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New archaeological and geological research at the palaeolithic locality of Wallertheim in Rheinhessen

Kolfschoten, T. van; Conard, N.J.; Preuss, J.; Langohr, R.; Haesaerts, P.;
Forrest, D.T.; ... ; Rebholz, A.

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NEW GEOLOGICAL RESEARCH AT THE MIDDLE PALEOLITHIC LOCALITY
OF WALLERTHEIM IN RHEINHESSENby Nicholas J. Conard, Johannes Preuss, Roger Langohr, Paul Haesaerts,
Thijs van Kolfschoten, Judit Becze-Deak, and Armin Rebolz

The village of Wallertheim is located in the Wiesbach drainage in the rolling hills of Rheinhessen 25 km southwest of Mainz. The archaeological locality is in the old brickyard just southwest of the village's train station (figs. 1-3)*. Wallertheim is one of the better known Middle Paleolithic sites in Germany, and its fame dates to the 1920s when Otto Schmidtgen, the former director of the Naturhistorisches Museum in Mainz, conducted large scale excavations in the Late Pleistocene stream deposits left by the Wiesbach (O. Schmidtgen and W. Wagner 1929). In 1927 and 1928 Schmidtgen's crew recovered over 12,500 faunal remains and several hundred lithic artifacts from an excavation with an area of ca. 430m² (S. Gaudzinski 1992). Schmidtgen found lithic artifacts in only one layer, and the great majority of the fauna came from the same stratum which he designated the »Fundschiicht«. Schmidtgen attributed virtually all of the larger fauna to the activities of prehistoric hunters and noted the great abundance of bison remains among the collection. Subsequent work by Gaudzinski (1992; 1995) argues that only the bison remains can be attributed to hominid hunting, and that most of the bones of the other species probably resulted from animals that died naturally on the flood plain of the Wiesbach. The roughly 550 chipped lithic artifacts recovered by Schmidtgen's excavations have been described in several publications and include bifacially worked »Faustkeilblätter«, a variety of scraper forms, some evidence for Levallois flaking and examples of non-standardized flake production (G. Bosinski 1967; B. Figiel 1979; G. Bosinski et al. 1985). The lithic artifacts are primarily made from quartzites and volcanic materials that are thought to be of local origin. The lithic assemblage includes at least three small series of refitted artifacts, the most informative of which is a large polyhedral quartzite core upon which seven flakes can be conjoined. These finds suggest that some of the artifacts were recovered from relatively undisturbed contexts. The assemblage also includes several burnt artifacts. A small sample of the archaeological material from Schmidtgen's excavation is on display in the Museum für die Archäologie des Eiszeitalters in Neuwied-Monrepos, while the great majority of the collection is housed in the Naturhistorisches Museum in Mainz.

Over the decades since the original excavation numerous geological studies have been conducted in Wallertheim (e.g. W. Fauler 1938; H. Leser 1970; K. Brunnacker and W. Tillmanns 1978). In 1979 Bogdan Figiel of the University of Cologne led a brief field season and recovered a small number of lithic artifacts and faunal remains. The more important result of the work in the late 1970s was a new description of the Pleistocene sequence at Wallertheim (G. Bosinski et al. 1985).

No additional fieldwork took place at the site until 1991 when the current excavations of the University of Connecticut began in cooperation with the Römisch-Germanisches Zentralmuseum and the Mainz office of the Landesamt für Bodendenkmalpflege. The new phase of fieldwork was motivated by the desire to reconstruct Middle Paleolithic economies and to test many of the behavioral models that had been postulated in the Anglo-American literature in the preceding decade. The present research strategy assumes that the best prospects for economic reconstructions will come from archaeological materials recovered from low-energy sedimentary environments like those found in Wallertheim. Furthermore, the site was chosen for excavation because its geological section is very well developed, and its rapid rate of sedimentation improved the likelihood that discrete episodes of hominid occupation could be identified and studied (N. Conard 1994). We originally hoped to find deposits similar to those excavated over sixty years earlier by Schmidtgen, and to test the interpretation put forward by Schmidtgen and Gaudzinski that the site, above all else, included evidence for repeated hunting of bison by Neanderthals. Given the strong evidence for this phenomenon in other parts of Europe (e.g. C. Farizy and F. David 1992; J. Hoffecker et al. 1991),

* Acknowledgements, references and a German summary follow the archaeological report on Wallertheim in this volume.

