

THE LBK ENCLOSURE AT HERXHEIM:  
THEATRE OF WAR OR RITUAL CENTRE?  
REFERENCES FROM OSTEOARCHAEOLOGICAL  
INVESTIGATIONS

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ABSTRACT

Numerous highly fragmented bones and some partial skeletons characterise the human skeletal remains at the Early Neolithic Linear Pottery Culture (LBK) enclosure of Herxheim, near Landau, Rhineland-Palatinate. The predominant portion of the archaeological and osteological finds had been deposited within apparent ditches, and these finds and the possible circumstances of their deposition led to the preliminary assumption that they were the result of a warlike conflict. First doubts were raised by the very large total number of at least 450 individuals. Moreover, the evidence that those skull injuries caused by strong blows had all completely healed, that intentional manipulation of the skulls, cut-marks and fragmentation of the postcranial skeleton were consistent among the finds, and that the human remains were laid down in depots, all suggest a recurring ritual act rather than a single warlike incident. Therefore, the hypothesis of a wartime event at Herxheim should be dismissed.

*Introduction: Linear Pottery Enclosures, Violence and Herxheim*

The Early Neolithic Linear Pottery Culture (LBK) of South Central Europe (Gronenborn 1999; Whittle 1996: 157–78) is generally characterised by ceramic bowls with incised linear band decoration; typical longhouse settlements; small-scale farming with cattle, pigs, sheep/goats, dogs, wheat, barley, lentils and flax as domesticates; and additional hunting and gathering. Around 5700 B.C., the first phase began to spread from Hungary to the middle Rhine valley, with settlements established mainly on fertile soils like loess. In the middle or Flomborn phase (ca. 5300–5000 B.C.), the LBK complex extended along the Rhine to the north and south, into areas in the Netherlands as well as southern Poland. In the late phase (5000–4900 B.C.), LBK settlements can be found from the Paris Basin in the west to central Poland and Moldavia in the east. The archaeological record of the later and latest phases of LBK shows signs of greater regionalism (Stehli 1989; Gronenborn 1997; Whittle 1996: 177–8; Zimmermann 1995) as well as evidence of cultural and/or subsistence crises (Gronenborn 1999: 187–90; Orschiedt 2001; Spatz 1998).

*Fortifications?*

Enclosures with V-shaped ditches are common from the LBK Flomborn phase onward (Andersen 1997: 172–8). Some of them were built with one or several parallel trenches around groups of longhouses. Whether the intended function of the LBK earthworks was mainly fortification, a manifest sign of social identity or rather a circumscription of ritual space is still under debate. Whittle (1996: 174–6) argues against a general defensive purpose, favouring the interpretation of formalised space “to reinforce . . . a sense of purely local identity and independence . . .” (*ibid.*: 176). In the final LBK period, however, an increase in physical conflicts can be observed, a fact that is sometimes combined with the fortification argument to draw a picture of a period of crises.

*Collective Violence*

Towards the end of the LBK, aggression was not restricted to hostilities between individuals but extended to systematic violence between groups. Sites like the mass grave at Talheim in SW Germany, containing thirty-four individuals, of whom eighteen were beaten to death from behind and three were severely injured by arrows (Wahl-König 1987; Whittle 1996: 170–71), or the earthwork at Asparn-Schletz in Austria that resembles the remains of a battlefield (Teschler-Nicola *et al.* 1996, 1997; Windl 1996), illustrate the results of such collective conflicts: extensive violence or even the physical destruction of a whole population. Even though the presence of late Mesolithic populations is well established during LBK times in regions with less fertile soils adjacent to LBK areas (Kind 1997; Louwe Kooijmanns 1993), it is not very likely that conflicts with these hunter-gatherer populations escalated towards the end of the LBK or became archaeologically manifest (c.p. Gronenborn 1999: 185–7; Whittle 1996: 176). Forensic evidence of blow marks from stone adzes (Wahl-König 1987) suggests that these conflicts most likely occurred among individuals, or populations or both within the Early Neolithic groups.

*Herxheim*

During construction in spring 1996 at an industrial area in Herxheim near Landau, Rhineland-Palatinate, an early Neolithic enclosure from the LBK period was discovered. From 1996 to 1999, a rescue excavation conducted by the State Office for Archaeological Monuments at Speyer investigated the SW third of the structure (Fig. 1). The northern and eastern parts were not examined because they were not then endangered, while the southern section had probably been destroyed earlier during construction of a storehouse: local people reported finds at that time of bones and human skulls. Only in summer



Fig. 1. The southwestern part of the LBK enclosure of Herxheim, excavated 1996–1999 with the two parallel systems of elongated pits forming apparent ditches.

