcoals during the 1993 section cleaning (HAESAERTS et al. 1996) in the stratigraphic unit B1 (pale yellowish homogeneous loess). In 2006 while working on cleaning and stabilization of the western section we were able to collect for the first time a small lithic and faunal assemblage from this horizon.

Scattered finds are forming a horizon in the upper loess cover (B1: pale yellowish homogeneous loess). In total 20 lithics, 1 bone fragment, 2 pieces of charcoal, 1 piece of ochre, and 1 piece of burnt sediment have been recovered. These 20 lithics are predominantly made on Hornsteinkalk (low quality hornstone from the lateral hornstone banks), which represents a local raw material from secondary deposits. It can be found in the Danube gravels near the site. Further, hornstone, jasper, nordic material, and quartzite are present in low numbers (1 to 2). Two pieces are undetermined (see Fig 19). Most of the pieces are not patinated. The nordic material has to be examined in detail during the next study season, but it is evident that this raw material does not exist in Eastern Austria. The suggested origin is Southern Poland. A detailed raw material analysis of all lithic objects of the collection is in its initial phase.

About half of the lithics are fragmented; some show edge damage due to use or sediment. None of the objects shows traces of heat treatment, one exhibits frost breakage.

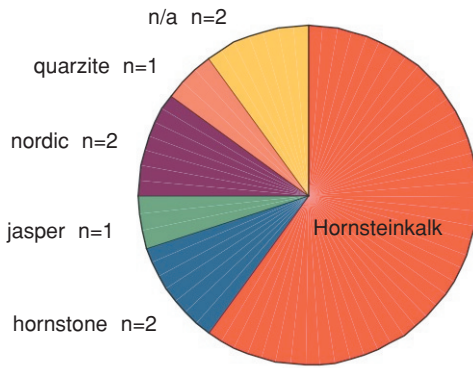


Fig. 19: Willendorf II, zone 01, AH 8a: raw material frequencies

The blanks consist of two blades, one of them a surface preparation blade, 10 flakes, among them surface preparation flakes, 4 bladelets, 3 shatters, and one tested raw material nodule. With regard to the *chaîne opératoire*, there is evidence of the raw material acquisition and testing phase (tested raw material nodule), of the core preparation phase, and most pieces belong to the blank production phase. Sixteen blanks

do not allow a determination of the knapping technique (mineral vs. organic), but four hint on a soft mineral hammer. A detailed analysis of the platform type and shape, as well as details of dorsal thinning is not conducted here because of the low number of finds with preserved platform. The orientation of the dorsal scars is predominantly unipolar, but pieces with undetermined orientation are also quite numerous.

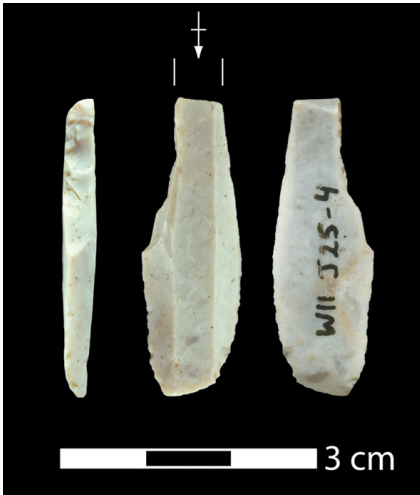


Fig. 20: Willendorf II, zone 01, AH 8a: J25-4 (Photo: Steffen Lättsch, Graphic: Carolin Herold).



Fig. 21: Willendorf II, zone 01, AH 8a: K27-49 (Photo: Steffen Lättsch, Graphic: Carolin Herold)

Two of the twenty lithics of z01-8a are retouched: one of them (J25-4; see Fig. 20) is a discard of backed bladelet production, the other one is a large, laterally retouched blade with an endscraper cap on the distal end (K27-49; see Fig. 21).

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