TOPICAL REVIEW – TEMATICKÁ SYNTÉZA

Structured depositions at Herxheim and elsewhere: Singular events or joint world views?

Strukturované depozice v Herxheimu a jinde: Ojedinělé události, nebo společné pohledy na svět?

Andrea Zeeb-Lanz

The exceptional enclosed site of Herxheim, characterised by hundreds of deliberately fragmented human skeletons whose skulls were transformed into calottes, alongside intentionally destroyed pottery and stone artefacts, constitutes one of the most significant assemblages of the late Linear Pottery culture (LBK). Comparable late LBK settlements with earthworks likewise display structured depositional practices and formal burials of human individuals within enclosure ditches. The site of Vráble, discovered and partially excavated in recent years, now provides a further case that is comparable to Herxheim in several aspects, although the specific social and historical circumstances underlying each site appear to have been highly particular. It is argued that the small number of LBK earthworks containing unusually treated human remains share a set of recurring features that point towards patterned practices. These practices cannot be meaningfully interpreted as evidence of large-scale warfare at the end of the LBK. Instead, they are more plausibly understood as material expressions of profound transformations in social relations, ritual practice, and ontological conceptions during this time. The destabilisation of established cosmological frameworks among the first farming communities may thus have played a significant role in the processes that ultimately led to the dissolution of the LBK cultural system.

Neolithic – Linear Pottery culture – violence – burials – skull caps – ritual

Výjimečné ohrazené sídliště Herxheim, charakterizované stovkami záměrně fragmentovaných lidských skeletů, jejichž lebky byly upraveny na tzv. kaloty, spolu se záměrně destruovanou keramikou a kamennými artefakty, představuje jeden z nejvýznamnějších souborů pozdní kultury s lineární keramikou (LBK). Srovnatelná pozdně LBK sídliště s ohrazeními rovněž vykazují strukturované depoziční praktiky a formální pohřby lidských jedinců v příkopech. Lokalita Vráble, objevená a částečně prozkoumaná v posledních letech, nyní poskytuje další případ, který je v několika ohledech srovnatelný s Herxheimem, ačkoli konkrétní sociální a historické okolnosti jednotlivých lokalit se zdají být vysoce specifické. Jsou předloženy argumenty, že malý počet LBK ohrazení obsahujících lidské pozůstatky se stopami neobvyklého zacházení sdílí soubor opakujících se rysů, které ukazují na ustálené vzorce jednání. Tyto praktiky nelze smysluplně interpretovat jako doklad rozsáhlých válečných konfliktů na konci LBK. Mnohem lépe je lze uchopit jako materiální projevy hlubokých proměn sociálních vztahů, rituální praxe a ontologických pojetí v daném období. Destabilizace zavedených kosmologických rámců prvních zemědělských komunit tak mohla sehrát významnou roli v procesech, které nakonec vedly k rozpadu kulturního systému LBK.

neolit – kultura s lineární keramikou – násilí – pohřby – lebeční kaloty – rituál

Introduction

The enigmatic Neolithic site of Herxheim (Southern Palatinate, Rhineland-Palatinate, Germany) has lost none of its fascination even after more than 25 years of intensive research. This fascination is due in large part to the uniqueness of the archaeological evidence, as well as to the fact that many questions about Herxheim remain unresolved – and the site

https://doi.org/10.35686/AR.2026.331

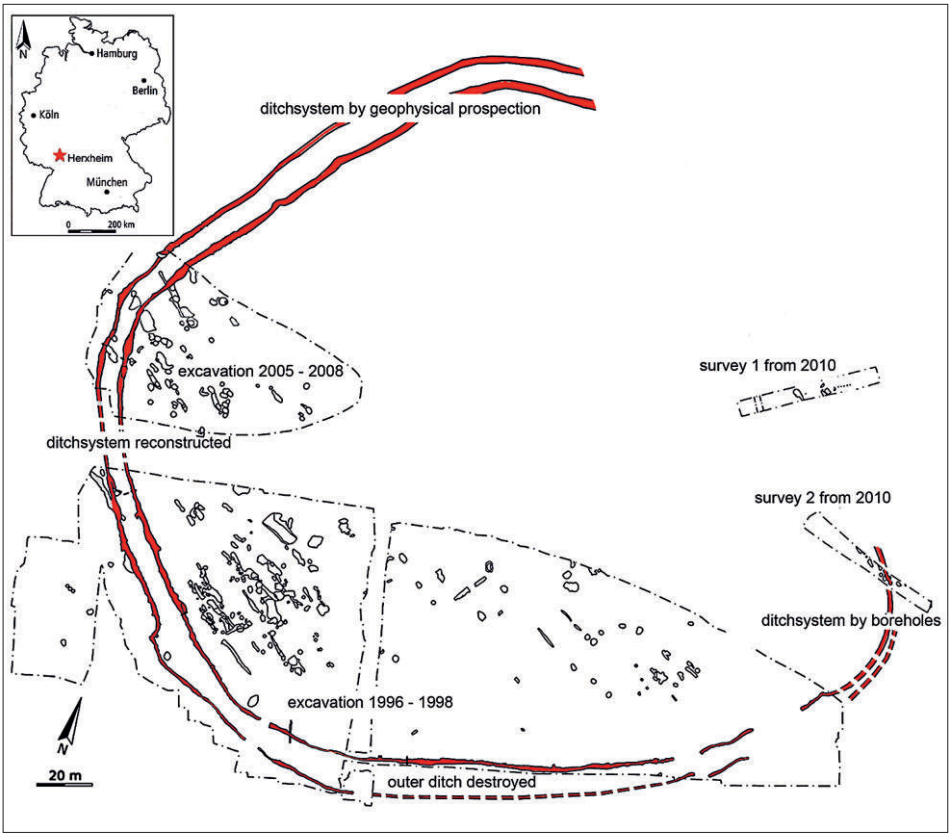

Fig. 1. Herxheim. General plan of the site after excavations and geomagnetic prospection (plan by F. Haack).

certainly played a central role in the end of the Linear Pottery culture (LBK), at least in its southwestern distribution area (*Zeeb-Lanz 2014*, 268).

During an excavation conducted in advance of the development of an industrial estate on the western edge of the municipality of Herxheim near Landau, the southern part (c. 3.5 ha) of an Early Neolithic settlement was uncovered in a four-year campaign (1996–1998; *Fig. 1*). As this was a rescue excavation conducted with time and financial constraints by the heritage authority, the features could not be documented at the level of detail that this exceptional site would actually have deserved. This shortcoming was addressed in a subsequent research excavation (2005–2008) employing state-of-the-art techniques such as 3D surveying and the digital recording of finds, as well as a methodology precisely tailored to the archaeological features (*Zeeb-Lanz – Haack 2016a*, 3–5). The care applied during the research excavation is evident from the fact that the same amount of time was invested in excavating and documenting less than 1 ha as had been needed for approximately 3.5 ha in the first excavation.

During the removal of the topsoil, what initially appeared to be a merely rudimentarily preserved Linear Pottery settlement surrounded by a double ditch turned out to be a fascinating archaeological feature that remains unparalleled in the prehistory of Europe to date.

Fig. 2. Herxheim. Example of a large find concentration (K 9/18) with the clustering of skull caps typical for this site, large numbers of smashed human bones, animal bones and pottery sherds (photo by F. Haack).

The central elements of the complex are two approximately parallel ditches; within these, the remains of approximately 600 human individuals were found, both in larger concentrations, reaching lengths of up to 7 m (*Fig. 2*), and in smaller clusters. The skeletons, which were only partially preserved in 96% of cases, had been smashed into small fragments. The long bones, for example, were often reduced to fragments less than 5 cm in length. Particular importance was apparently attributed to the heads of the deceased: the cranial base and facial skeleton were carefully removed from the skulls of nearly 500 individuals, leaving only the cranial vault (*Fig. 3*), i.e. the 'calotte' (*Zeeb-Lanz 2011*).

In addition to the human remains, the concentrations contained scores of fragments of intentionally destroyed ceramic vessels, many of them richly decorated. Associated with the human bones and the pottery were also shattered stone tools and grinding stones, as well as implements made from animal bone and unworked animal bones (*Zeeb-Lanz 2016a*; *Zeeb-Lanz et al. 2007*; *2009*; *2016*).

The decorated pottery dates the assemblages to the latest phase of the Linear Pottery culture, to which a large share of the preserved settlement pits also belong. However, pottery from a number of settlement pits proves that the village of Herxheim was already founded during the Flomborn phase and was then continuously occupied up to the latest LBK phase (*Zeeb-Lanz 2010*; *Zeeb-Lanz et al. 2014*, 13; *Haack 2016a*, 22). Contrary to earlier assumptions (*Zeeb-Lanz et al. 2007*, 199–200; *Jeunesse 2011*; *2018*), the excavation of the ditches in the form of individual long pits did not begin as early as the Flomborn phase. Instead, the ditches were dug shortly before the rituals took place that led to the assemblages contained within the features (*Haack 2017*, 559). Based on the documentation of the research excavations, *Haack* (*2016a*) was able to demonstrate that although long pits

