

## **SUMMARY: SPATIAL USE PATTERNS OF THE LATE UPPER PALAEOLITHIC AT OELKNITZ (THURINGIA, GERMANY)**

The open site of Oelknitz is situated approximately 10 km south of Jena in Germany and represents one of the most northern Magdalenien sites in Europe. Excavation was undertaken from 1957 until 1967 by Günther Behm-Blancke and Rudolf Feustel. In the course of excavation ca. 850 m<sup>2</sup> of the site were uncovered. Thousands of lithics and bones as well as organic tools, items of personal ornament and pieces of art were unearthed during excavation, together with large worked and unworked stone slabs. The site was not comprehensively analysed and only a few details have been published so far (Behm-Blancke 1976; Musil 1985; Feustel 1989).

Excavation at Oelknitz was conducted following a grid system and comprised trenches, square-metre rows, metre squares and quarter metre squares. The spatial distribution of the archaeological material was recorded two dimensionally, accompanied by photo-documentation. Detailed, 3-dimensional information is available for the evident structures. All of the pits and almost all of the hearths were sectioned both horizontally and vertically. Information on the microstratigraphy of these features and other evident structures was documented, along with the associated archaeological material. In addition, 3-dimensional measurements of the palaeo-surface are available, as well as numerous geological sections.

Unfortunately the recovery of material not associated with the evident features was undertaken only with reference to the grid system. As a result detailed spatial information using the quarter metre square system is only available for certain parts of the site.

### **MATERIAL AND METHODS**

The methods used for the identification of features interpreted as ground-plans of dwellings and/or living areas comprise the spatial analyses of latent and evident distribution of archaeological finds, as well as refitting studies.

#### **Plotting**

Distinct categories of archaeological material such as lithics, bones and rocks, as well as indications for fire were plotted. Many of the patterns which emerged during plotting were interpreted in terms of arrangements of architectural elements and/or particular functional areas and/or activity zones within certain areas of the site. Recording unmodified or only marginally modified stone slabs and rocks averaging more than 30 cm in size proved to be an especially useful tool in the identification of the spatial patterns.

## Pit analysis

Pits are an additional, potential source of identification of ground-plans of dwellings. In order to distinguish the character of the pits, their vertical and horizontal shape, depth, contents, as well as information on their microstratigraphy were documented. At Oelknitz small and relatively shallow pits occasionally display an infilling that could be clearly interpreted as wedging (**fig. 140**). Therefore features with a coloured fill, measuring 10 to 20 cm deep and up to 20 cm in diameter were interpreted as post-holes. The overwhelming majority of these features produced no finds.

Other pits can be interpreted in terms of »caches«. This is suggested by an analysis of the contents of the pits. For example, the pit shown in **figure 174** was filled with fragmented blades, which could be refitted to give 10 blades, up to 20 cm in length. These blades were themselves refitted, showing that the contents of the cache represent part of a reduction sequence of a blade core. Plotting procedures were undertaken in order to evaluate the spatial distribution of pits of different character. The ground-plans of several dwelling structures could be identified based on the results.

The microstratigraphy of pits served as an indicator for an evaluation of the contemporaneity of different structures at Oelknitz. At Oelknitz pits had been dug from different horizontal levels, which became evident when the sections of the pits were analysed. Horizontal plotting of post-holes at different levels reveals overlapping post-hole constructions in particular areas of the site.

## Refitting

In order to evaluate the contemporaneity of the proposed dwellings and/or spatial structures, refitting analyses were undertaken on lithics, bones and rocks. Due to the problems associated with the documentation of the material, large scale plotting of refitted finds was only possible when the finds were associated with small evident structures such as pits and hearths, which had been recorded in large numbers at the site.

## Analysis of the bone assemblage

### Systematic description

Taxonomic identification of the bone assemblage was carried out by the author. In addition, Professor Dr. Peters (Museum Senckenberg/Frankfurt am Main) identified the bird remains to taxon. Bone assemblages from prehistoric sites and the recent mammalian collection from the MONREPOS Archaeological Research Centre and Museum for Human Behavioural Evolution of the Römisch-Germanisches Zentralmuseum were used for identification.