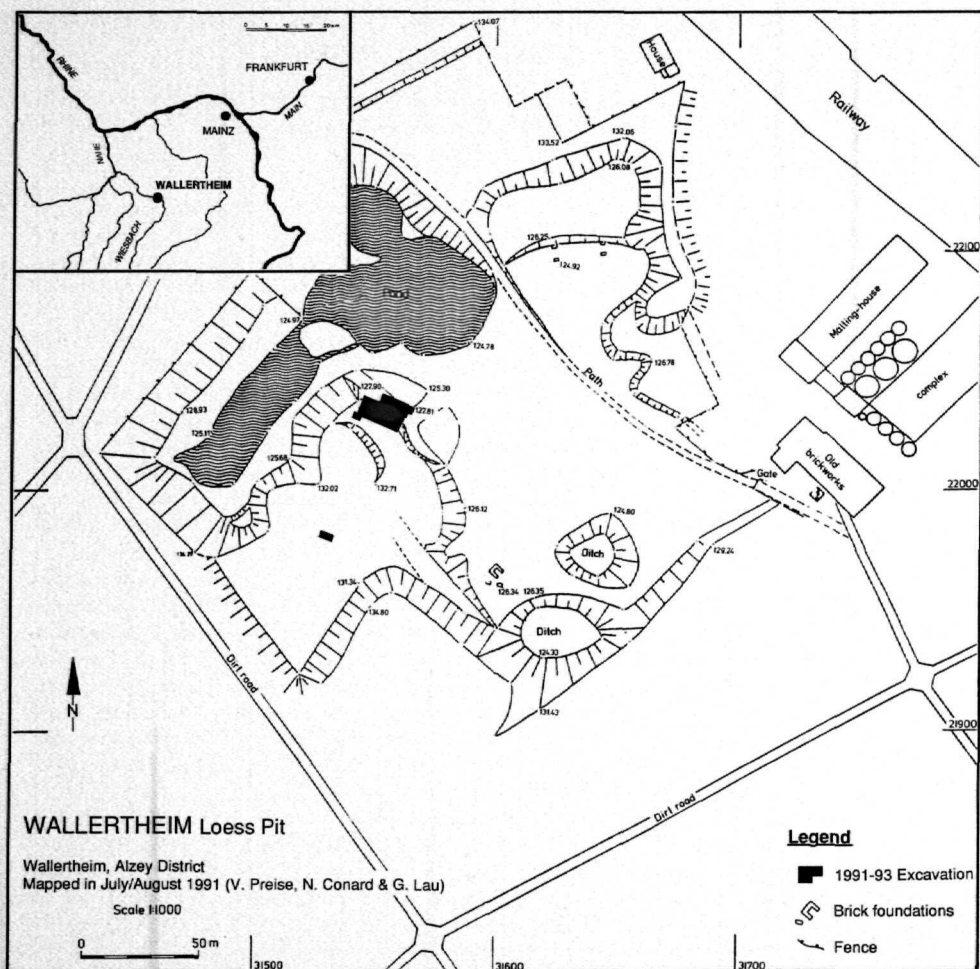


Fig. 1 The location of the village of Wallertheim and a map of the old brickyard.

we wished to determine whether this practice could be confirmed on the basis of new excavations in the Rhineland where recent excavations at Tönchesberg (N. Conard 1992) had yielded evidence for a broad range of subsistence strategies during the Middle Paleolithic.

In 1991, 1992 and 1993, crews with an average size of seven people conducted ten months of excavation (N. Conard et al. 1994; N. Conard in press). In 1991 Volker Preise surveyed the area and created a new map of the brickyard which has served as the basis for subsequent work at the locality (fig. 1). At present 214 m² have been dug in the main area of excavation, numerous geological sections have been recorded, and sediments over much of the site have been cored to reconstruct the former landscape. The new excavation is approximately 60 m south of Schmidtgen's, and the geological sections in both areas of excava-



Fig. 2 Aerial photograph of the Wallertheim brickyard (August 1992). The arrow points to the main area of excavation. (Vervielfältigt mit Genehmigung des Landesvermessungsamtes Rheinland-Pfalz vom 16. März 1995 – Az.: 2.3465/95).

tion can be correlated without great difficulty. This paper and the accompanying archaeological report summarize the state of our research on the Pleistocene sediments and the Paleolithic archaeology at Wallertheim as of the spring of 1994. Results from the analyses of molluscan fauna, botanical remains, paleomagnetic studies, thermoluminescence measurements, geochemical studies, raw material sourcing and seasonality studies based on annual cementum were too preliminary to include here. Following the completion of the excavation we plan to publish a more comprehensive interdisciplinary presentation of the results from Wallertheim.

N. J. C.

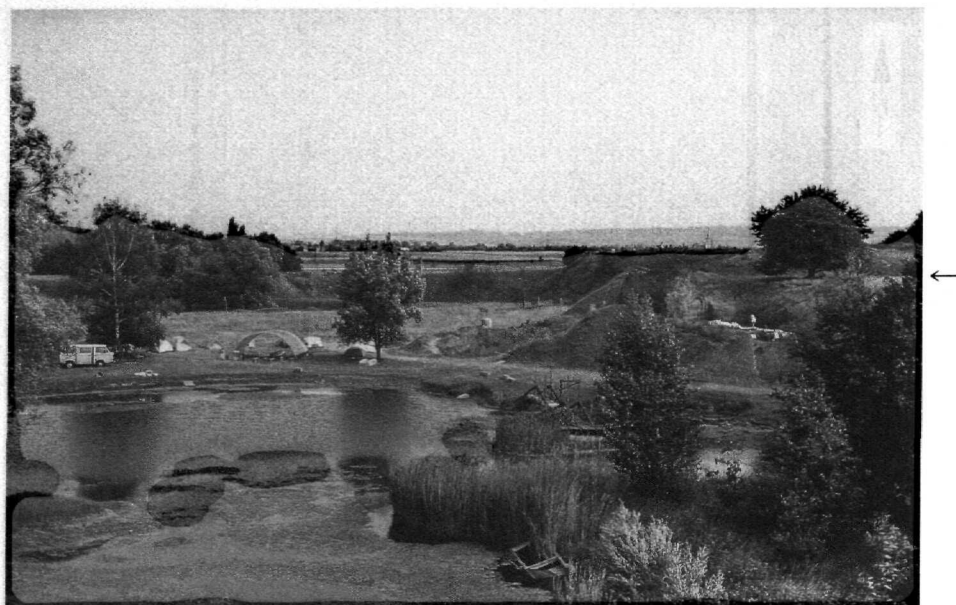


Fig. 3 Wallertheim. Overview of the old brickyard (June 1993). The arrows point to the main area of excavation.