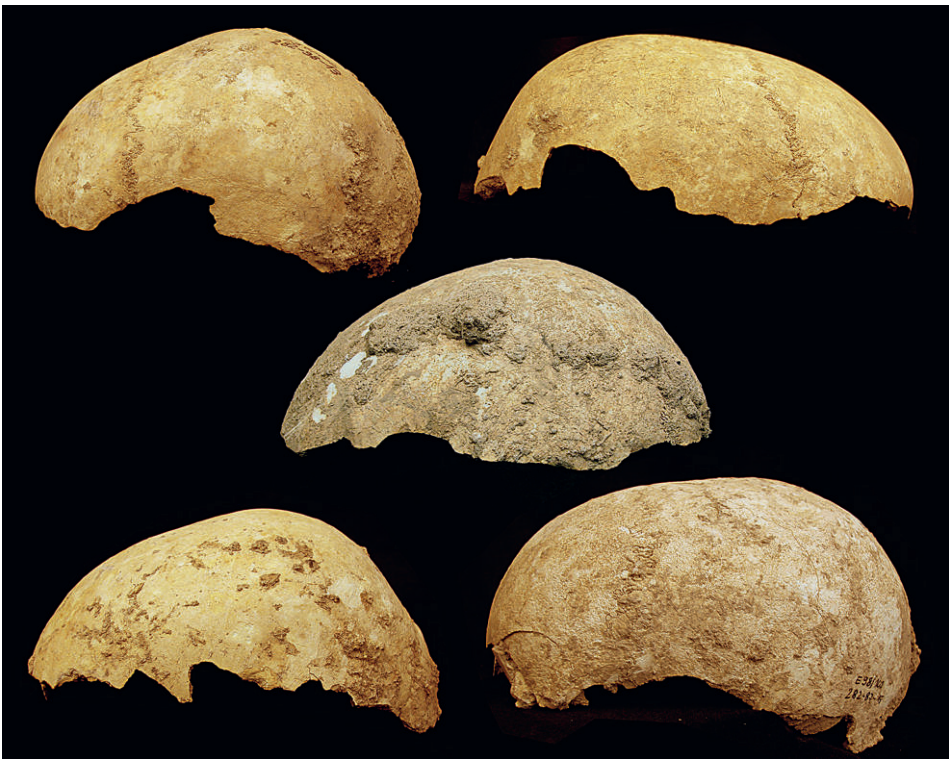

Fig. 3. Herxheim. These examples of skull caps demonstrate that there was a certain range of variation in the production of calottes: while in many calottes the entire cranial base was removed (top right, centre, bottom left), in others the upper part of the cranial base was left as part of the skull cap (top left, bottom right) (photo by J. Orschiedt).

represent the basic architectural form of the ditches, or at least of longer ditch segments, they do not intersect, but were clearly dug simultaneously and therefore do not correspond to the 'Rosheim model' (*Jeunesse – Lefranc 1999*; *Jeunesse 2011*, 31). This model describes an earthwork in which pits are repeatedly dug along a predetermined line and then quickly backfilled until there were so many refilled pits that they overlapped with the new ones, creating for the modern excavator the impression of a continuous ditch.

An extensive geomagnetic survey of the presumed total settlement area showed that no traces of ditches could be detected on the eastern side (see *Fig. 1*) of the approximately trapezoidal enclosure (*Haack 2016a*, 85–87). Taken together with Haack's findings that the excavation of the ditches must have preceded the creation of the assemblages by only a short period of time, this indicates that the Herxheim enclosure at no point served to defend the village, but most likely fulfilled ritual functions (*Zeeb-Lanz 2019b*, 443–444).

More than a hundred find concentrations consisting of human bones and artefacts have been documented. These assemblies vary considerably in size, extent, and composition; they may contain up to 4,000 bone fragments, but much smaller quantities have also been found. In addition to the assemblages recorded within the ditches, predominantly in the inner ditch, comparable concentrations also occur in a small number of larger settlement

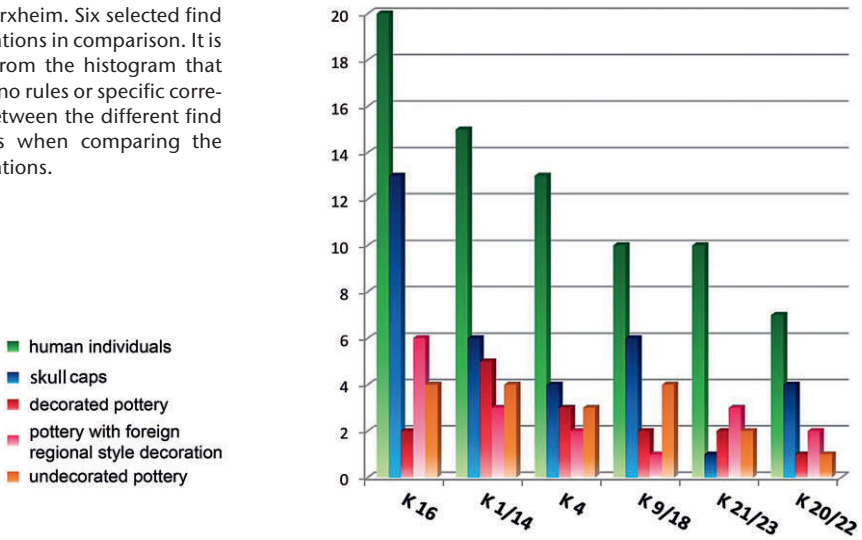

Fig. 4. Herxheim. Six selected find concentrations in comparison. It is obvious from the histogram that there are no rules or specific correlations between the different find categories when comparing the concentrations.

pits inside the enclosure. However, comparisons of the quantities and characteristics of the finds in various concentrations reveal no regular patterns of association (*Fig. 4*), as demonstrated by statistical analyses of a selection of these assemblages (*Zeeb-Lanz 2016b*).

Nevertheless, all of these concentrations are governed by clear rules and norms in the treatment of human bones and artefacts, as well as by a pronounced selectivity in the choice of the latter. The decorated pottery is characterised by an exceptional quality of manufacture and form, and among the lithic artefacts, only high-quality chert varieties were deliberately reduced to splintered and thus unusable pieces (*Schimmelpfennig 2019*). All of the find categories mentioned were intentionally destroyed as part of specific practices, just as the human remains were subjected to intensive manipulation before they were transformed into unrecognisable bone fragments and artefact-like cranial bowls and deposited in the ditches or additionally in a few settlement pits (*Zeeb-Lanz 2019a*). The following paper aims to provide a more in-depth examination of Linear Pottery phenomena, represented by special archaeological assemblages that are indeed associated with violence, and to interpret them from a different perspective. The question is actually whether the respective assemblages are to be seen as singular warlike events or whether we find traces of a joint change in world views in the late LBK, manifestations of which were connected to interpersonal violence.

Multidisciplinary research of Herxheim

The human skeletons and skeletal parts

Although approximately 96% of the excavated human remains—numbering around 80,000 specimens (*Zeeb-Lanz 2025a*, 228)—consist of smashed bones and manipulated skulls, other types of human remains are also present. These include several flexed burials in the ditches (*Fig. 5*) and in grave pits within the settlement area, as well as complete or

Fig. 5. Herxheim. Flexed skeleton of a man (inv. no. 282-12-10; age 35–50 years) who was buried in the inner ditch among a large number of fragments from other skeletons, pottery sherds and other artefact categories (the other artefacts and bone fragments had already been cleared away when the picture was taken during excavation, photo by A. Häußer).

Fig. 6. Herxheim. Torso of a man (inv. no. 282-6-8) consisting of the skull, the spinal column, the pelvis and the right femur. The missing facial bones show that the actors of the manipulations had started to create a calotte but had then abandoned this attempt and deposited the torso in the inner ditch (photo by A. Häußer).

Fig. 7. Herxheim. An isolated mandible from one of the find concentrations in the inner ditch. Several cut marks are perfectly distinguishable on the ramus (photo by J. Orschiedt).

nearly complete skeletons in other positions within the enclosure ditches, a small number of torsi (*Fig. 6*) in various states of preservation (*Langer 2025*, tab. 1), isolated skulls, and intentionally arranged 'nests' of skull caps and whole skulls (see *Fig. 8*; *Zeeb-Lanz 2019b*, 432).

No traces of killing can be identified on the bone fragments or the calottes of the smashed individuals; however, given the large number of people who died within a short period of time, it must be assumed that they did not die of natural causes (*Zeeb-Lanz – Haack 2016b*, 257). The treatment of the bodies has already been described in detail on several occasions (*Boulestin et al. 2009*; *Boulestin – Coupey 2015*; *Bauer 2019*), so only the most important points are briefly summarised here.

The bones of the deceased display numerous indications of *perimortem* manipulation, such as cut marks (*Fig. 7*) and scraping traces, which point to the dismemberment of individuals who, to all appearances, had been killed beforehand. Flesh and soft tissues were then meticulously removed from the body parts. Subsequently, the bones—especially the long bones, but also ribs and other skeletal elements—were smashed into small fragments (*Boulestin – Coupey 2015*, 51–58).

The heads of the deceased received particular attention from those who carried out these bodily manipulations. After removal of the scalp, as the numerous cut marks on all areas of the skull attest, the cranial base and facial portion were severed by targeted blows, probably from stone adzes (*Zeeb-Lanz 2025b*, 232), leaving only the cranial vault (calotte). In total, almost 500 such calottes were recovered during the two excavation campaigns; the considerable number of additional fragments of cranial vaults suggests a total of approximately 600 individuals (*Zeeb-Lanz 2019b*, 430), whose remains were excavated during the two archaeological campaigns. As only the skull was used for an approximation of the total number of individuals (*Boulestin – Coupey 2015*, 101), other body parts, such as long bones, cannot be drawn on for a more precise estimation. The latter are usually smashed in a manner that renders it impossible to determine precise quantities. Since the northern third of the enclosure and the settlement area within remains untouched in the ground, it can be assumed that 1,000 or more (*Boulestin – Coupey 2015*, 101) people were killed at Herxheim in the late LBK (*Zeeb-Lanz 2025a*, 232–233).

Fig. 8. Potentially intentionally arranged 'nest' of several skulls (without the lower jaw) in the outer ditch. The arrows indicate the carefully cut-out long triangles from the humeri lying on both sides of the central skull (photo by F. Haack).

Fig. 9. Dislocated bones from an individual (inv. no. 282-130-1) in a bone concentration in the inner ditch. The anthropological examination has shown that the skull, the arm with the hand still attached, and most of the bone fragments and whole bones that lie around all belong to a single individual (photo by A. Häußer).