### Taphonomic analysis

Skeletal elements were quantified according to several criteria: the number of identified specimens (NISP), the minimum number of individuals (MNI), the number of skeletal elements (MNE), and the minimum number of animal units (MAU) (Binford 1981; Lyman 1994). In describing taxonomic frequency, all the elements

that were assigned to a particular taxon were counted (NISP values), including epiphyses and long bone shaft fragments. In calculating the MNI, the most common anatomical part of a particular taxon served as the basis for estimation, after having taken into account body side, age and sex.

The quantitative composition of some of the assemblages analysed was calculated with bone density values (Lyman 1994; Lam u. a. 1999).

For observing bone damage, a stereo light microscope with a magnification of 10×40 was used.

### **Analysis of the lithic assemblage**

Analysis of the raw-materials used for stone tool production were analysed using the lithic comparative collection of the MONREPOS Archaeological Research Centre and Museum for Human Behavioural Evolution of the Römisch-Germanisches Zentralmuseum. In general, analysis of the lithic assemblage was restricted to qualitative and quantitative recording.

### **RESIDENCE AT OELKNITZ**

The archaeological record is characterized by seven areas of spatially distinct concentrations of finds which can be easily recognized when observing the distribution of stone slabs and pits (figs 9. 11). The concentrations include circular arrangements of stone blocks alone (Oelknitz 2), or stone slabs and blocks, lithics and faunal remains (Oelknitz 1, 4 and 6). A further pattern comprises wreath-shaped arrangements of stone enclosing an empty interior (Oelknitz 3). These structures can be accompanied by numerous pits and/or hearths and/or circular features displaying a fill different in colour to the surrounding sediment (Oelknitz 3 and 7).

The spatial record is separated by two areas of disturbance, which run through the area of excavation in a North-South direction. The disturbance resulted from earlier excavations undertaken during the 1930's by Neumann. Unfortunately, it was not possible to join the different excavation plans together. During this phase of investigation pits and hearths overlain by lithics and bones were not identified as such and remained either completely intact or were partly destroyed. Nevertheless, the features were still recognizable and it was possible to record them during later field campaigns.

The different spatial concentrations at Oelknitz were defined according to the distribution of pits and/or stone slabs, lithics and bones.

Oelknitz 1 (figs 9-11. 13) is located in the westernmost part of the site and is represented by a scatter of unmodified stones only rarely exceeding 30 cm in length, along with numerous bones and lithics. An evident hearth was not documented, but traces of fire (charcoal and soil-colouration) were recorded in the southern part of the scatter as well as immediately to its north. No pits were recorded at Oelknitz 1. Oelknitz 1 comprises a »star-shaped« find scatter with an elongated southern annex.

Oelknitz 2 (figs 9-11. 13) consists of a roughly circular arrangement of stone slabs enclosing a central area of 6m<sup>2</sup>. Oelknitz 2 has two hearths. One hearth was recorded in the centre of the circle of stone slabs. A second hearth, on the south side of Oelknitz 2, was located in the gap between the circle of stones and an additional row of stones which trail down from the feature to the south-west. Only a few bones and lithics were found in Oelknitz 2, entangled between the stone slabs. The centre of this feature was void of finds.

Oelknitz 3 (figs 9-11. 13) spreads across an area of ca. 60m<sup>2</sup> and is separated clearly from Oelknitz 1 and 2

by zones containing very few finds. Stone slabs form an approximately circular structure with a large hearth at its centre. As in Oelknitz 2, the area around the hearth in this feature contains hardly any finds and only some lithics and bones were found between the stone slabs. The arrangement of stones is associated with almost 100 pits of different sizes and shapes, most of them filled with bones and lithics. Several of these pits could be identified as post-holes. The microstratigraphy of the pits documented during excavation emphasizes the fact that these features were dug from different levels. Plots of post-holes constructed during the final occupation horizon, where lithics and bones were located, revealed a circular arrangement corresponding to the circular distribution of the stone slabs, lithics and bones. Plots of post-holes dug from a lower level are arranged in a semi-circle, underlying the circular arrangement of the pits dug from the upper level (**figs 182-183. 185-186**). This evidence indicates that more than one episode of occupation is represented in the archaeological record at Oelknitz.