Geomorphology

A research group in geography from the University of Mainz has begun a series of sedimentological analyses (heavy metals, C/N measurements, CaCO_3 , grain size etc.) for the entire Late Pleistocene sequence and has conducted a boring program to reconstruct the paleorelief of the area near the archaeological site in Wallertheim.

During the 1991 field season, we conducted a series of borings beginning at the southern edge of the excavation and continuing towards the southwest to determine in which direction the archaeological find horizons extended. These cores started from an elevation of 132m, the height of the middle plateau of the brickyard. Over the course of the following field season we carefully bored and sampled cores from an area measuring $90 \times 40\text{m}$. Generally, a 10m boring grid was followed using a coring bit with a diameter of 28mm. In 1992 over 900 samples from 56 cores were studied, each one extending from the contemporary surface of the middle plateau of the brickyard to the Tertiary marl that underlies the Pleistocene sediments. In 1993 an additional 11 cores were taken to define more closely the location of the archaeological find horizons.

To complement the boring program, three stratigraphic sections have been studied. These include the main Middle and Late Weichselian sequence preserved in a section on the southwestern wall of the brickyard. This section extends from 137.53-131.23m in altitude and includes thick loesses and the »Eltviller« and »Wallertheimer« tephros. About 15m northwest of the previous profile, a smaller section between 134.04-131.67m has been studied. The eastern part of the main wall of the excavation has also been sampled covering the range of elevations of 133.03-127.03m. Here a complete section from the surface of the middle plateau of the brickyard to the top of the Tertiary deposits could be documented.

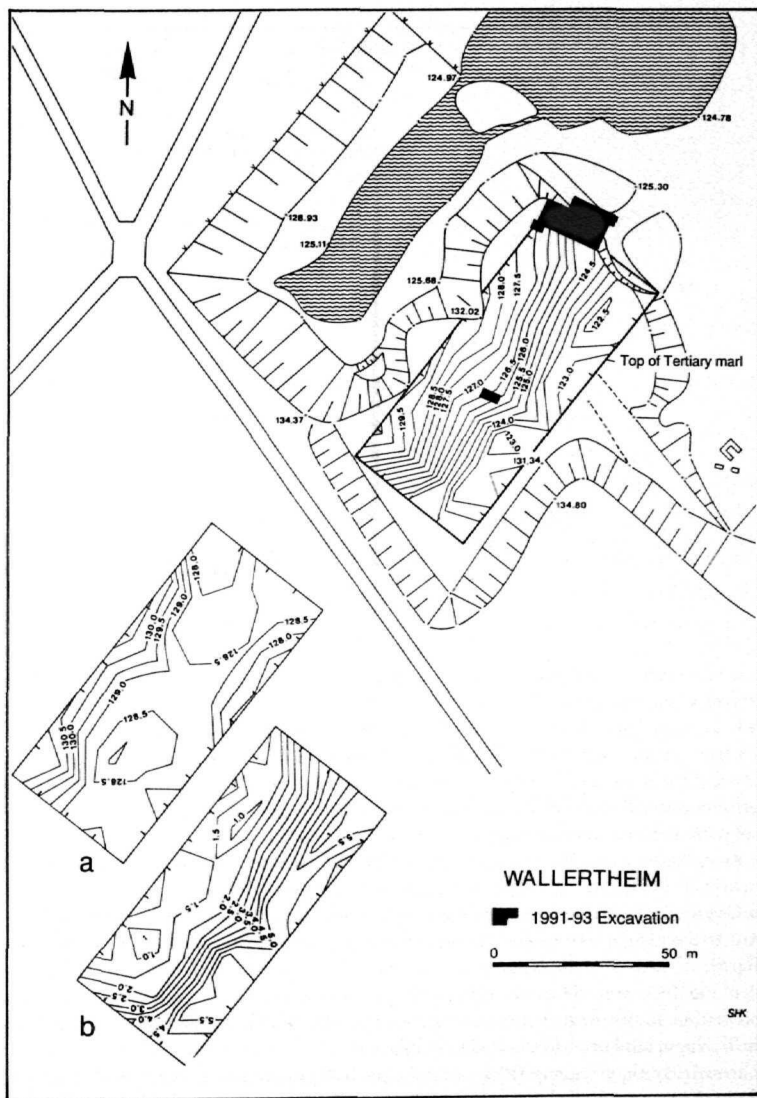


Fig. 4 Wallertheim. Map of the brickyard showing the elevation of the top of the Tertiary marl; a) the elevation of the base of the early Weichselian humic deposits; and b) the thickness of sediments overlying the Tertiary marl and below the base of the Early Weichselian humic deposits.