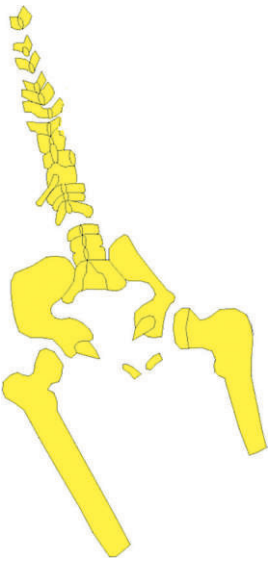

Fig. 10. Schematic representation of bones comprising a torso (inner ditch, slot 282-61) without skull, arms, ribs, and lower legs; the femora were intentionally cut off above the knee (drawing by F. Haack).

In addition to the modified cranial vaults, there are also a few completely preserved isolated skulls, which were found in three deliberately staged depositional scenarios. Particularly striking is the concentration of five skulls in the outer ditch. Three of them were arranged in a row, with the central skull framed by two long bones from which a long triangular piece of bone had been deliberately removed (*Fig. 8*), as proven by the exact same size of the triangle in both long bones.

Several flexed burials also form part of the human finds at Herxheim (*Zeeb-Lanz et al. 2006*, 63). Five of these represent regular settlement burials in grave pits within the interior area of the enclosure, while three others were located in the inner and one in the outer ditch. A complete skeleton in a supine position in the inner ditch may likewise be interpreted as a 'regular' burial. In addition, there are three nearly complete skeletons in anatomical articulation, as well as one disarticulated but likewise almost complete individual (*Fig. 9*).

Three torsos, all of which were found in the inner ditch, display noteworthy similarities. Two consist of spine–pelvis–femur torsos, in which the vertebral column is only partially preserved and the femora had been severed above or at the knee (*Fig. 10*). The third torso comprises a skull, vertebral column, pelvis, and one femur (see *Fig. 6*). Of particular interest is the observation that an attempt had been made to produce a calotte from the individual's skull while it was still connected to the spine by tendons and/or muscles. After the facial skeleton had been largely removed, however, the manipulators abandoned this attempt and deposited the partial skeleton in the inner ditch (*Langer 2025*, tab. 1).

Additional skeletal elements that were still in anatomical articulation at the time they were deposited in a concentration, such as several connected vertebrae, some upper extremities, and a small number of complete hands or feet, have not yet been quantified in greater detail. Also worth mentioning are three neonates/infants that were deposited as complete skeletons in the typical flexed position, both in concentrations within the inner ditch and in one assemblage in a settlement pit, together with other human bones and calottes (*Zeeb-Lanz 2019b*, 430). As a final category of the 'aggregate state' of human remains

Fig. 11. Two examples of high-quality pottery from the concentrations of Herxheim. A – bottle with decoration in the Elster-Saale style; B – Bottle decorated with ornaments in the Rhine-Main hatching style (photos by F. Haack).

from Herxheim, isolated long bones that were not smashed but occur in some concentrations alongside shattered skeletal elements should be mentioned (*Haack 2009*).

Decorated pottery

Although decorated pottery has not yet been published in detail (*Häussler – Zeeb-Lanz in preparation*), preliminary studies have already been carried out (e.g., *Zeeb-Lanz et al. 2007*; *Haack 2016a*). The pottery is of extraordinary quality and is distinguished by its well-polished surfaces, fine ornamentation, and overall highly accomplished workmanship (*Fig. 11*). In this respect, it surpasses all assemblages known to date—whether from burials or settlements—from the entire western LBK area, as was impressively demonstrated at a recent workshop featuring original ceramics from numerous stylistic regions of the late/latest LBK (*Zeeb-Lanz in print*).

What makes the Herxheim pottery exceptional is not only its outstanding quality, but above all the fact that substantial numbers of vessels from no fewer than twelve regional stylistic zones of the latest LBK (*Fig. 12*) have been identified, except for Bavaria and the Paris Basin (Bliquy), from which only a single vessel unit each is represented (*Eva Häussler, pers. comm.* 20 October 2025; see also *Zeeb-Lanz 2017*, 109–110; *2019b*, 432–434). Chemical analyses of the clay compositions (*Mecking 2019*) have provided some indications that vessels decorated in non-local styles originate from regions other than those producing the Palatinate-style pottery (*Jeunesse et al. 2009*). However, the results of these analyses are by no means conclusive. Petrographic analyses of the minerals within the clay matrices are currently underway and are expected to yield clearer results on this issue.

Even if the non-local-style vessels had been produced in the Palatinate or directly at Herxheim, potters must nonetheless have been present on site who either originated from the respective regional style areas or at least possessed knowledge of the decorative traditions. This circumstance points to far-reaching connections between the inhabitants of the Neolithic village of Herxheim and, in some cases, quite distant settlement areas of the LBK.

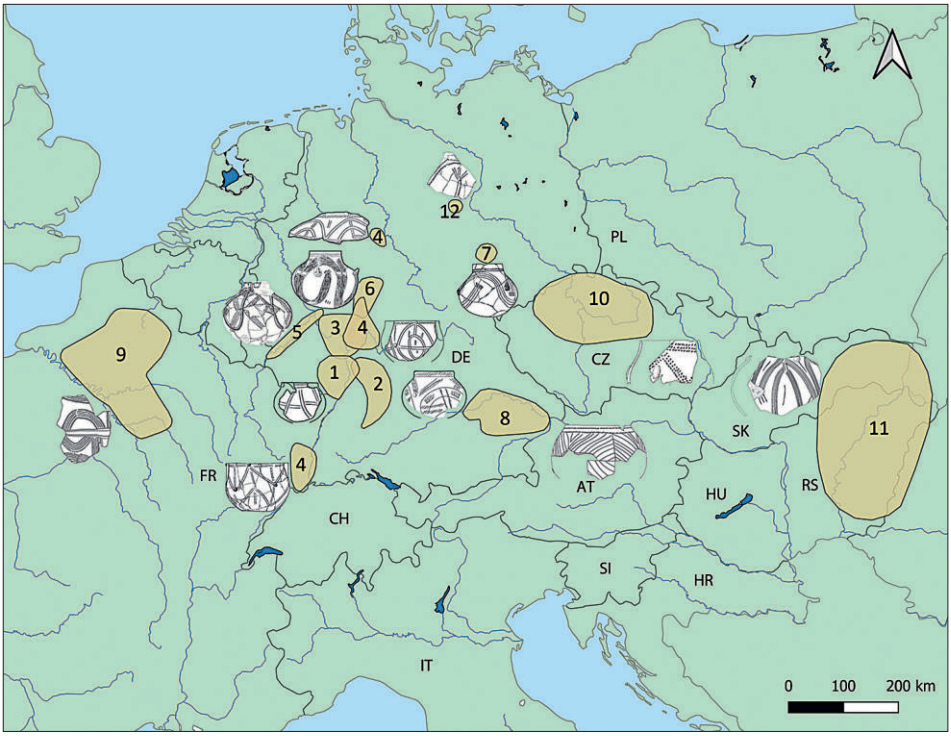

Fig. 12. Map of the origin areas of the different regional styles represented on the Herxheim pottery. 1 – Palatinate/mouth of the Neckar style; 2 – Neckar style; 3 – Rhine-Main-hatching style; 4 – style 'X'; 5 – Moselle-Rhine area style (Plaidter style); 6 – style of Leihgestern; 7 – Elster-Saale style; 8 – style of Bavaria; 9 – style of Blicquy/Villeneuve-Saint-Germain; 10 – Šárka style; 11 – Bükk style; 12 – style of Thuringia (map by E. Häussler and J. Buchholz).

With the exception of a small group of miniature vessels, all pottery was intentionally smashed, a practice that also applies to the undecorated ceramics. The fact that many of the pots, bottles, and bowls—naming only the principal vessel forms—can be largely reconstructed indicates that the destruction took place directly on site (*Zeeb-Lanz 2019b*, 432–436).

The stone implements

The spectrum of lithic artefacts from Herxheim comprises tools and a small number of arrowheads made of flint, axes of igneous and metamorphic rock, as well as grinding and whetstones, the latter predominantly made of sandstone (*Schimmelpfennig 2019*, 113–117).

Overall, both the quantity and the range of flint tool types at Herxheim correspond to the typical spectrum of Linear Pottery settlements. However, two aspects are exceptional. Within the artefact assemblage specifically examined from the research excavations, the majority (91.3%) are made of chalk flint (*Schimmelpfennig 2019*, 97), which originates from Western Europe (France, Belgium, the Netherlands). All corresponding raw material sources are located more than 200 km from Herxheim (*Schimmelpfennig 2019*, 86). In addition, among flint tools made from high-quality raw materials such as this chalk flint,

Fig. 13. Herxheim. A huge stone slab (grinder) weighing 12 kg was first put into an open fire and then smashed into seven pieces, six of which were found in different parts of the inner and outer ditch (photo by D. Schimmelpfennig).

there is a disproportionately large share of splintered pieces, i.e. blades deliberately rendered unusable that had previously been employed as harvesting tools. The destruction of sickle blades fits well with the pattern of intentionally smashed pottery and other deliberately broken artefacts (e.g. adzes; cf. *Schimmelpfennig 2019*, 107–109). It can likewise be assumed that specific motives underlay the deliberate disabling of flint artefacts and broken stone axes from the find concentrations (*Zeeb-Lanz 2019b*, 436).

With regard to the stone axes, the high share of pieces showing damage that cannot be interpreted as traces of heavy use is particularly noteworthy (*Schimmelpfennig 2019*, 107). Some blades were evidently shattered by force, breaking into large fragments (e.g. *Schimmelpfennig 2019*, 108, figs. 10–12).

The destruction or deliberate disabling of objects runs like a red thread through all quantitatively significant categories of finds, including grinding stones and whetstones. From the southern excavation area (1996–1999 campaign), which encompasses a much larger settlement area than the second excavation campaign, a total of nine complete grinding stones (five grinders and four saddle querns) were recovered. These may, at least in part, belong to the earlier, 'normal' settlement phases of the site rather than to the period of destruction rituals. In contrast, a very high share of fragmented grinding stones, some smashed into numerous pieces, can be attributed to the latter phase. Many of these grinding-stone fragments, which appear to have been placed in fire for thermal stress before being broken (*Schimmelpfennig 2019*, 117–121), come from find concentrations in the two ditches (*Fig. 13*).