Oelknitz 4 (**figs 9-11. 13**) is located in the central area of the site. This area is characterised by a sharply delimited concentration of stone slabs and stone blocks. This feature is amorphous in shape, and opens towards the north. The spatial distribution of bones and lithics is restricted to the southernmost part of this structure. Two sickle-shaped arrangements of stone slabs and blocks extend northwards from Oelknitz 4. Horizontal plots of stone blocks and slabs 30 cm in size and larger reveal a semi-circular arrangement around a central hearth. Traces of fire were also located to the north. Smaller stone blocks reveal a different spatial pattern (**fig. 322**).

Oelknitz 4 is characterised by the presence of almost 150 pits. The sickle and the »star-shaped« concentrations partly cover 97 pits. Within the latter structure 10 bag-shaped pits occur in association with the circular hearth structure.

Almost 50 pits were identified as a circular arrangement of post-holes. The circular distribution does not correlate with the form of the stone-features and might therefore be associated with a different phase of occupation, also indicated by the analysis of the different generations of pits (**fig. 321**). It is suggested that this structure lasted over a longer period of time and underwent several phases of reconstruction. There are arguments for a contemporaneity of the central hearth with the circular arrangement of post-holes.

The pits are overlain by a paving characterised by a spatial distribution of finds which bear remarkable similarities to the »star-shaped« scatter of finds documented for Oelknitz 1 and can be regarded as its mirror-image (**fig. 323**). In addition, traces of fire are located at almost the same position in both features, in the north-eastern area.

As the post-holes suggest that at least these pits represent remnants of an earlier occupation, the evidence might indicate that Oelknitz 1 and 4 display the same ground-plan, even though Oelknitz 4 differs from Oelknitz 1 in the presence of many pits located underneath the spatial distribution of stone slabs (**figs 9-11. 13**).

Although Oelknitz 1 and 4 followed similar construction, there are obvious differences in the utilisation of the inner space in each feature. This is underlined by the spatial distribution of bones and lithics, which differs considerably between Oelknitz 1 and 4. The form of Oelknitz 1 is dictated by the spatial distribution of lithics and bones, whereas bones and lithics are more or less absent at Oelknitz 4.

To the south, Oelknitz 4 merges into Oelknitz 5 (**figs 9-11. 13**). Oelknitz 5 is characterised by an absence of obvious architectural elements. This feature comprises an area of ca. 80 m<sup>2</sup>. The archaeological record consists of stone slabs, lithics and bones accompanied by some pits. The pits are mainly located in the eastern part of this area which is associated with the trenches left behind by earlier excavations. Pits and hearths stratified below the finds of the occupation horizon were either not observed during these field campaigns or destroyed. Thus during later excavations, some of these features could only be documented in an incomplete state. Three hearth structures accompany the spatial distribution of stones and bones. The

largest hearth is situated in the centre of Oelknitz 5 and was recognized by the black discolouration of the soil and the presence of charcoal.

Oelknitz 6 (figs 9-11. 13) is represented by a loose scatter of pits overlain by stone slabs and only a few bones and lithics. Of particular interest are two hearths. One hearth is located within the amalgam of pits, another large hearth area is located to the south-west connecting Oelknitz 6 and 7. This part of the site was considerably disturbed. However the distribution of stone blocks in this part of the site shows similarities in shape with the distribution pattern recognized for Oelknitz 1 and 4.

The distribution of the stone blocks does not correspond to the distribution of post-holes, which are arranged in a semi-circle. This evidence shares major characteristics with the semi-circular arrangement of post-holes identified for Oelknitz 3 (fig. 365).

Oelknitz 7 (figs 9-11. 13) is located in the eastern part of the site. As at Oelknitz 4, it consists of a large arrangement of pits overlain by large stone slabs and blocks as well as lithics and bones. Of particular interest is the southernmost part of Oelknitz 7, which is characterised by a loose scatter of huge stone blocks. Five areas of coloured soil, all of different shape, form a circular structure here. These features are accompanied by post-holes which emphasize the circular form of the feature. The coloured features and the post-holes encircle an oval area with a hearth (fig. 411).