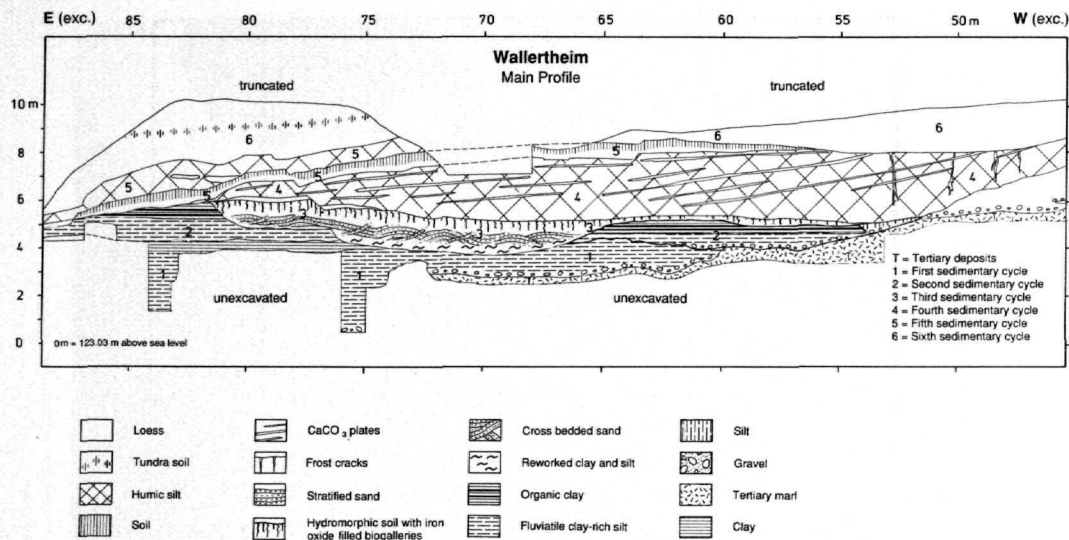


Fig. 5 Wallertheim. Schematic illustration of the main profile of the excavation showing the position of sedimentary cycles 1-6.

On the basis of the cores it was possible to reconstruct the three dimensional orientation of the major stratigraphic units at the site. Figure 4 shows the thickness of the sediments overlying the Tertiary marl and below the base of the Early Weichselian humic deposits. The same figure also provides the elevation of the base of the Early Weichselian humic deposits over the area sampled. The boring program shows that the western bank of the Wiesbach flood plain is intact at the elevation of the find horizons for a distance of at least 100m. Beneath the find horizons, between 1 and 5.5 meters of Pleistocene sediment are preserved. The base of these sediments is characterized by a fluvatile gravel at an elevation of about 123m. This gravel corresponds to the base of » Bachablagerung I« in the sedimentary system presented by K. Brunnacker (G. Bosinski et al. 1985) and is the same as the gravel at the base of sedimentary cycle 1 in the terminology used here. Overlying the find horizons and starting at an elevation of 128m, several meters of humic deposits are present. In the eastern part of the section, these deposits are separated by a loess within sedimentary cycle 5 (fig. 5).

As a result of the 1993 cores, we can reconstruct the position of the find horizons in the area southwest of the current excavation. Unfortunately, the eastern part of the brickyard is filled with so much construction debris that the borings could not be extended over this area.

The soil chemistry of the stratigraphic sequence is now being examined in the hopes of gaining more information about the environmental history of the locality. We are also examining the chemical properties of the find horizons in the hopes of better defining their spatial extent and to see if the find-bearing sediments have any unique geochemical signatures. This work may help to determine where future excavations should take place.

J. P. and A.R.

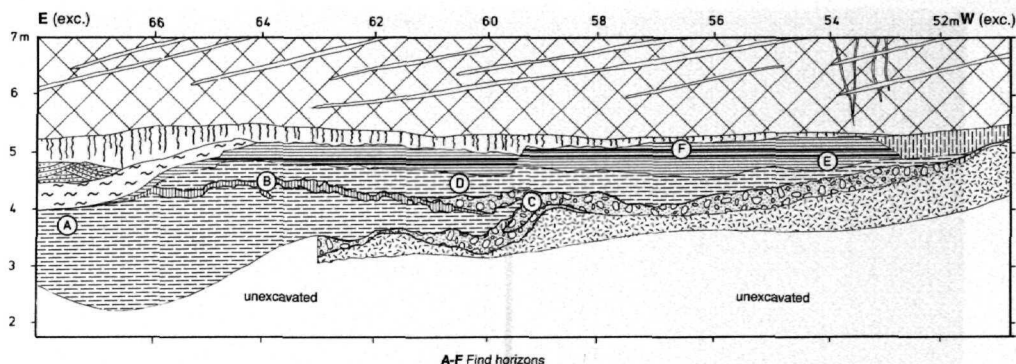


Fig. 6 Wallertheim. Illustration of the stratigraphic position of archaeological find horizons A-F on the north = 41 m line (see fig. 5 for key).

Pedology

Here cycles 1-6 refer to the sedimentary cycles defined thus far, and units A-F refer to the six find horizons that have been identified on the basis of excavations from 1991-1993 (figs. 5-8). All six find horizons are within the first two sedimentary cycles.