2005 were new excavations started, due to planned construction works in the northwestern section of the enclosure.<sup>1</sup>

The rather elliptical enclosure, situated on a slight slope, may have occupied an area of 5 to 6 hectares with an extension of approximately 300 by 230 m. The inner area of the settlement has been largely destroyed by erosion, though a few postholes and flanking daub pits could be documented in

<sup>1</sup> While the excavation led by Anemarie Häußler was still underway, an international project was initiated for the investigation of the site (Häußler 2001b). Various researchers in different disciplines have contributed to this project, under the leadership of Andrea Zeeb-Lanz from the State Office for Archaeological Monuments Rhineland-Palatinate, Speyer (Germany). Research on the pottery is done by Christian Jeunesse (University of Strasbourg, France) and Samuel van Willigen (National Museum of Zürich, Switzerland), and the pits and the enclosure were analysed by Katja Schmidt (University of Strasbourg, France). The animal remains have been studied by Rose-Marie Arbogast (University of Basel, Switzerland), and the human remains are being examined by Miriam Noël Haidle (University of Tübingen, Germany) and Jörg Orschiedt (University of Hamburg, Germany). Investigation on the bone artefacts was carried out by Fabian Haak (State Office for Archaeological Monuments Rhineland-Palatinate, Speyer, Germany), the work on the flint and stone artefacts is done by Dirk Schimmelpfennig (University of Cologne, Germany), and the analysis of the botanical remains is carried out by Angela Kreuz (State Office for Archaeological Monuments Hesse, Wiesbaden). This project is kindly funded by the Deutsche Forschungsgemeinschaft (DFG). Additional support is granted to Miriam Haidle by the Alexander von Humboldt Foundation.

the west. The settlement was apparently surrounded by two parallel ditches; and the discovery in the ditches of a large number of scattered human remains and smashed skulls has raised the question of whether a violent large-scale conflict took place between LBK groups at Herxheim (Häußer 1998; Spatz 1998).

### *'Ditches' and their Archaeological Content*

In order to reconstruct the filling of the ditches, a profile was cut every 2.50 m. Surprisingly, all the profiles revealed different cross-sections, varying from rather shallow U-shaped profiles to deep V-shaped forms (Schmidt 2004a; 2004b). The presence of apparently parallel ditches with at least some V-shaped cross sections surrounding house structures led excavators to a preliminary assumption that this was a fortified late LBK settlement. This assumption, conjoined with the evidence of numerous and highly fragmented human remains, resulted in an initial working hypothesis of a battlefield or some kind of mass grave from a large-scale conflict in the course of a general environmental, subsistence and/or cultural-political crisis at the very end of the LBK.

Additional longitudinal profiles were cut parallel to the axis of the ditch, the interpretation of which was intensively debated. Katja Schmid demonstrated that the supposed ditches were in fact elongated pits with different depths, lying behind and overlapping each other (2004a; 2004b). In addition, the so-called Rosheim model published by Jeunesse and Lefranc (1999) used a linear concept to provide an explanation of the pits' puzzling features. In the first phase, a series of elongated pits was dug, each with its own individual measures and cross sections; the pits appear not to have all been open at the same time, but instead were dug successively, with at least some of them already in the process of re-filling while new ones were still made. In a later phase, the pits started to overlap and were sometimes cut within existing backfilled pits. The consequence is a rather complex pattern of elongated pits, with highly variable cross-sections and an overlap of different longitudinal profiles at the same location, pits that at a first glance might be construed as a ditch when archaeologically investigated today. Dating based on the typology of the pottery indicates that the site was constructed and used from the Flomborn phase to the final phase of the LBK.

### *High Frequency of Imports*

The artefact assemblage within the long fosses is dominated by pottery with a considerable proportion of complete vessels (Jeunesse van Willigen, pers. comm.). Flaked stone tools of flint and chert were present, accompanied by

ground stone artefacts and a number of mill stones (Schimmelpfennig 2001). Bone, antler and tooth artefacts like pendants and saddle querns (Haack 2001; 2002; 2003) were frequent elements within the animal bone inventory (Arbogast 2003).