Against the background of the description of architectural features at Oelknitz, it should be pointed out that the ground-plans proposed here do not necessarily have to be interpreted as dwellings since the structures may have served other purposes, nor do they reflect the outer shape of the structure. This especially applies to the interpretation of ground-plans based on the arrangement of post-holes.

### Concerning the contemporaneity of structures

The recovery practices employed at Oelknitz hinder the meaningful refitting study necessary for an evaluation of the chronological history of the different accumulations. Only in singular cases can contemporaneity between particular ground-plans be shown. Refitting of horse teeth shows a connection between Oelknitz 1, 2 and 3. Teeth from four individual mandibles of horse recovered in Oelknitz 1, 2 and 3 were refitted. This evidence points to the relative contemporaneity of Oelknitz 1 and 2. The possibility that Oelknitz 1 and 3 were also contemporary seems highly plausible, even if the tooth which was refitted to the molar from Oelknitz 1 was recovered from a pit in Oelknitz 3 (fig. 103).

Even though contemporaneity can be demonstrated in individual cases it seems rather likely, on the evidence drawn from the spatial arrangement of pits dug from different stratigraphical levels, that temporal differences can also be observed in the history of occupation of Oelknitz. Attempts were made to identify these differences in temporal levels using AMS dating. Bones from pits dug from different levels in Oelknitz 3 and 4 were dated. The AMS results did not contradict the results obtained archaeologically, but statistically show the same age. This suggests that the history of occupation at Oelknitz could be beyond the chronological resolution of <sup>14</sup>C-dating. However, analysis of the evidence allows the proposal of at least two distinct phases of occupation at the site. While the first occupation phase is only revealed by the pits, it seems that the installation of pavements in areas rich in pits is one of the distinct characteristics of the subsequent occupation (fig. 412).

## Analysis of Oelknitz 1

Analysis of the find material recovered from Oelknitz 1 served to more closely define the character of occupation. Oelknitz 1 is represented by a scatter of ca. 5,000 unmodified stones, bones and lithics only rarely exceeding 30 cm in length, deposited on sterile loess. It covers an area of ca. 26 m<sup>2</sup> and has been interpreted as deriving from a living structure which was oriented towards the South.

The faunal material represents butchered remains of 33 large mammals and two birds. Horse dominates with a Minimum Number of Individuals of 21. Analysis of the butchery remains indicates that the horses were brought into the living structure selectively as dismembered parts. Horse exploitation was geared towards carcass sharing.

Faunal remains with anthropogenic work traces are interpreted as waste products resulting from manufacturing organic tools. No indication for the use of organic tools is given and complete tools are absent. The lithic assemblage comprises ca. 2,000 artefacts. Their qualitative and quantitative composition is similar to other Magdalenian assemblages, indicative of only short stay duration. The assemblage contains finds for which an interpretation in terms of objects of every day life can be given, such as geodes. The spatial analysis of the material indicates a strict subdivision of the living structure into different zones of activities.

Oelknitz 1 has been interpreted as reflecting a special task living-structure used during winter/spring and specialised in animal dismemberment. Against this background it seems highly unlikely that Oelknitz 1 reflects a dwelling. Oelknitz 1 is contemporary with Oelknitz 2 and 3.

Indications are present that after the abandoning of Oelknitz 1 numerous elements of its original layout were recycled.

## Analysis of Oelknitz 2

Oelknitz 2 consists of a roughly circular arrangement of stone slabs enclosing ca. 6 m<sup>2</sup>. The total extension for this structure covers ca. 15 m<sup>2</sup>. The presence of two hearths in this part of the site is striking. A hearth was recorded in the centre of the circle of stone slabs. A second hearth on the south side of Oelknitz 2 was located in the gap between the circle of stones and an additional row of stones that trails from the feature in a south-west direction. Only a few bones and lithics were associated with Oelknitz 2 and these were found between the stone slabs of the external hearth. The centre of the circular arrangement of stone slabs was void of finds.