Other find groups in the concentrations

In addition to the manipulated human skeletons, the vast quantities of smashed pottery, and the destroyed stone implements, other artefact groups are also represented in the find concentrations within the ditches for which no traces of intentional destruction could be documented. These consist primarily of implements made from animal bone (*Haack 2003*;

Fig. 14. Herxheim. Eight perforated human teeth (4 molars, 2 premolars, 2 incisors) from find concentration K 41 in the southwestern part of the inner ditch (photo by F. Haack).

2008; *2013*) and items of jewellery made of limestone, shells (*Rähle et al. 2019*), animal teeth and bones, and—in one case—clay (*Zeeb-Lanz 2019c*, 71–73). Particularly noteworthy are eight perforated human teeth (4 molars, 2 premolars, and 2 incisors) from find concentration K 41 in the southwest of the inner ditch, which were evidently worn as ornaments (*Fig. 14*). A ninth perforated tooth (deciduous incisor) came to light in layer 7009 in the northwest of the inner ditch. Finds of perforated human teeth are thus far very rare in Linear Pottery contexts (e.g. Vráble: *Furholt et al. 2023*, 51).

Animal bones likewise constitute a not insignificant share of the material recovered from concentrations in the ditches (*Arbogast 2019*). In addition to ordinary butchery waste, particular mention should be made of the almost 30 bucrania and individual cattle horn cores. Bucrania in particular are interpreted in many prehistoric cultures as symbolically and ritually charged objects (e.g. *Deschler-Erb et al. 2002*). Other unusual faunal finds include wing bones of large wading birds and a concentration of mandibles of small carnivores such as polecat, marten, stone marten, and wildcat. Herxheim also stands out for its unusually large collection of dog bones in a Linear Pottery setting, including almost 300 specimens representing at least 13 animals (*Janssens et al. 2019*).

In addition to the investigation and evaluation of the features and the individual categories of finds, various scientific analyses were carried out in order to extract further information from the deceased of Herxheim.

Radiocarbon dating

Samples for radiocarbon dating were taken from 35 human individuals, including both complete skeletons and isolated mandibles/teeth, and measured in three different laboratories; 22 individuals in this inventory yielded reliable results. Unfortunately, as is well known, the calibration curve exhibits a plateau between roughly 5200 and 5000 BC (*Riedhammer 2019*; *Weninger 2020*), meaning that the fortunately normally distributed dates (*Riedhammer 2019*, 290, fig. 2) can only be narrowed down to a time span of about 250 years within the Linear Pottery period. Bayesian modelling suggests that the special activities at Herxheim that resulted in the smashed human bones and the associated artefacts took place within an approximate time window of c. 5050–5030 cal BC (*Riedhammer 2019*, 296).

Stable isotopes – strontium

The nearly 100 tooth enamel samples from complete skeletons, isolated skulls, and 'mandible individuals' from the find concentrations at Herxheim that were analysed for strontium produced unexpected results. About 90% of sampled individuals were non-locals who had not grown up in Herxheim or its immediate surroundings. Instead, the values indicate that a large share of these non-local individuals originated from higher upland regions characterised by granite and gneiss bedrock (*Turck et al. 2012*; *Turck 2019*)—areas for which no permanent Linear Pottery settlement has yet been convincingly documented (*Valde-Nowak 2002*; *Turck 2019*, 393–398). Particularly striking among the samples from isolated mandibles in the find concentrations was the high share of individuals with elevated to very high values that are entirely atypical for the LBK (*Fig. 15*). This suggests that the manipulated individuals were people who did not belong to the local Linear Pottery population.

Stable isotopes—carbon and nitrogen

During the first excavation campaign in the 1990s, 21 human samples (long bones and crania) were taken for analysis of the stable isotopes ^{13}C and ^{15}N. These were compared with data from the cemetery of Trebur (c. 85 km from Herxheim) in order to investigate whether diet differed significantly between the late Early and early Middle Neolithic (*Dürrwächter 2003*). Only two of the 21 Herxheim samples came from burials within the settlement area; all other samples—with the exception of one burial in the outer ditch—came from the inner ditch and for the most part belonged to smashed individuals.

For Herxheim, the results showed that the diet was relatively unremarkable and fell within the range of the diet known for the LBK (*Dürrwächter 2003*, 60). However, greater variability was observed in the nitrogen values. *Dürrwächter* (*2003*, 61) attempted, by comparing the settlement burials, securely regarded as local Herxheim inhabitants, with the samples from the ditches, to propose the cautiously phrased hypothesis that locals may have consumed more cereals and less meat than the individuals from the ditches. Subsequently, however, radiocarbon dating revealed that one of the burials in the settlement area dates to the Middle Ages (*Turck 2019*, 337, comment 25). This leaves only a single Early Neolithic burial for the settlement–ditch comparison, meaning that the comparison cannot yield meaningful results.

At present, a total of 130 samples from Herxheim are being analysed for ^{13}C and ^{15}N values in bone as part of a research project on LBK diet at the Spanish Research Council in Barcelona. These analyses are expected to provide statistically robust results on dietary practices. For the Herxheim project in particular, the focus will be on the question of whether individuals exhibiting high strontium values differed in their dietary choices from the typical Linear Pottery populations of the lowlands.

Genetic analyses

The first series of samples for the determination of mitochondrial DNA (n=26) was taken explicitly from the tooth roots of selected teeth whose enamel had already been used for strontium analyses and which exhibited particularly high Sr ratios. The aim was to

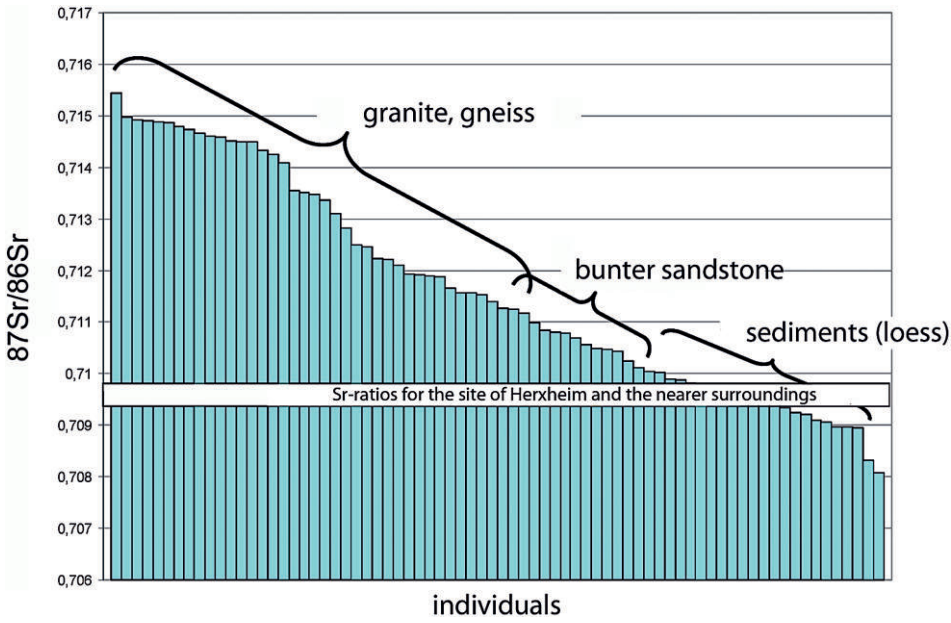

Fig. 15. Herxheim. Histogram of the Sr-analysis results from the first molar of 74 human individuals (after *Turck 2019*, 374, fig. 54).

address the question of whether the individuals from higher upland regions might represent Late Mesolithic groups. However, all 26 samples yielded haplogroups typical of the Central European Linear Pottery culture (*Blöcher et al. 2019*). Not a single sample provided any indication of a direct origin of an individual from the indigenous Mesolithic population of Europe.

In the meantime, a further 70 individuals were analysed in a new DNA collaboration project with the universities of Vienna and Harvard, focused on whole genome sequencing. The sampled individuals likewise display Anatolian-origin haplogroups and do not represent Mesolithic individuals (unpublished; *Pinhasi pers. comm.*). In this new genetics project, which will ultimately analyse samples from approximately 550 individuals from Herxheim, particular attention will be paid to questions of kinship among the dead of Herxheim.

Discussion

Taking stock of the findings outlined above, it becomes clear that Herxheim represents a unique site, one that to date has no direct analogue not only in the Early Neolithic but in the entirety of European prehistory. When considering the largest and most important category of finds at Herxheim—the human remains—it can be observed that, despite all variability in detail, their treatment follows specific rules and norms that were repeatedly considered in the same manner for at least 96% of the documented individuals. Some of these rules evidently also apply to the main artefact groups, namely pottery and stone implements.

The actions at Herxheim that led to the find concentrations in ditches and settlement pits represent a form of special ritual activity. In the sense proposed by *Burkert* (*1997*), this activity is likely to have involved a high degree of communication between the ritual actors, possible spectators, and the victims of the actions themselves.

The destruction of both human bodies and material constitutes a consistently present and important aspect of the ritual practices at Herxheim. However, it is not necessarily the case that the manipulation of human skeletons—particularly the production of cranial vaults—was motivated by exactly the same considerations as the smashing of pottery and stone tools.

Ritual destruction of valuable artefacts is well known from many prehistoric and protohistoric cultures (e.g. *Nebelsick 1997*; *Horn 2011*). In such cases, the predominant motivation for destruction—especially in the context of offerings to deities or objects that had been symbolically ritually charged through ceremonial actions—is their rendering unusable for profane purposes, or a change to an extent that renders profane reuse impossible. Examples such as the 'potlatch of destruction' illustrate that the notion of a gift to the gods, the appeasement of deities, or the veneration of ancestors often play a central role in such sacrifices. The Kwakiutl (Vancouver Island, North America) and the Tlingit (northwest coast of Canada), for instance, conduct a special exchange of gifts during a potlatch, which are subsequently intentionally destroyed, often by exposure to fire. The aim of these actions is the symbolic transfer of the gifts to a deity or to the revered ancestors (*Mauss 2016*, 86, note 132).