The silex raw material, as well as the pottery decoration styles, is widespread in origin. Studies by Dirk Schimmelpfennig (2001; 2004; Zeeb-Lanz *et al.*, in press) on 482 silex artefacts showed 50 percent of high-quality flint, the main variants of which can be found at a distance of at least 250 km to the north of Herxheim in the Netherlands, though some of the other flint at Herxheim originates in the Paris Basin and Champagne region. Another considerable quantity of imported raw material is unspecific Jurassic hornstein from the Swabian and/or Franconian Alb; nearest deposits are located about 100 km SW of Herxheim (Schimmelpfennig 2001; 2004).

The high-quality pottery found associated with the human remains in the latest phase at Herxheim creates both similarities and differences. Besides a local Palatinate style, a large number of northern and eastern late LBK pottery styles can be observed, though there is no evidence of imports from the NW or west. The origins of the pottery styles found at Herxheim are widespread: Plaidt and Leihgestern types are present, as well as pottery from the Lower Main, the Rhine-Neckar, and the Elster-Saale group. The most distant styles come from Bohemia and the Elbe valley, about 400–500 km away (Zeeb-Lanz *et al.*, in press; Jeunesse van Willingen, pers. comm.).

### *Depots*

It is clear that the skeletal remains were not randomly thrown into the elongated pits. Regular concentrations of several skull caps (Fig. 2) could be observed, occasionally even stacked into each other. Other sectors of the enclosure contained considerable admixtures of facial fragments, jaws and other skeletal elements. In the course of the analysis of the elongated pit systems and the pottery styles, it became clear that the human remains were deposited only in the final LBK phase, within no more than 50 years. Some of the concentrations and accumulations of human remains were identified subsequently as depot-pits dug into the already-existing system of overlapping elongated pits (Zeeb-Lanz *et al.*, in press; Jeunesse van Willingen, pers. comm.).

### *The Human Remains*

Most striking at Herxheim were the numerous non-articulated human skeletal remains, 64% of which were discovered in the inner elongated pit system, 32% in the outer elongated pit system and only 4% in settlement pits (Häußer



Fig. 2. A typical calotte from one of the final LBK depots at Herxheim. Note the blow marks from the shaping of the skull cap.

1998; 2000; 2001a). The majority of the human remains were highly fragmented. Skeletal remains in anatomical context were rare, and only nine complete burials were discovered in the 'ditches' and pits. The position of the burials vary from flexed, which is most common in the LBK context, to nearly extended; the bodies can be regarded as usual burials within a settlement, a phenomenon well known in the LBK. Besides complete but entirely unarticulated skeletons, which seem to have been strewn in the pits, so-called torsos (Fig. 3) form another category of human remains at Herxheim. In most cases, those partial human skeletons, still in anatomical position, represented the pelvic area with fragmented femurs and parts of the spine, skeletal elements known to disarticulate only in a rather late stage of decomposition of the corpse. The largest category of human remains at Herxheim, however, consisted of only highly fragmented and scattered bones. Given the fact that the remains were found within loess soil, any possibility of taphonomic factors creating certain breakage pattern can be ruled out. Signs of carnivore or rodent damage, such as puncture marks on the bone surface, or bite or gnawing marks, were nearly absent.

#### *Calottes*

A preliminary investigation of the skeletal remains (Haidle-Orschiedt 2001) showed that the most noticeable elements are the numerous calottes, of which



Fig. 3. One of the torsos found at Herxheim: a partial skeleton still in articulation.

more than 400 specimens have so far been identified. All but a few skulls show traces of post-mortem manipulation. The edges of the majority of skull-caps, as well as many other cranial and post-cranial fragments, reveal fractures that occurred while the bone was still fresh. Nevertheless, it is impossible to determine exactly when the destructive manipulation occurred, since the breakage pattern reveals only a peri-mortar stage in which the bone was manipulated, and decomposition of the organic elements in bone depends on moisture, temperature and other environmental factors. Furthermore, fragmentation patterns indicating the breakage of fresh bone can still occur months or even years after death. Yet at Herxheim, not all the broken bones, especially the postcranial remains, indicate a fragmentation in the peri-mortar stage of bone decomposition. Some of the bones show dry breakage patterns indicating a post-mortar stage, in which they were treated. Fragmentation and fragment size of these bones prove a similar treatment to those bones that were manipulated in a perimortal stage.