Cycle 1 – The cycle begins with the slow accumulation of alluvial plain deposits in the eastern part of the site. Gradually the amount of silty colluvial deposits increases towards the west. This colluvium probably stems from eroded loess. At this time the upland loess sediments were strongly eroded at least in the area surrounding the profile. The artifacts and bones in archaeological horizon A were deposited during aggradation of the sediments. The sediments in which archaeological finds from horizon B are enclosed probably result from an admixture of material from nearby exposures of Tertiary sediments.

Later the surface (Soil 1) stabilized and a fluctuating calcareous water table led to the accumulation of secondary carbonates. The climate was characterized by alternation of wet and dry seasons. The surface is only partially preserved in the western part of the section, and traces of animal trampling in soft sediment are clearly visible. The trampling corresponds to periods with a high ground water table. No clear indications of freeze-thaw cycles are visible here, and there is no clear evidence for a cold phase between the first two sedimentary cycles.

Cycle 2 – This cycle begins with the erosion of Soil 1. In the western part of the section, the soil is partially eroded by a torrential, heterometric deposit, consisting mainly of coarse material. This unsorted gravel is archaeological horizon C, and it must be assumed that the archaeological finds from this deposit have been redeposited.

Following the deposition of the gravel, the level of the surface soil rose as a result of alluvial deposition from east to west, with only limited colluvial contamination in the western part of the profile. Towards the end of cycle 2, a pronounced colder period left traces of freezing and thawing and possibly permafrost that contributed to the damage of faunal remains and lithic artifacts in horizon D.

There are no traces of erosion at the end of cycle 2, and most of the finds from horizons D, E and F have been deposited during sediment aggradation.

Cycle 3 – At the beginning of cycle 3 in the western part of the profile, silty sheet-wash and splash deposition occurred on a bare surface or in a shallow pond. At this time an erosional episode occurred creating a long depression 10-15 m wide and about 1 m deep. This period of erosion may have occurred as a result of a degradation of permafrost. Solifluction then carried sediments from the top of cycle 2 and the bottom of cycle 3 into the depression. This process continued with sand and microgranular sediment fragments filling the depression over a very short period of time, perhaps in a few years. At this time, the fast aggradation



Fig. 7 Wallertheim. Stratigraphic section including sedimentary cycles 1 and 2 and archaeological horizons A-F (August 1992).

caused little or no vegetation to grow in the depression. At the end of cycle 3, a poor marshy vegetation appeared in the depression which was now nearly filled.

Cycle 4 – Sedimentary cycle 4 begins at the level of the former alluvial plain, initially with the deposition of sand, and later with the deposition of what appears to be a mixture of humiferous eolian and colluvial silt and sand on a grass covered surface. At the same time an upland humiferous horizon was exposed to erosion. This humiferous deposit predates cycle 4 but is not easy to place within the main sequence of sedimentary development. Starting with cycle 4 we encounter sediments deposited during very dry climatic conditions, and the alluvial plain becomes inactive at this level. With time, eolian sedimentation continued, creating a gradient dipping downward from west to east.

The environmental conditions during cycle 4 were uniformly cold and very dry. Towards the end of cycle 4, permafrost and aridity are indicated by the accumulation of CaCO_3 along prism faces. No trace of the stable land surface at the end of this cycle of sedimentation is present.

The transition between cycles 4 and 5 is characterized by very cold, very dry conditions with several cycles of permafrost producing thermal retraction cracks with depths of more than two meters. These cracks were filled with loess that blew over this bare or nearly bare surface.

Cycle 5 – The loessic deposition continued with relatively brief periods of stabilization leading to the formation of a weakly developed calcareous chernozem. Evidence for freeze-thaw is visible in this part of the section, but there is no indication of permafrost. The cycle continues with the erosion of the upper part of the surface soil followed by the deposition of finely stratified silt, coarse sand, and very fine gravel. At present we are unsure whether these sediments were deposited by wind or water.

Cycle 6 – With this sedimentary cycle we see the beginning of the main phase of Middle Weichselian loess sedimentation.

R. L. and J. B.-D.



Fig. 8 Wallertheim. Overview of the main excavation (July 1993).

Paleontology

Preliminary analysis of microfauna recovered during excavation and water-screening has led to the identification of a few hundred specimens from 12 taxa (tab. 1). The aquatic species pike (*Esox lucius*) was recovered from the gravels of horizon C, while the semiaquatic species beaver (*Castor fiber*) was recovered from horizons A, B and C. The water vole (*Arvicola terrestris*), another semiaquatic species, has been identified in sediments from the first, second and third cycles.

In the rich faunas of horizons E and F, the common vole (*Microtus arvalis*), the field vole (*Microtus agrestis*) and the water vole are the most abundant species.

Throughout the geological sequence considered here, the enamel differentiation quotient (SDQ) of the *Arvicola* molars as defined by Heinrich (1978) has values of less than 100, a value that is consistent with the placement of the sediments within the later part of the last interglacial and the climatic oscillations of the early part of the last glacial cycle.