This aspect may also apply to the destruction or disabling of artefacts at Herxheim—objects offered to the gods and thus withdrawn from profane use. However, it must be taken into account that only very specific categories of objects were destroyed at Herxheim. For example, all implements made of animal bone or antler, which occur in fairly large numbers (*Haack 2003*), were entirely spared from destruction or even damage; the same applies to jewellery and clothing accessories (*Haack 2021*, 36–37).

The interpretation proposed earlier—that the ritual activities at Herxheim, culminating in the sacrifice and smashing of human individuals, were accompanied by ritual feasts during which the subsequently destroyed vessels, flint and stone tools, and grinding stones were used (*Zeeb-Lanz 2019b*, 445–446)—fits this pattern very well. After the feast, these ritually charged objects would have had to be withdrawn from the profane sphere, which was probably ensured by their destruction. In their fragmented state, they may in turn have acquired a new meaning and possibly served to create or reinforce bonds among the participants in the ceremonies (*Chapman 2000*), but it is impossible to describe a specific scenario here (*Chapman et al. 2023*; see also *Zeeb-Lanz – Gramsch 2023*). At the same time, the fragments of the ritually charged objects may well have continued to function as offerings to ancestors or deities.

A certain degree of force is required to smash, for example, stone adzes or grinding stones. However, in this context, violence does not play a destructive or negative role, but rather constitutes a necessary component of the ritualisation of the objects and is thus positively connoted, at least for the actors of the special actions at Herxheim (*Zeeb-Lanz et al. 2014*, 44).

Demographic analysis of the dead from the research excavations at Herxheim has shown that the age structure of this population does not correspond to that of a typical prehistoric mortality population from a cemetery. Rather, the pronounced overrepresentation of older

adolescents and young adults reflects a living population (*Boulestin – Coupey 2015*, 114). This makes the killing of several groups of living individuals, which moreover represent the most potential part of any population, highly probable for Herxheim (*Zeeb-Lanz 2019b*, 465). An interpretation of the dead as human sacrifices, therefore, appears plausible.

Human sacrifice is demonstrably attested in prehistoric cultures. Numerous descriptions of human sacrifice exist as indirect sources for the Aztecs, Inca, and Maya. However, these accounts were generally produced only after European conquest and were written by Spanish or Portuguese priests, and thus must be treated with critical caution (*Verano 2008*, 1045). Nevertheless, direct evidence from archaeological investigations has indeed been documented in more recent times (e.g. *Reinhard – Ceruti 2000*; *Ceruti 2004*; *Besom 2009*). A prominent example is the mass sacrifice of children and llamas in the Moche Valley in Peru: 140 boys and girls ranging from 5 to 14 years of age (*Prieto et al. 2019*, 23), as well as more than 200 llamas were sacrificed and buried there. The children were presumably subjected to heart extraction, as indicated by incisions through the sternum and the widening of the rib cage observed in all of the victims (*Prieto et al. 2019*, 5).

For the LBK, reference should be made to the unusually buried individuals from Eilsleben, above all a young woman who was interred beneath a bucranium with a crushed frontal plate. Several grinding stones had been placed on the bucranium; the woman's head was forced into a completely unnatural position bent backwards. The extreme flexed posture suggests that the body had been bound. The excavator interpreted this burial and further irregular interments from Eilsleben as probable human sacrifices (*Kaufmann 2001*; *2003*).

The human sacrifices at Herxheim were not merely killed and then deposited in the enclosure ditches. Rather, prior to deposition, they underwent a prolonged, standardised sequence of manipulations that ultimately resulted in skeletal remains smashed into small fragments and no longer identifiable as human bodies. The skulls, too, were modified in such a way that the facial skeleton, which unmistakably identifies a person as a member of the species *Homo sapiens*, was removed. What remained was only the cranial vault, evoking an artefact in the form of an oval bowl.

This treatment of the dead at Herxheim was driven by a very specific motivation that, unfortunately, can no longer be deciphered. It is well known that in prehistoric cultures (and in modern indigenous ones) people not belonging to the in-group, i.e. 'foreigners', could and can be treated differently in death than individuals from the in-group. They can be subjected to sacrifice with or without decapitation or other special treatment (e.g. *Sutter – Cortez 2005*; *Stavreva 2017*). The high strontium ratios of a large number of the samples from Herxheim hint at the conclusion that these individuals did not belong to the 'normal' LBK communities living in the loessial plains of Europe. On the contrary, their aDNA haplogroups are common in LBK populations, so we cannot be sure that the special treatment of the manipulated dead from Herxheim results from their being strangers. They might have originated from low mountain ranges but may well have been integrated into LBK communities later in life, as they were not truly outsiders but of the same genetic ancestry as the members of the farming communities. Ongoing studies on dietary issues concerning these individuals from mountainous areas may shed further light on the relationships between Linear Pottery groups from loessial regions and those from higher mountain areas (*Morell Rovira in preparation*).

Nevertheless, the handling of the dead at Herxheim—and in parallel that of the artefacts—suggests that a new worldview may be reflected here, one that is not encountered

Fig. 16. Selected examples from a concentration of about 30 lower jaws from small carnivores, e.g. marten, stone marten, polecat, and wild cat in slot 282-96-6 of the inner ditch (photo by R.-M. Arbogast).

in the earlier Linear Pottery culture. The treatment of the dead, unprecedented in this form and on this scale, may point to a transformation in the relationship between the living and the dead, as well as a change in the relationship between humans and an animistic environment—overall, a new cosmology. Exceptional faunal finds from Herxheim, such as the wing bones of wading birds, the concentration of halves of mandibles of small carnivores which bore traces of ochre (*Fig. 16*), and the special treatment of dogs (*Arbogast 2019*, 159), further underscore this interpretation. Such profound changes in the ritual–religious sphere were certainly not restricted to the few communities that gathered in Herxheim for ritual ceremonies.

In the latest phase of the LBK, further sites can be identified, pointing to a novel relationship among Linear Pottery groups, as well as within LBK communities themselves, and thus to a new worldview. At these sites, deceased individuals were treated in special ways and were not buried according to regular funerary practices. In general, recent research has linked most of these sites to a sharp increase in intergroup aggression or violence.

These sites include, in particular, Talheim in Baden-Württemberg, Germany (*Wahl – König 1987*; *Wahl – Trautmann 2012*); Asparn-Schletz in Lower Austria (*Teschler-Nicola et al. 1996*; *Windl 2001*; *Wild et al. 2004*; *Pieler – Teschler-Nicola 2023*); Kilianstädten in Hesse, Germany (*Meyer et al. 2015a*); and Halberstadt in Saxony-Anhalt, Germany

(*Meyer et al. 2015b*; *2018a*; *Fibiger 2018*). For these sites, massive violence between different Linear Pottery groups has been postulated, which is thought to have been responsible for the demise of the LBK in a widespread scenario of warfare and crisis (*Petrasch 1999*; *Golitko – Keeley 2007*). Other scholars are more cautious and argue that the tangible evidence of interpersonal violence, even at the group level, can indeed be described as armed conflict, but that it is not yet appropriate to speak of 'war' in the Early Neolithic (*Beyneix 2007*; *Fibiger et al. 2023*), and that the LBK period should not be regarded as '*particularly belligerent*' (*Fibiger 2021*; *Fibiger et al. 2023*, 2). Here, I understand war as an organised and coherent violent action conducted between different established groups (cf. *Lincoln 1991*, 138). War affords military training and presupposes societies with an established hierarchy that makes it possible to appoint leaders in the event of war and to implement clear chains of command. Organised wars could, in the eyes of some scholars, therefore not be defined earlier than in the Late Neolithic or Early Bronze Age (*Beyneix 2001*, 329; *2007*).

In contrast, I use the term 'warfare' for violent and lethal encounters between smaller groups from rather egalitarian societies, like the Early Neolithic LBK. The independent groups—kinship groups within a community, communities or even several linked communities—acted as independent political units, and raids or comparable violent actions cannot be seen as '*part of an all-encompassing, simultaneously occurring pan-LBK conflict*' (*Meyer et al. 2018a*, 7). According to the definition of *Otterbein* (*1989*, 40), ambushes, raids and skirmishes are the predominant form of warfare in primitive (egalitarian) societies (see also *Otterbein 1994*).

It is noteworthy that prior to the discovery of the first LBK sites containing multiple individuals who had died violent deaths, the then widely accepted view held that the egalitarian communities of the early farmers had lived peacefully alongside one another and diligently gone about their daily work, without any aggressive confrontations (*Link 2014*, 271). This notion was very quickly reversed with the discoveries at Talheim and Schletz. Comments characterising the (late) LBK populations as '*violentes, barbares, brutales*' (*Guilaine – Zammit 1998*, 136) or stating that '*the western LBK is comparable to the most violent known societies, in which conflict is a constant preoccupation*' (*Golitko – Keeley 2007*, 335) exemplarily demonstrate the enormous impact that the discoveries of these two sites had on the research community. This assessment culminated in a widely accepted article from 2007, in which claims such as '*there are a number of well-known LBK contexts that have demonstrated that violence was often quite severe during the Early Neolithic of Central Europe*' (*Golitko – Keeley 2007*, 333) are to be found. All of the mentioned sites, including Herxheim, have already been jointly discussed and interpreted in numerous publications as evidence of 'war-mongering' Linear Pottery communities (e.g. *Farruggia 2002*; *Golitko – Keeley 2007*; *Meyer et al. 2014*; *2018b*).

I do not intend to discuss the notion of Neolithic or prehistoric war in general; numerous scholars have published books and articles addressing the topic (e.g. *Keeley 1996*; *Ehrenreich 1997*; *Haas 1999*; *Thorpe 2003*; *Christensen 2004*). It is the aim of this paper to show that among the dozen or so known LBK sites with traces of interpersonal lethal violence, there are at least some which cannot be unconditionally regarded as direct proof of war or warfare. The settlement area of the LBK covered about 700,000 square kilometres at its peak expansion (*Dubouloz 2008*). Therefore, it is inaccurate to speak of 'war in the LBK' given the overall low number of lethal conflict scenarios.