#### *Intentional Modification of Skull Caps*

The skullcaps, which seem to be the most prominent anatomical element in the Herxheim assemblage, were subject to systematic manipulation. Identical procedures in a peri-mortar stage were followed in severing the calottes, even in those cases where separations were incomplete. Well-aimed hits on the

frontal bones, mostly to the centre of the foreheads and above the orbits, preceded blows along the line above the ears to remove the facial bones and the basicranium with the lower portions of the occipital, parietal and temporal bones; the removed pieces of the skulls are usually found mixed with other bone fragments. Few of the calottes have the left, the right or both orbital roofs preserved. In some cases, blows were also aimed to the sagittal line, splitting faces, mandibles and skull caps into symmetrical halves (Häußer *et al.*, in press; Haidle-Orschiedt 2001). A few calottes and other bones show superficial and local traces of applied heat; this might be due to incidental contact with live coal and ashes, small remains of which are embedded in sinter layers covering some of these bones.

### *Cut Marks*

In about 10 percent of the cases, the skin or scalp was removed prior to the blows that shaped the skulls into calottes. The evidence of the cut marks shows that this was always done in a similar way: horizontal cuts above the orbits, vertical cuts along the sagittal suture and oblique cuts on the parietals. In a few cases, cut marks are also found on the mandibles, usually on the ramus and in the area of the condyles, indicating removal of the mandible by cutting the ligaments and the *m. masseter*. The cut marks provide evidence that at least some of the individuals found at Herxheim had not decomposed to a sufficient degree to be manipulated in the simple way, but had to be treated by the opening and removal of the scalp and the lower jaw before they were shaped. Only a few cut marks on the postcranium have been identified during the ongoing analysis of the human remains; in these cases, cut marks were present on the scapula, the distal joint of the humerus and fibula, and the femoral neck, as well as on the second vertebra (axis) in the area of ligament and muscle insertions. Accordingly, there are no indications of systematic dismemberment or defleshing of the human bodies comparable to meat extraction from animal bodies (Häußer *et al.*, in press; Haidle-Orschiedt 2001).

### *Fragmentation of the Postcranial Elements*

Another characteristic aspect is the smashing of postcranial skeletal elements, especially the long bones. This was done intensively, as manifested in masses of long bone splinters. They commonly show spiral fractures accompanied by impact areas, which indicate an intentional breakage of the still-fresh bone in a peri-mortem stage. Hardly any long bone is preserved completely. Although the analysis of the human remains from the site is still in progress, it seems



that the distribution of skeletal elements is not proportional to their natural anatomical representation.

### *The Death Community of Herxheim*

More than 450 human individuals are represented by the bones discovered in the 1996–1999 excavation, with the remains of an additional unknown number destroyed in the course of constructing works in the south of the enclosure, and further skeletal remains possibly still buried in sections of the site not yet excavated. Assuming that all the human remains were in fact deposited within only 50 years (see above), it is very unlikely that they represent only a local population. Adding the evidence of high frequencies of imported stone raw material and non-local pottery styles, the Herxheim assemblage may be seen as a death community of mixed origin. Additionally, although the loess sediment supports even the preservation of tiny and fragile bones of children, the very fragmented, scattered and mixed condition of most of the remains makes a demographic analysis of the sample problematic. Determination of sex of the most interesting skull caps is impossible with the usual morphological methods; it can be effective only on other more or less complete bones thus rendering only a crude approximation of the real sex frequencies within the assemblage. Age determination, which should be roughly possible on the calottes for the adult individuals, with the help of the sutural closure patterns, is often impossible due to heavy sinter accumulations on the bone surface, which can not be removed without destroying the bones.

Nevertheless, some preliminary statements can be made describing the death community of Herxheim. All age groups between neonates and old matures are regularly present, there are women as well as men. Dental and general health status is generally good. Only a few weak enamel hypoplasias can be detected, contradicting a general and prolonged subsistence crisis in the final LBK phase. Degenerative changes of the joints and the spine are rare, indicating only a moderate work load.