The small mammals from Wallertheim are not indicative of very specific paleoenvironments. Species which prefer steppic conditions such as ground squirrel or steppe lemming (*Lagurus lagurus*) or species indicative of deciduous forests such as dormouse (*Muscardinus avellanarius*) have not yet been identified among the small mammal species. During the excavation nearly 3,000 specimens of larger mammalian faunal remains have been recovered from the six find horizons. Among the larger fauna, the presence of fallow deer (*Dama dama*) in horizons A and B and wild boar (*Sus scrofa*) in horizon B suggests a correlation of these layers with a period of interglacial conditions. The other archaeological horizons, while containing rich faunal remains, lack larger mammalian species that are strong environmental indicators (tab. 1).

T. v. K.

Wallertheim Faunal Material		Find Horizons						
Scientific name	Common name	A	B	C	D	E	F	E-F
<i>Esox lucius</i>	pike			x				
<i>Rana/Bufo</i>	frog/toad		x					x
<i>Soricidae</i>	shrew							x
<i>Sorex araneus</i> group	common shrew							x
<i>Sorex</i> sp.	shrew				x			
<i>Talpa europaea</i>	mole							x
<i>Castor fiber</i>	beaver	x	x	x				
<i>Clethrionomys</i> sp.	bank vole			x				
<i>Arvicola terrestris</i>	water vole		x	x	x			x
<i>Microtus arvalis/M. agrestis</i>	common vole/field vole			x	x			x
<i>Microtus</i> sp.	vole	x	x					
<i>Apodemus</i> sp.	wood mouse		x					x
<i>Canis lupus</i>	wolf			x		x		
<i>Vulpes vulpes</i>	fox			x		x		
<i>Ursus</i> sp.	bear						x	
<i>Felis leo</i>	lion			x	x		x	
<i>Equus</i> sp.	horse	x	x	x	x	x	x	
<i>Equus hydruntinus</i>	wild ass			x			x	
<i>Sus scrofa</i>	wild boar		x					
<i>Dama dama</i>	fallow deer	x	x					
<i>Cervus elaphus</i>	red deer		x	x	x		x	
<i>Bos/Bison</i>	aurochs/bison	x	x	x	x	x	x	

Table 1 List of vertebrates recovered from the Wallertheim sequence.

Chronostratigraphy and Paleoenvironments

The history of chronostratigraphic research at Wallertheim is long and fascinating, but here only the essential elements of this history can be presented. With the exception of Fauler (1938) virtually all publications place the main find horizon from Schmidtgen's excavation in the early part of the last glaciation. In their report Schmidtgen and Wagner (1929) placed the find horizon on stratigraphic grounds in the first cool phase after the last interglacial. Using the Milankovitch curve published by W. Soergel (1925), they argued that the find horizon dated to between 113,000 and 110,000 years ago. Later work, most notably that by G. Bosinski et al. (1985) and S. Gaudzinski (1992), agreed with the interpretation of Schmidtgen and Wagner, and argued for broadly similar dates based in part on the presence of the Blake Event of reversed magnetization in the stream deposits in the lower part of the sedimentary sequence. Although the current stratigraphic exposures differ slightly from those available to Schmidtgen, the position of his find horizon corresponds to the start of the second sedimentary cycle and most closely resembles the stratigraphic position of our archaeological horizon C (see Schmidtgen and Wagner's [1929] Tafel 4 and Tafel 5, fig. 2).

On stratigraphic grounds it is clear that Schmidtgen's »Fundschiicht« and the six find horizons identified from 1991-1993 postdate the deposition of the Talwegterrasse. As Schmidtgen and Wagner argued, the position of the find horizons in the terrace sequence strongly suggests that the finds belong to the last interglacial-glacial cycle. Only the basal gravel of the Talwegterrasse and the overlying lower loess

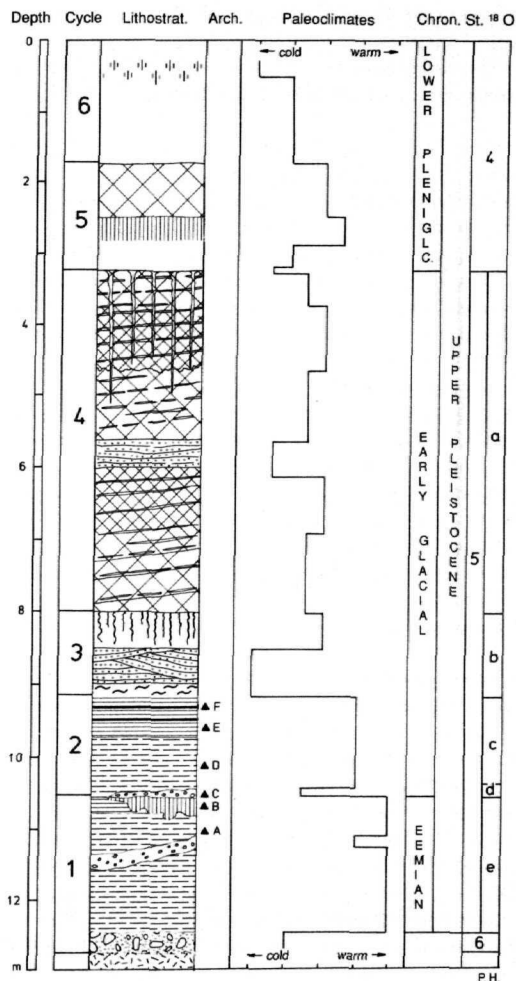


Fig. 9 Schematic stratigraphy of the main profile of the Wallertheim excavation with preliminary climatic and chronological correlations (see fig. 5 for key).