Thus, empirically unsupported statements concerning the Linear Pottery culture, e.g. '*in the imbalances that arise, such as the heterogeneous distribution of resources, lies one of the main reasons for the wars that develop*', or '*both mass graves* [Talheim, Schletz] *mark the beginning of the phenomenon of war in Central Europe and are two examples of direct archaeological evidence of collective and organised violence—in other words, war*' (*Meller 2013*, 239–240; translation by the author) are not helpful when we want to decipher the meanings of actions such as the manipulations at Herxheim or Vráble, for instance. Articles with titles like '*War and murder in the Linear Pottery culture*' (*Petrasch 1999*) likewise suggest seemingly proven scenarios and do not reflect the wide variability of possible functions that manipulated and possibly also sacrificed individuals may have had in the late LBK.

However, there is a growing number of dissenting voices opposing these war hypotheses (e.g. *Zeeb-Lanz 2009*; *Link 2012*, 124–126; *Stäuble 2014*, 27–28; *Link 2014*; *Zeeb-Lanz et al. 2014*, 44–46; *Zeeb-Lanz 2019b*, 460–462). In his work, *Link* (*2014*) undertook the effort to subject most of the aforementioned evidence to critical review, exposing many preconceived notions that lack an archaeological foundation. These assumptions tacitly presume that the motivations for violent confrontations in the Early Neolithic must have been the same as those underlying modern wars—namely, competition for land for food production (*Fibiger et al. 2023*, 1) or, alternatively, acts of retaliation for previous attacks, poaching, the capture of slaves or women, disputes over territory, or general claims to prestige or power (*Golitko – Keeley 2007*, 339). These assumptions can perhaps be proven for ethnographic analogies, but not for the LBK thousands of years ago.

Apart from the four sites cited above, there are additional LBK sites with 'special treatment' of the dead, such as Zauschwitz (*Pasda et al. 2004*), Tiefenellern (*Kunkel 1955*; *Orschiedt 1997*; *Boulestin 2017*), and Menneville (*Hachem et al. 1998*; *Thevenet 2016*; *Thevenet et al. 2023*). Although no evidence for massive lethal violence has been identified at these sites, at least peri- or post-mortem manipulation of bodies, unusual treatment of the dead, or extraordinary burial compositions can be documented (cf. *Zeeb-Lanz – Haack 2016b*). Some of the sites can be grouped under various general categories:

- Massacres/executions of several individuals or groups of people (Talheim, Halberstadt, Kilianstädten)
- Special burial practices (Tiefenellern, Menneville, Wiederstedt, Zauschwitz [?])

The LBK site with a village ditch at Vaihingen an der Enz (*Krause 1998*) is not considered here, as the burials in, at, and around the ditch do not constitute special burials. The ditch was not used as a burial place during its active phase; rather, the grave pits were cut into the already backfilled ditch after its period of use. It therefore represents a regular village cemetery (*Krause 1997*, 106–110).

Another selection criterion is the presence of enclosing ditches in which dead humans are deposited in an irregular or special manner, such as in Herxheim, Menneville, and Schletz. The most recent and important example to be added to this list is Vráble, Slovakia (*Furholt et al. 2020a*; *2020b*; *2023*). For Menneville, results including the most recent (*Thevenet et al. 2023*) once again demonstrate that this is a site whose ditch system contains very particular burials, fitting well into the pattern of enclosure sites with specially treated inhumations, a category to which Vráble definitely has to be assigned as well.

According to the conventional long-standing narrative, Schletz represents a site where, in an attack on a Linear Pottery village, all inhabitants were massacred. The attackers then threw a number of the defenders into the surrounding ditches of the settlement, where they remained—at least for some time—freely accessible to carnivores (for a brief overview of the evidence, see *Link 2014*, 274–276). There have been voices for more than a decade, including mine, that have expressed doubts about this interpretation (*Zeeb-Lanz 2009*, 93; *Link 2014*, 274–279; *Zeeb-Lanz – Haack 2016b*, 252; *Zeeb-Lanz 2019b*, 462). Important evidence was presented by new DNA analyses performed on 93 individuals from the ditch, water well, and settlement burials, 92 of which yielded usable results. The ratio of genetically related to unrelated individuals at Schletz is only 0.15, whereas the comparative cemeteries of Polgár-Ferenci-hát (Hungary) and Nitra–Horné Krškany (Slovakia) display values of 0.83 and 0.65, respectively (*Gelabert et al. 2024*, table 1).

Among the 69 individuals from the Schletz enclosure ditch for whom whole genomes were sequenced, the authors of the study identified only a single pair of first-/second-degree relatives, as well as one possible kinship link between an individual from the ditch and a burial within the settlement. Consequently, only four individuals within the sample of 69 are related to one another up to the third degree. A single direct father–son relationship between two individuals from the massacre context, together with the data cited above, demonstrates that the 'attack' on the settlement apparently involved hardly any members of the village community itself, but predominantly people from other groups outside Schletz. The latter is based on the fact that there are hardly any genetic relations between the analysed individuals, but more of these kinship relations would be expected in a community. It is therefore possible that entirely different interpretations are required for Schletz as well—interpretations that open up completely new perspectives beyond the simple and seemingly obvious, but not necessarily correct, thesis of a violent and murderous attack by one Linear Pottery community on another. It would be entirely possible to account for ritual meanings for the archaeological findings at Schletz (*Zeeb-Lanz 2009*, 93).

The ongoing projects concerning this site, which now pose new riddles, will hopefully also shed additional light on the many unresolved questions surrounding Schletz. The project *United by Crisis* at the University for Continuing Education Krems investigates the immediate surroundings of the site through surveys in order to further clarify the role of Schletz as a potential central place and to identify possible reasons for the events that occurred here some 7,000 years ago.

The settlement of Vráble is among the largest Linear Pottery sites in Europe (*Furholt et al. 2023*, 47). Comprising three 'neighbourhoods' (*Müller-Scheeßel et al. 2021*, 66), the settlement in the valley of the Žitava River was inhabited for over 300 years, between approximately 5250 and 4950 BC (*Meadows et al. 2019*). At its peak, as a central settlement, each neighbourhood contained up to 80 houses existing simultaneously (*Furholt et al. 2023*, 48; *Müller-Scheeßel et al. 2023*, 181: 60 houses). The areas of the three sub-settlements each display an approximately trapezoidal ground plan (*Furholt et al. 2020a*, 471). This layout, however, is only clearly recognisable in the south-western neighbourhood, as it was surrounded in its final phase by a double ditch (*Müller-Scheeßel et al. 2021*, 67). Trapezoidal ditches constitute a construction tradition that is repeatedly encountered in enclosed Linear Pottery sites and is, in fact, represented by the great majority of known LBK ditch systems (*Haack 2016b*, 333–335; *Zeeb-Lanz – Haack 2020*, 193).

During the excavations, up to the end of 2017, the remains of 19 human individuals were discovered (*Müller-Scheeßel et al. 2021*, 5); since then, however, this number has increased considerably, not least due to additional isolated skeletal finds but also as a result of the discovery of a mass grave containing 37 individuals (*Furholt et al. 2023*, 49–51 with Fig. 10). Except for a skull fragment from the northern neighbourhood and a single complete individual from a longitudinal house pit in the south-eastern sub-settlement, the vast majority of human remains were uncovered in the south-western neighbourhood (*Müller-Scheeßel – Hukeľová 2020*, 161). What is striking about the human remains is not only that the majority of the skeletons are headless, but also that these headless individuals—apart from those in the mass grave—were deposited in pairs, in a seemingly 'strategic' manner, at the western ditch terminals of entrances in the outer ditch and, in one case, also in the inner ditch (*Müller-Scheeßel – Hukeľová 2020*; *Müller-Scheeßel et al. 2021*, 5–7). In addition, there are regular crouched burials in grave pits; six of these were found on both sides of the ditch system (*Müller-Scheeßel et al. 2023*, 182).

The mass grave, located in the eastern ditch head of the southern entrance, has so far yielded 37 skeletons, 36 of them headless. Only the single child among the individuals in the mass grave retained its skull and was deposited in a regular burial position with flexed legs. The skeletons were laid on or close to the ditch bottom and display various body positions. In addition to the complete headless skeletons, 15 concentrations of isolated bones lacking any anatomical connection were documented in the centre of the mass grave. The assemblage of human remains in this mass context is further supplemented by at least 25 skeletal elements—parts of skeletons such as entire arms or legs (*Müller-Scheeßel et al. 2023*, 49–51).

Photographs of the mass grave (*Müller-Scheeßel et al. 2023*, figs. 8 and 9) clearly show that the bone deposits extend into the eastern section profile. This means that further skeletal finds in the southern section of the outer ditch are certainly to be expected in future excavation campaigns. Consequently, the mass grave is likely to contain a—possibly considerably—higher number of human skeletal remains than the excavators have been able to document so far.

The researchers working on Herxheim have long been waiting for a site such as Vráble. There are fundamental differences between the two sites. Herxheim is a place where the main body of finds consists of ritually smashed human remains and destroyed artefacts, whereas at Vráble the evidence largely comprises burials with or without heads. Nevertheless, the two settlements are linked by a whole array of similarities (see *Furholt et al. 2023*, 49; *Zeeb-Lanz 2019b*, 430–432):

- The occupation span of both settlements is approximately 300 years. Special depositions and the associated actions took place at the end of their respective periods.
- Both sites feature ditches that contain human remains in considerable numbers.
- The human individuals were (at least for the most part) manipulated in one way or another.
- Besides nearly whole skeletons, partially articulated skeletal elements and isolated bones occur in the ditches of both sites.
- Regular burials in settlement pits are also documented at both sites.
- At Vráble, intentional accumulations of pebbles occur within the mass grave, but also in association with headless individuals and articulated skeletal elements.