The faunal material comprises 152 elements representing a total of 7 large mammals. Horse dominates with at least 4 individuals. Numerous butchering traces were recorded, indicating that these bones represent food remains.

287 lithics were recorded. The qualitative and quantitative composition of the assemblage is representative of a Magdalenian assemblage. The finds are small and were found scattered between the large stone blocks which are part of the spatial arrangement characterising the shape of the Oelknitz 2 record.

Considering the find situation the lithic assemblage can only be considered to represent a marginal portion of an originally much larger assemblage. The fact that the centre of the circular arrangement of stone blocks with the hearth is void of finds is interpreted in terms of human clearing activities. For Oelknitz 2 an interpretation is given as an external hearth construction, which was in contemporaneous use with Oelknitz 1 and 3. A roofed work place has been proposed as an alternative interpretation.

## Analysis of Oelknitz 3

Microstratigraphy of pits, the qualitative and quantitative analysis of the contents of pits as well as analysis of the spatial distribution of stone blocks, bones and lithics indicate at least 2 phases of occupation for Oelknitz 3.

The occupation starts with a semi-circular arrangement of posts, ca. 3 m in diameter, oriented towards the South. Post-holes are almost always void of find material or show find associations which can be interpreted in terms of wedging. A circular hearth construction is located in the entrance area. An additional hearth outside the post-hole feature is situated immediately towards the South and is accompanied by several pits containing many burned stones and bones.

Indications for the integrity of the contents of several pits indicate their contemporaneous use. This is underlined by analysis of the raw material used for stone tool production. Remnants of a particular flint nodule were found spatially distributed over adjacent pits. Moreover, it was possible to refit the lithic contents of individual pits. The particular co-occurring association of singular and/or different find categories in adjacent pits around the outside hearth can also be mentioned in this context.

The area around the hearth is interpreted in terms of an activity centre. The associated find material here consists of 200 faunal remains, representing 7 species and at least 9 individuals. Horse dominates and again their remains reflect human butchering activities.

1,000 lithic artefacts complete the assemblage. Their qualitative and quantitative composition is striking as splintered pieces and borers are over represented compared to the composition of stone tools recorded at other Magdalenian sites.

The presence of numerous organic tools such as needles, retouchers and worked antlers points to a domestic setting, as do the presence of haematite and stone blocks used for haematite preparation, engraved slate plaques and female figurines. Indications for a season of occupation are not given.

A second, later phase of occupation can be disentangled from the amalgam of latent and evident records at Oelknitz 3. The spatial distribution of bones, lithics and stone blocks covering all the pits is clearly defined and forms an annular arrangement. To the east, soil discolorations accompany and complete the spatial record.

The distribution of finds was interpreted in terms of a round structure which covers an area of 6.50 m along a North-South axis. Size plotting of stone blocks, lithics and bones allow the reconstruction of the clearly defined internal structure. Crescent-shaped arrangements of finds encircle the centre of the structure which is more or less void of finds as well as a clearly distinguished zone of find concentration located to the South (Zone G) (**fig. 262**).

The crescent shaped structures are separated from each other by four circular arrangements of stones (Zones A, B, D and E). Two further circular arrangements are located outside the crescents. A circular arrangement of post holes accompanies the spatial evidence already described.

The find material recovered from the pits, which have been associated with the distribution of stone blocks, lithics and bones, comprises ca. 1,750 elements among them ca. 400 bones and teeth. Horse dominates the faunal assemblage. Within the spatial distribution of bones and teeth certain areas can be outlined which are characterised by the dominance of particular taxa. While the faunal material in some adjacent pits represents selected parts of horse carcasses, the contents of other pits mainly consists of selected fox remains. A high proportion of tools distinguish the lithic assemblage. Again the proportion of splintered pieces is high compared to other Magdalenian lithic assemblages. The spatial distribution of the lithics is more or less congruent with the distribution of the faunal remains.