### *Discussion: War at Herxheim?*

Although the site displays, at least in some parts, features like V-shaped ditches commonly assumed for fortified settlements, and despite the occurrence of scattered human remains, complete bodies, still articulated parts of corpses, and isolated remains with signs of perimortal breakage, the argument for a violent war-like conflict has to be rejected. Granted, the occupation of Herxheim was abandoned at the very end of the LBK, a time often seen as a period of economical crisis, in which acts of group violence have been

proven at Talheim in Germany (Wahl-König 1987) and Asparn-Schletz (Teschler-Nicola *et al.* 1996; 1997; Windl 1996) in Austria. Yet a major difference between these sites and Herxheim is the high frequency of isolated fragments, which make up more than 90% of Herxheim's human remains. Furthermore, while the violent acts at Talheim and Schletz are evident in typical and deadly lesions of the head, often inflicted from behind by blows with stone adzes, as well as injuries caused by arrows, a close inspection of the Herxheim skulls reveals that traumatic lesions here consist of only healed lesions, caused by a variety of different implements, and are evidenced in only 3–4% of the total sample of skull vaults. Thus the lesions document not group, but individual, violent incidents within the Herxheim sample. For example, one cranial vault had undergone three to four blows with blunt or semi-sharp objects to the frontal and the left parietal bone; judging from the different stages of healing, the individual must have faced at least two attacks separated by a considerable time span. All of the lesions were well healed without any serious complications, indicating that the individual had sufficient immunity and received some medical treatment, including care that must have exceeded a mere tending of the wounds, considering the mental disorders surely suffered during convalescence (Orschiedt *et al.* 2003). So far, no arrow-shot wounds have been detected in the Herxheim human remains.

### *How to Process More than 450 Individuals?*

In sum, the systematic perimortal breakage of the skulls and the postcranial remains of more than 450 individuals is the result of intentional manipulation and not of interpersonal violence. The sheer number of the Herxheim individuals, which would have had to include a presumed local population plus allies and enemies killed in the battle in order to reach that number, argues against this scenario. An additional large number of hostile armed forces would then have been needed to kill, butcher and thoroughly deflesh the men, women and children, manipulate their skulls and smash their long bones in the observed way—all within two or three days, based on the very low rate of animal gnawing marks—before carefully covering the bodies with soil. All of this is implausible. Moreover, if the smashing of the bones and the mixing and scattering of the fragments had indeed been done with all the fresh corpses at once, cut marks would be expected much more frequently and not in carefully placed patterns observed at Herxheim. Thus the low frequency and the regular location of the cut marks on some of the skullcaps, mandibles and postcranial remains further argue that these manipulations are not the consequence of taking war trophies, but the result of a systematic dismembering and defleshing of only one or a few individuals or single body parts at a time, prior to their fragmentation.

Another argument to weaken the hypothesis of a warlike scenario at Herxheim concerns the so-called ditches. Because the ditches never existed as a complete unified structure, but were created as a sequential agglomeration of elongated oval-shaped pits, they could not have provided fortification. Altogether, then, there is evidence of neither a fortified settlement nor of a massacre of its inhabitants and neighbour groups.

### *Ritual Treatment of Bones and Objects*

The absence of any signs of violent killing or of animal access to the corpses, added to abundant evidence of systematic manipulation, leads to the alternative hypothesis that the bones were purposefully laid down and buried in recurrent ritual actions. Accordingly, the accumulation of the remains of at least more than 450 individuals can be restricted to a maximum of 50 years. The clustering of skull caps, halves of maxillas and mandibles, as well as smashed and mixed long bone fragments, suggests a deposition of elements of up to 10 individuals in single discrete events. The variation in remains—torsos and other skeletal elements still in articulation, in addition to complete but widely spread skeletons; cut marks on only some individuals; and slightly differing breakage patterns—indicate the treatment of bodies in different stages of decomposition, sometimes in one event. Thus, the Herxheim material can be seen as an agglomeration of secondary burial events dealing with individuals as well as groups of dead.

Where the individuals reburied at Herxheim come from cannot yet be known, though a hint of the possible maximum catchment area is given by the origins of the stone raw material and the pottery styles. Emptied graves can probably be identified in the cenotaphs—fosses with the measures of grave pits without finds, which are often documented from LBK cemeteries (e.g. Schwetzingen: Behrends 1997; Haidle pers. observation; Sondershausen & Bruchstedt: Kahlke 2004).