(Schmidtgen and Wagner's [1929] layer c, the »jüngerer Löß I«) appear to have been deposited prior to the last interglacial. The silts and clays of the first three sedimentary cycles which correspond to Brunnacker's »Bachablagerungen I-III« (G. Bosinski et al. 1985) appear on stratigraphic grounds to begin with deposits from the last interglacial. The remains of Soil 1 in find horizon B would then be the Eemian soil. This interpretation is supported by the presence of fallow deer and wild boar from archaeological horizons A and B. If this is correct, the overlying sediments belong to the last glacial, the Weichselian of the northwest European sequence.

Above the remains of the probable interglacial soil we see a series of fluviatile and humic deposits that reach a thickness of 5 m. Still higher in the sequence at Wallertheim one encounters approximately 8 m of loess that were deposited during the Middle and Late Weichselian (cf. H. Leser 1970; G. Bosinski et al. 1985). These deposits are interstratified with poorly developed interstadial soils and two volcanic tephras,

the lower of which is comprised of two distinct layers and is the »Wallertheim Tuff«. The upper tephra is the »Eltviller Tuff«. The section concludes with the Holocene soil.

A detailed description of the upper part of the section falls outside the scope of this report; instead, we will turn to the lower part of the sedimentary sequence that formed during the Eemian and the Early Weichselian.

The archaeological finds from Wallertheim fall within the first two sedimentary cycles. Horizons A and B were probably deposited during the Eemian and date to roughly 125,000 b.p. Find horizon B is slightly younger than A, but since it is reworked it is possible that material from earlier and later times could be incorporated into the deposit. Next follows an erosional episode that accompanied a climatic decline. The second sedimentary cycle begins with the deposition of the unsorted gravel of find horizon C. This layer corresponds stratigraphically to the position of Schmidtgen's »Fundschiicht«, and we agree with Schmidtgen and Wagner that these finds date to the first cooling after the Eemian. The approximate age of 113,000-110,000 b.p. given in 1929 by Schmidtgen and Wagner in their original report does not differ significantly from our current dates for Isotope Stage 5d, the first cooling after the Eemian.

The red-brown, clay-rich silt of archaeological horizon D overlies the gravel. This stratum and the stratified gray clays and organic bands of archaeological horizons E and F belong to the second cycle of sedimentation. The relatively stable surface of horizon F probably corresponds to the first climatic amelioration after the Eemian, or stage 5c of the oxygen isotope chronology. The ages of horizons D, E and F would then be about 100kyr b.p. with D being somewhat older than E and F.

Find horizons A-F all correspond to occupations on the flood plain of the Wiesbach. While find horizons B and C have been reworked to a significant extent, on stratigraphic grounds, A, D, E, and F appear to be largely intact. Numerous refitted artifacts and faunal remains from these layers provide another convincing line of evidence that these finds have not been disturbed very much since their deposition. The drying cracks present in horizons E and F indicate that hominids utilized this area during a period when the flood plain was seasonally wet and dry.

At least three climatic fluctuations are preserved between find horizon F and the base of the Middle Weichselian loess that corresponds to the beginning of sedimentary cycle 6. Thus far no archaeological deposits have been identified after the end of the second cycle. As with earlier sedimentary cycles, these typically begin with phases of erosion followed by the deposition of coarse sediments and end with a period of stabilization. These stabilizations correspond to pedological developments which probably occurred during mild or at least less cold conditions. Figure 9 provides a schematic sequence of the lithostratigraphy and a tentative correlation with the climatic stages of the oceanic oxygen isotope record. Wallertheim along with Tönchesberg (e.g. U. Becker, W. Boenigk and B. Hentzsch 1989; N. Conard 1992; M. Frechen 1994) and Metternich (e.g. H. Hofer 1937; W. Boenigk, M. Frechen and M. Weidenfeller 1994) provide the most detailed paleoenvironmental data from the last interglacial-glacial cycle in the Middle Rhine region. An important focus of the current project is the reconstruction of the climatic and environmental history of the region during the last 130,000 years.

P. H. and N. J. C.

Nicholas J. Conard

*Department of Anthropology
University of Connecticut
Storrs, CT 06269-2176 / USA*

Paul Haesaerts

*Institut Royal des Sciences Naturelles de Belgique
Rue Vautier 29
B-1049 Bruxelles*

Thijs van Kolfschoten

*Archeologisch Centrum
Postbus 9315
NL-2300 RA Leiden*

Roger Langohr · Judit Becze-Deak

*Soil Science Unit
Faculty of Sciences
University of Ghent
Krijgslaan 281
B-9000 Ghent*

Johannes Preuss · Armin Rebbholz

*Geographisches Institut
der Johannes Gutenberg Universität Mainz
Saarstr. 21
D-55099 Mainz*