Several zones of activities can be identified by qualitative and quantitative analysis of the contents of the pits. It is above all the strictly subdivided eastern part of the structure which can be emphasized as a main centre of activity. The curation of stone tools, processing of fox and bird carcasses as well as butchered horse remains and the fabrication of organic tools is evident for this part of the living structure. Production and use of backed bladelets occurred in the northern and western part of the structure, whereas blank production is restricted to the western part (fig. 264). These activities occurred around a rest area enclosed by the post stand; traces of fire have been documented here.

A plausible interpretation for the described evidence is an open tent construction supported by a partly closed circular post stand. If the crescent shaped stone arrangements are interpreted in terms of weights for a covering it seems plausible to suggest a flexible span here that could be adjusted to different needs. As the centre of activity was obviously located in the north-eastern part of the tent it seems plausible to suggest that the entire construction was mainly oriented towards the North-East. This part of Oelknitz shows a striking absence of pits, though large hearth structures can be located here.

Analysis of latent and evident evidence indicates that this tent was contemporaneous with Oelknitz Structures 1 and 2 and occupied during winter/spring.

For both living structures reconstructed for the different phases of occupation at Oelknitz 3 the suggested rest areas indicate that a number of three to four persons might have shared space here.

## PERSPECTIVES

Even at this stage of analysis the evidence from Oelknitz provides important information for our understanding of Magdalenian dwellings and living structures. Although the different ground-plans uncovered during excavation vary in form, there are similarities in their layouts.

Oelknitz 1, Oelknitz 4 and possibly Oelknitz 6 are similar in shape. Oelknitz 1 can be considered as the mirror image of Oelknitz 4. Both features are associated with an external northern hearth.

The most plausible interpretation for this evidence is that these features probably do not represent dwellings but other forms of site structures.

Whether a particular dwelling type/living structure was associated with a specific function is difficult to assess. The character and composition of the bone and lithic inventories found in Oelknitz 1 and 4 suggest that structure form and function are unconnected. Faunal remains and lithics constitute the major find groups of Oelknitz 1, in fact the spatial distribution of these elements contribute considerably to the shape of this feature. Analyses of fauna indicate that the remains accumulated during the winter/spring season. Spatial associations between particular skeletal elements of horse and particular tool types could be outlined and use as a butchering spot was suggested for Oelknitz 1.

In contrast Oelknitz 4 is almost entirely void of bones. It doesn't seem plausible that this could result from artificial cleaning as one would expect at least some small bones to have survived among the structural elements of the interior, as observed, for example, in Oelknitz 2 and 3. Bearing in mind that the amount of material within a dwelling probably correlates with the duration of its use, then Oelknitz 1 might have had a much longer life-history than Oelknitz 4 resulting in differences in the spatial accumulation of bones and lithics. A preferable interpretation is that these almost identical dwellings fulfilled different purposes. Moreover Oelknitz shows that symmetry seems to constitute a component in dwelling and/or living structure construction. This indicates that measuring systems were employed.

That the large amount of evidence uncovered at Oelknitz did not result from a single occupation can be demonstrated by plots of post-holes which derive from earlier occupations of the site (fig. 412). However, this does not necessarily mean that the find-material from the occupation horizon results from a palimpsest of dwelling activities.

These results suggest that our conventional view of Magdalenian settlement patterns with large and small sites has to be reconsidered. Oelknitz represents a site which can be interpreted in terms of an »aggregation site« (Binford 1978b). Even though analysis of Oelknitz is ongoing the study suggests so far that clusters considered characteristic of aggregation sites merely result from intensive re-occupation of particular topographical locations with good logistics in the landscape. Whether these phases of re-occupation are interconnected is not clear at the moment.

Analysis of other late Upper Palaeolithic Magdalenian sites will hopefully enlarge our knowledge about dwelling construction during the Late Glacial, and further contribute to an understanding of Late Upper Palaeolithic Magdalenians lifeways. As Kolen puts it: »Dwelling [...] is more than physically erecting a home, as it also involves interrelated cultural and cosmological concepts, norms and values. It not only relates to the house or home base in particular, but also to spatial experience in general, and in this sense has wider geographical connotations« (Kolen 1999, 141).