### *Carnivore Bones as Part of the Ritual*

The interpretation of a ritual setting is further underlined by the association of not only ceramics and stone tools, but also specially treated animal bones, with the human remains in the so-called depots from the latest LBK phase. Two extraordinary examples of groups of associated animal bones will be noted. One assemblage composed of 23 halves of mandibles of small carnivores like marten, wildcat and fox was found together with metapodia and phalanges of these animals. Some of these mandibles exhibit cut marks and traces of red ochre, which may be the result of fur removal or special usage

as an amulet. Another sample within the animal bones consists of more than 200 remains of dogs. In contrast to other animal or human bones, their remains are rarely fragmented. Maxillas and mandibles are sometimes broken into halves. The remains are frequently articulated parts of skeletons, like complete paws. Occasionally, there are traces of fire and cut marks indicating activities like the removal of the skulls and scorching of the fur (Arbogast 2003). These examples illustrate a rather complex treatment of some of the animal species that differ markedly from the butchered animal remains usually found in an LBK context. They also show similarities to the treatment of human remains, like cut marks and the association with fire, as well as an agglomeration of the remains of several individuals in a number of accumulations.

### *Ritual Destruction of Pottery and Other Artefacts*

The preservation state of the pottery meets only in part the expectations for pottery from LBK settlement contexts. Besides the usual dispersed pottery fragments, there are large pieces of high-quality vessels as well as complete or almost-complete pots; the better-preserved ceramic specimens were generally found together with human remains. It seems plausible that these more or less complete vessels were broken during the deposition of the human remains (Jeunesse pers. comm.). A possible ritual meaning of pottery is also suggested by the discovery of a rather unusual vessel form in LBK contexts: a simple oval-shaped bowl, resembling the outline and size of a skull cap, found in one of the elongated pits that form the so-called ditches. This find illustrates the significant role of the shaping of the skull vaults within the ritual practices carried out at Herxheim.

As for other artefacts, mill stones, flint blades, stone axes and saddle querns found at Herxheim are usually incomplete and often show signs of deliberate destruction. The bone artefacts found were probably also deliberately destroyed, as they are frequently fragmented, although several complete pieces might represent regular grave goods; these display a larger spectrum of raw materials and broader range of forms than do bone artefacts from other LBK enclosures and settlements. Also unusually, a large number of animal and human tooth pendants appear among the ornament assemblage (Haak 2001; 2002). Finally, there is a fragmentary human figurine sculpted from clay. However, the association of the stone, bone, antler, tooth, and small ceramic artefacts with the depots, the human remains, and thus the final phase of the LBK has still to be checked for every single tool.

*Conclusion: Herxheim as a Ritual Centre*

Rather than having been a fortification, the function of the Herxheim enclosure can be described as a central place for ritual purpose and a necropolis, at least in the latest phase of the LBK, to which the human remains are dated by the associated pottery. As a maximum, the time span of that period amounts to 50 years, or about two generations. While the total number of individuals deposited in the elongated pits of the Herxheim enclosure remains unclear, a minimum number of individuals (MNI) of about 450 can be calculated on the basis of skulls and skull caps discovered in the course of the excavation of around one third of the structure. The projection of the number of individuals present, at least partially, in the complete enclosure to a probable total of 1,300 to 1,500 rules out the possibility of a local graveyard—and points a regional centre at Herxheim to which human remains were transported for the purpose of reburial. The extent to which skeletal manipulation took place here or elsewhere requires further investigation. At any rate, the large quantity of imported pottery and flint raw material found in the pit system indicates a wide-ranging contact network between a variety of regional LBK subgroups. This network area, evident in the regions of origin of stone and ceramic artefacts, should be regarded as a potential maximum range of the region of origin of the human remains at Herxheim; how much it can be reduced or put in more concrete terms will be determined by future research.

To organise the transport not only of stone tools and pottery but also of human bones and partial or maybe even complete corpses implies an efficient organisational and communication system. This is especially true if the multiple secondary burials took place not as chance events but in a regular and formalised way, as seems to be the case at Herxheim—an inference that pointedly challenges the hypothesis of a severe cultural crisis extending even to a collapse of the LBK community towards its final phase. Similarly, while it has been postulated that the process of social-political disintegration is manifested, for example, by the increasing diversification and regionalization of pottery styles, a phenomenon interpreted as a sign of loss of contact between the different LBK subgroups, there is no evidence of a basic economical crisis at the end of the LBK at Herxheim, where, instead, neither the health status of the buried individuals nor the archaeological finds shows any indication of war or economical depression, and where there is every indication that communication routes and bonds between LBK communities still existed. Thus the basis for a violent collapse of the LBK in general seems to be rather small. Violent outbursts were not uncommon in LBK communities, as seems usual for groups with similar social-organisational structures. The few

and nevertheless gruesome examples of organised group violence and war-like behaviour at Talheim and Asparn-Schletz confirm only that neither the LBK nor the end of that cultural complex was peaceful.

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