At gate 5 in the southwest of the enclosure, an actual pebble pavement was documented, although no human remains were present there (*Furholt et al. 2023*, 52). At Herxheim, several find concentrations yielded accumulations of small, rounded clay pellets. The highest number (26 pellets) was found in concentration K16 (research excavation), while the second-largest amount (11 pellets) came from a concentration of the rescue excavation (slot 282-11) (*Zeeb-Lanz 2019c*, 67–69).

- The occurrence of several perforated human teeth, which are very rare in LBK contexts, also links the two sites.

In this respect, Vráble and Herxheim show the greatest number of similarities among the four known ditch systems with human remains. Kilianstädten is not included in the comparisons, as it is unclear whether the excavated ditch segment constituted part of a proper enclosure. Schletz can be compared with the sites of Herxheim and Vráble: the enclosure also consists of two parallel ditches, with the inner ditch containing (apart from a single burial) only isolated human bones, which occur throughout all fill layers (*Pieler – Teschler-Nicola 2023*). The settlement existed for approximately the same period as Herxheim and Vráble. At all three sites, the construction of the ditches as well as the deposition of manipulated/killed individuals can be dated to the end of the occupation sequence.

Most of the human remains at Schletz were found in the ditches, including three regular burials. Another 14 burials were discovered within the settlement area, but there was also a burial outside the earthwork, as at Vráble (*Pieler – Teschler-Nicola 2023*, 152 Table 1). Remarkably, among the regularly buried individuals, there are also some with perimortem cranial injuries, which *Pieler* and *Teschler-Nicola* (*2023*, 162) classify as 'massacre victims'. Partial skeletons occur predominantly in ditch II, but sporadically also in settlement pits. According to the current state of research, the partial skeletons in the ditch are attributed exclusively to taphonomic processes (the loss of bone material during the period of exposure in the open ditch) as well as to extensive carnivore gnawing. As a final category, it is necessary to mention isolated bones, which were documented in numerous settlement pits and also in the well at Schletz. This enumeration clearly shows that the three sites share numerous similarities despite the singular overall situation at each of them.

Menneville, the fourth site with earthworks containing human individuals, presents yet another image (*Thevenet 2016*; *Thevenet et al. 2023*). Here, alongside regular burials in the settlement area and in ditch segments, it is primarily combinations either of several interred individuals (usually including young children) or of fragmented human skeletons that were deposited together with animal remains (mostly domestic animals such as cattle and goats) on the bottoms of ditch segments. Pure animal depositions also occur. The investigators identify repetitive structuring patterns and assume that, not least, the animal depositions were subject to recurring codified rules. The depositions, which are concentrated in the ditch segments, are attributed to symbolic and ritual motivations.

Conclusion

With the four causewayed enclosures discussed here, a dimension of evidence related to human remains becomes apparent. Despite all differences, they share a whole series of common features. It has been shown that ditch systems containing human individuals

	Herxheim	Vráble	Menneville	Schletz
Burials in ditch	X	X	X	X
Burials in settlement contexts	X	X	X	X
Whole/nearly whole skeletons	X	X	X	X
Torsi	X	X	X	X
Isolated bones	X	X	X	X
Animal burials			X	
Animal bones	X	X	X	X
Special finds (pebbles, clay pellets)	X	X	X	

Tab. 1. Comparison of the four LBK enclosures with human remains in the ditches. The table shows clearly that Herxheim, Vráble, and Menneville share most similarities concerning human finds.

in various 'states of aggregation', such as Herxheim, Vráble, and Menneville, certainly had different specific meanings. Yet, in view of their clear parallels, they are likely to be rooted in an overarching worldview, perhaps even one immanent to the LBK as a whole. Seen through these shared features (*Tab. 1*), even a site such as Schletz becomes a context that may require a different assessment rather than representing a case of a simple warfare calamity.

As early as the 19th century, prominent scholars such as the anthropologist and ethnologist E. B. Tylor were aware that early cultures—considered 'primitive' from the perspective of his time—had possessed an animistic worldview, traces of which can still be found among indigenous peoples today (*Tylor 1873*, 460–476; see also *Sahlins 2022*). In such a worldview, humans are not at the centre of events; rather, the entire environment is. Animals and plants are ensouled, have their specific agendas and constitute important actors in people's everyday lives—everything is interconnected. A further step would be to include cosmology in the sense of shamanistic worldviews as well (*Zeeb-Lanz – Reymann 2019*, 15).

An example of a possible interpretation grounded in an animistic worldview is provided by the clay pellets from Herxheim and the pebbles from Vráble: clay pellets could stand for 'earth', pebbles for 'water', as pebbles originate from water and are shaped by it. In this way, a symbolic connection may have been established between the individuals deposited in the ditches and these elements. Of course, it is unfortunately not truly possible for us to decipher the symbolic language of LBK people.

If one proceeds from the premise that the LBK cosmology—which, as is evident from the causewayed enclosure examples discussed here, certainly placed varying emphases in different communities—was fundamentally different from our modern worldview, it becomes difficult to continue to uphold the explanation of 'simple war in the LBK', at least for the sites of Herxheim, Vráble and potentially also Schletz. Of course, a ritual setting does not automatically rule out warlike activities, as many archaeological and ethnographic examples demonstrate (e.g. *Zinko 2020*). And it is not at all my intention to resurrect the old image of a completely peaceful early farming culture. A site such as Talheim is and remains the result of an aggressive act of violence, probably a sort of raid on a village, and the controlled execution of nine individuals at Halberstadt also counts among violent scenarios connected to warfare as lethal encounters between smaller subgroups of rather egalitarian societies. Yet the opposite extreme—a global crisis at the end of the LBK with

wars at many places—is just as untenable as the image of utterly peaceful farming communities.

With regard to sites like Herxheim and Vráble, one could speculate about changes in the cosmology in late LBK society, which were, in the end, in part responsible for the demise of this culture. Special sites such as Herxheim and Vráble in particular demonstrate very clearly that we are still far from having solved all the riddles surrounding the earliest farming communities and that the time has come for new, nuanced explanatory frameworks that take into account the particular characteristics of each of the special sites with traces of violence in the LBK.

I would like to thank the editors for giving me the possibility to publish my views on particular late LBK enclosures and the end of the LBK in this special edition of the journal Archeologické Rozhledy. Also, I would like to express my sincere thanks to Eva Häussler and Jonas Buchholz for creating the map in Fig. 12 of this article.

References

Arbogast, R.-M. 2019: Analysis of the faunal assemblages of the LBK site of Herxheim: the larger mammals. In: A. Zeeb-Lanz, Ritualised Destruction in the Early Neolithic – The Exceptional Site of Herxheim (Palatinate, Germany), Vol. 2. Forschungen zur Pfälzischen Archäologie 8.2. Speyer: Generaldirektion Kulturelles Rheinland-Pfalz, Direktion Landesarchäologie–Speyer, 139–232.

Bauer, S. 2019: Human bones from the rescue excavation 12996–1999. Examination of selected material (excavation slots 282-100 to 282-107). In: A. Zeeb-Lanz, Ritualised Destruction in the Early Neolithic – The Exceptional Site of Herxheim (Palatinate, Germany), Vol. 2. Forschungen zur Pfälzischen Archäologie 8.2. Speyer: Generaldirektion Kulturelles Erbe Rheinland-Pfalz, Direktion Landesarchäologie–Speyer, 3–24.

Besom, T. 2009: Of Summits and Sacrifice: An Ethnohistoric Study of Inka Religious Practices. Austin: University of Texas Press.

Beyneix, A. 2001: Aux origins de la guerre: actes de violence et massacres dans le Néolithique Européen. Revue des Études Anciennes 103, 329–342.

Beyneix, A. 2007: Réflexions sur les débuts de la guerre au Néolithique en Europe occidentale. L'Anthropologie 111, 79–95. https://doi.org/10.1016/j.anthro.2006.12.017

Blöcher, J. – Figarska, S. M. – Burger, J. 2019: Genomic analysis of Early Neolithic humans from Herxheim, Germany. In: A. Zeeb-Lanz, Ritualised Destruction in the Early Neolithic – The Exceptional Site of Herxheim (Palatinate, Germany), Vol. 2. Forschungen zur Pfälzischen Archäologie 8.2. Speyer: Generaldirektion Kulturelles Erbe Rheinland-Pfalz, Direktion Landesarchäologie–Speyer, 305–312.

Boulestin, B. 2017: Tiefenellern „Revisited". Ergebnisse einer erneuten Bearbeitung des menschlichen Knochenensembles der Linearbandkeramik aus der Jungfernhöhle bei Tiefenellern (Lkr. Bamberg). Bericht des Historischen Vereins Bamberg 153, 7–36.

Boulestin, B. – Coupey, A.-S. 2015: Cannibalism in the Linear Pottery Culture: The Human Remains from Herxheim. Oxford: Archaeopress.

Boulestin, B. – Zeeb-Lanz, A. – Jeunesse, C. – Haack, F. – Arbogast, R.-M. – Denaire, A. 2009: Mass cannibalism in the Linear Pottery culture at Herxheim (Palatinate, Germany). Antiquity 83, 968–982. https://doi.org/10.1017/S0003598X00099282

Burkert, W. 1997: Homo Necans: Interpretationen Altgriechischer Opferriten und Mythen, 2nd edition. Religionsgeschichtliche Versuche und Vorarbeiten 32. Berlin – New York: de Gruyter.

Ceruti, M. C. 2004: Human bodies as objects of dedication at Inca mountain shrines (north-western Argentina). World Archaeology 36, 103–122.

Chapman, J. 2000: Fragmentation in Archaeology. People, Places and Broken Objects in the Prehistory of South Eastern Europe. London: Routledge. https://doi.org/10.4324/9780203759431

Chapman, J. – Gaydarska, B. – Jakob, T. 2023: New perspectives on deliberate fragmentation and bodily mobility. Germania 101, 165–188. https://doi.org/10.11588/ger.2023.108258

Christensen, J. 2004: Warfare in the European Neolithic. Acta Archaeologica 75, 129–156.

Deschler-Erb, S. – Marti-Grädel, E. – Schibler, J. 2002: Bukranien in der jungsteinzeitlichen Siedlung Arbon-Bleiche 3. Status, Kult oder Zauber? Archäologie der Schweiz 25(4), 25–33.