PRELIMINARY ARCHAEOLOGICAL RESULTS
FROM THE 1991 - 1993 EXCAVATIONS IN WALLERTHEIM

by Nicholas J. Conard, Daniel S. Adler, Daniel T. Forrest, and Peggy J. Kaszas

During ten months of fieldwork between 1991 and 1993, the archaeological excavation in Wallertheim has covered a contiguous area of 214 m²*. In addition to the main excavation, a 10 m² test pit 60 m south of the main excavation has been dug and several small test excavations along the main sedimentary profile have been conducted to determine the horizontal extent of the prehistoric occupations. Although faunal remains have been found in several areas, lithic artifacts and unambiguous evidence for Paleolithic use of the site have been recovered only from the first two sedimentary cycles. These finds probably belong to the Eemian interglacial and the first climatic oscillation thereafter. The archaeological work at Wallertheim followed natural strata visible during excavation. Excavators plotted in three dimensions all lithic artifacts and faunal remains that were deemed identifiable or that were larger than about 4 cm. Charcoal and other botanical remains were recorded within each horizon and representative elevations were measured, while burnt faunal and lithic materials were recorded in three dimensions. Other finds such as small bone fragments and remains of micromammals and snails were recorded by stratum and quarter-meter. We collected at least one 20 liter waterscreening sample for each square meter from each archaeological horizon, and within lithic concentrations all sediments were waterscreened. Six find horizons, A - F, are worthy of mention here. This report reflects the state of our knowledge in the spring of 1994. At this time much laboratory work was still needed for the materials already recovered and at least one more season of excavation was planned at Wallertheim.

Find horizon A - Thus far well over 400 lithic artifacts and 200 faunal remains have been recovered from the yellow-brown silt of horizon A. Of the 35 finds that have been identified, remains from large bovids and horses are the most common, followed by lesser amounts of fallow deer and beaver. Although preliminary examination has identified faunal elements modified by hominids, additional study of the faunal remains is needed before an interpretation of the finds can be made.

The lithic assemblage includes two materials that were chipped at the site; these have been tentatively identified as fine-grain, dark red rhyolite and pink silicified tephra with irregular veins of impurities. In parts of the excavation lithic artifacts were often scattered within 10 cm in the vertical dimension (fig. 1). Within the find horizon, the ubiquitous presence of dendritic microbiogalleries, which probably result from rootlets, indicates that the occupation occurred on a grassy surface. The narrow vertical scatter and the presence of numerous refits suggest that many of the finds lie in undisturbed positions. All sizes of artifacts from microdebitage to large finds are present and show that no sorting of the artifacts has taken place. A meaningful horizontal organization of the finds is not yet visible since the concentration continues further to the east and south into unexcavated portions of the site. The flaking of the most abundant material, the pink silicified tephra, follows no obvious pattern and eventually the knapper discarded a polyhedral waste core. Retouched forms of the two most abundant raw materials mentioned above have yet to be recovered; however, six retouched artifacts are present among the finds of other raw materials. Most of the tools are quartzite scrapers (fig. 2). Small fragments of charcoal have been recovered from horizon A, but they have not been identified, and it is unclear whether or not they are of cultural origin.

Find horizon B - Finds from this layer have been reworked, and both lithic and faunal material from horizon B lie in irregular pockets of a gray, speckled soil. These discontinuous pockets appear to have been formed by animal trampling in soft sediment. The lithic assemblage contains about 50 artifacts of diverse raw materials including quartzite, andesite, rhyolite and agate (fig. 2). Six lithic artifacts from this layer have been refitted. The assemblage contains over 200 faunal remains including finds of fallow deer, horse,

* See the companion paper in this volume for geological and historical information about Wallertheim.



Fig. 1 Wallertheim. Small concentration of rhyolite from archaeological horizon A (October 1993).

wild boar, red deer, large bovid and beaver. Noteworthy is the presence of fallow deer and wild boar, both suggestive of interglacial environments.

Find horizon C – The unsorted gravel overlying the reworked soil of find horizon B has yielded over 150 lithic artifacts and 400 faunal remains. There is reason to assume that the finds from this horizon have been reworked and that the spatial distribution of finds reflects more the geological and biological forces that have affected the deposit than patterning left by hominids. Despite the generally unrolled state of the artifacts and relatively well-preserved fauna, the artifacts and faunal remains from this horizon could very well have originated from other strata and may have been moved tens or even hundreds of meters from their original point of deposition. The 65 specimens identified among the faunal remains include horse, large bovid, wolf, wild ass, fox, lion, beaver, and red deer in descending order of abundance. The lithic artifacts from horizon C include diverse raw materials among which quartzites and volcanic materials are most abundant. There is no indication of concentrations of particular raw materials, and both cores and retouched forms show considerable variability. Figure 2 illustrates lithic artifacts from horizon C.

Find horizon D – Over the course of the 1993 season the red-brown, clay-rich silt that overlies the gravels of layer C produced rich lithic scatters and considerable faunal material. Over 1,600 lithic artifacts and 350 faunal remains have been recovered from the find horizon. This stratum has an average thickness of 50 cm and is of a homogeneous color and texture. Within horizon D several scatters of refitting lithic artifacts have been recovered. Figures 3 and 4 show the horizontal pattern of lithic refits and indicate the presence of two distinct scatters, each containing two raw material units. The eastern concentration is more dispersed in the horizontal and vertical dimension. When projected short distances onto a profile, the lithic artifacts in the eastern concentration are scattered within a 25 cm band, while the western concentration spreads over a vertical distance of 15 cm. In this horizon, as in A, E and F, siliceous limestone cobbles have been found in close association with artifacts and faunal remains (fig. 5). Few of these finds show signs of