Dubouloz, J. 2008: Impacts of the Neolithic Demographic Transition on Linear Pottery Culture Settlement. In: J.-P. Bocqet-Appel – O. Bar-Yosef (eds), The Neolithic Demographic Transition and its Consequences. Berlin: Springer, 207–234. https://doi.org/10.1007/978-1-4020-8539-0_9

Dürrwächter, C. 2003: Archäometrische Analysen zur ökonomischen und kulturellen Transition beim Übergang vom Früh- zum Mittelneolithikum. Mainz: University of Mainz. Unpublished MA thesis.

Ehrenreich, B. 1997: Blood Rites: Origins and History of the Passions of War. New York: Metropolitan Books.

Farruggia, J.-P. 2002: Une crise majeure de la civilisation du Néolithique danubien des années 5100 avant notre ère. Archeologické rozhledy 54, 44–98.

Fibiger, L. 2018: Conflict and violence in the Neolithic of Central-Northern Europe. In: M. Fernández-Götz – N. Roymans (eds), Conflict Archaeology: Materialities of Collective Violence from Prehistory to Late Antiquity. EAA Monograph Series „Themes in Contemporary Archaeology" 5. New York: Routledge, 13–22.

Fibiger, L. 2021: Steven Pinker's 'Prehistoric Anarchy': A bioarchaeological critique. In: P. Dwyer – M. Micale (eds), The Darker Angels of our Nature: Refuting the Pinker Theory of History and Violence. London: Bloomsbury Academic, 107–124.

Fibiger, L. – Ahlström, T. – Meyer, C. – Smith, M. 2023: Conflict, violence and warfare among early farmers in Northwestern Europe. Proceedings of the National Academy of Sciences 120, e2209481119. https://doi.org/10.1073/pnas.2209481119

Furholt, M. – Cheben, I. – Müller, J. – Bistáková, A. – Wunderlich, M. – Müller-Scheeßel, N. (eds) 2020b: Archaeology in the Žitava Valley I – The LBK and Želiezovce settlement site of Vráble. Scales of Transformation in Prehistoric and Archaic Societies 9. Leiden: Sidestone.

Furholt, M. – Cheben, I. – Wunderlich, M. – Bistákova, A. – Fuchs, K. – Hukeľova, Z. – Szilágyi, K. – Kühl, T. 2023: A new peculiar mass deposition of headless human bodies from the LBK settlement in Vráble, SW Slovakia. The European Archaeologist 78, 47–54.

Furholt, M. – Müller-Scheeßel, N. – Wunderlich, M. – Cheben, I. – Müller, J. 2020a: Communality and Discord in an Early Neolithic Settlement Agglomeration: The LBK Site of Vráble, Southwest Slovakia. Cambridge Archaeological Journal 30, 469–489. https://doi.org/10.1017/S0959774320000049

Gelabert, P.– Bickle, P. – Hofmann, D. – Teschler-Nicola, M. – Anders, A. – Huang, X. et al. 2024: Social and genetic diversity in first farmers of central Europe. Nature Human Behavior 9, 53–64. https://doi.org/10.1038/s41562-024-02034-z

Golitko, M. – Keeley, L. H. 2007: Beating ploughshares back into swords: warfare in the Linearbandkeramik. Antiquity 81, 332–342. https://doi.org/10.1017/S0003598X00095211

Guilaine, J. – Zammit, J. 1998: Le sentier de la guerre. Visages da la violence préhistorique. Paris: Editions du Seuil.

Haack, F. 2003: Knochenstäbchen – Zur Terminologie bandkeramischer Knochengeräte. In: H. Bernhard (ed.), Archäologie in der Pfalz. Jahresbericht 2001. Rahden/Westfalen: Marie Leidorf, 266–270.

Haack, F. 2008: Gewandknebel, Geweihknebel, Knochenknebel, Spondylusknebel – Zur Technologie, Typologie und Chronologie linienbandkeramischer Grabbeigaben. In: F. Falkenstein – S. Schade-Lindig – A. Zeeb-Lanz (eds), Kumpf, Kalotte, Pfeilschaftglätter. Zwei Leben für die Archäologie. Gedenkschrift für Annemarie Häußer und Helmut Spatz. Internationale Archäologie. Studia Honoraria 27. Rahden/Westfalen: Marie Leidorf, 117–128.

Haack, F. 2009: Zur Komplexität der Verfüllungsprozesse der Grubenanlage von Herxheim: Zwei Konzentrationen aus Menschenknochen, Keramik, Tierknochen und Steingeräten der Grabungen 2005–2008. In: A. Zeeb-Lanz (ed.), Krisen – Kulturwandel – Kontinuitäten. Zum Ende der Bandkeramik in Mitteleuropa: Beiträge der internationalen Tagung in Herxheim bei Landau (Pfalz) vom 14.–17.06.2007. Internationale Archäologie. Arbeitsgemeinschaft, Symposium, Tagung, Kongress 10. Rahden/Westfalen: Marie Leidorf, 27–40.

Haack, F. 2013: „Ein Beutel voller Knochennadeln" – Produktion und Deponierung von außergewöhnlichen Knochenspitzen aus der linienbandkeramischen Siedlung von Herxheim. In: A. Zeeb-Lanz – R. Stupperich (eds), Palatinatus Illustrandus. Festschrift für Helmut Bernhard zum 65. Geburtstag. Mentor. Studien zu Metallarbeiten und Toreutik der Antike 5. Ruhpolding: Franz Philipp Rutzen, 47–51.

Haack, F. 2016a: The early Neolithic ditched enclosure of Herxheim – architecture, fill formation processes and service life. In: A. Zeeb-Lanz (ed.), Ritualised Destruction in the Early Neolithic – The Exceptional Site of Herxheim (Palatinate, Germany) Vol. 1. Forschungen zur Pfälzischen Archäologie 8.1. Speyer: Generaldirektion Kulturelles Erbe, Direktion Landesarchäologie–Speyer, 15–118.

Haack, F. 2016b: Die frühneolithische Grabenanlage von Herxheim bei Landau: Architektur, Verfüllungsprozesse und Nutzungsdauer. Berlin: Freie Universität Berlin. Unpublished PhD thesis.

Haack, F. 2017: Die Grubenanlage von Herxheim, Lkr. Südliche Weinstraße, Rheinland-Pfalz – Architektur, Verfüllungsprozesse und Fundkonzentrationen. In: H. Meller – S. Friederich (eds), Salzmünde – Regel oder Ausnahme? Internationale Tagung vom 18. bis 20. Oktober 2012 in Halle (Saale). Tagungen des Landesmuseums für Vorgeschichte 16. Halle (Saale): Landesamt für Denkmalpflege und Archäologie und Landesmuseum für Vorgeschichte, 549–560.

Haack, F. 2021: Erdwerke und ritualisierte Gewalt: Herxheim und das Ende der Bandkeramik. Mitteilungen des Tübinger Vereins zur Förderung der Ur- und Frühgeschichtlichen Archäologie 18, 27–44.

Haas, J. 1999: The Origins of War and Ethnic Violence. In: J. Carman – A. Harding (eds.), Ancient warfare: archaeological perspectives. Stroud: Sutton, 11–24.

Hachem, L. – Guichard, Y. – Farruggia, J.-P. – Dubouloz, J. – Illet, M. 1998: Enclosure and burial in the earliest Neolithic of the Aisne valley. In M. Edmonds – C. Richards (eds), Understanding the Neolithic of north-western Europe. Glasgow: Cruithne Press, 127–140.

Häussler, E. – Zeeb-Lanz, A. in preparation: Mobilität und Kommunikation im Frühneolithikum Mitteleuropas – die Keramik von Herxheim als Anzeiger überregionaler Verbindungen in der Endphase der Linearbandkeramik (working title). In: A. Zeeb-Lanz (ed.), Ritualised Destruction in the Early Neolithic – The Exceptional Site of Herxheim (Palatinate, Germany), Vol. 4. Forschungen zur Pfälzischen Archäologie 8.4. Speyer: Generaldirektion Kulturelles Erbe, Direktion Landesarchäologie–Speyer.

Horn, C. 2011: Die rituelle Zerstörung von Stabdolchen. Archäologische Informationen 34, 49–63. https://doi.org/10.11588/ai.2011.0.10156

Janssens, L. A. A. – Arbogast, R.-M. – Zeeb-Lanz, A. 2019: Dogs of the final Bandkeramik at Herxheim: refitting and pathology. In: A. Zeeb-Lanz, Ritualised Destruction in the Early Neolithic – The Exceptional Site of Herxheim (Palatinate, Germany), Vol. 2. Forschungen zur Pfälzischen Archäologie 8.2. Speyer: Generaldirektion Kulturelles Erbe, Direktion Landesarchäologie–Speyer, 233–246.

Jeunesse, C. 2011: Enceintes à fossé discontinu et enceintes à pseudo-fossé dans le Néolithique d'Europe centrale et occidentale. In: A. Denaire – C. Jeunesse – P. Lefranc (eds), Nécropoles et enceintes danubiennes du Ve millénaire dans le Nord-Est de la France et le Sud-Ouest de l'Allemagne. Rhin, Meuse, Moselle. Monographies d'Archéologie du Grand-Est 5. Strasbourg: Université de Strasbourg, 31–72.

Jeunesse, C. 2018: Un type d'enceinte méconnu du Néolithique européen: l'enceinte à pseudo-fossé. In: M. Gandelin – V. Ard – J. Vaquer, L. – Jallot (eds), Les Sites Ceinturés de la Préhistoire Récente. Nouvelles Données, Nouvelles Approches, Nouvelles Hypotheses. Toulouse: Archives d'Écologie Préhistorique, 225–234.

Jeunesse, C. – Lefranc, P. 1999: Rosheim <<Sainte-Odile>> (Dep. Bas-Rhin), un habitat rubané avec fossé d'enceinte. Premieère partie: Les structures et la céramique. Cahiers de l'Association pour la Promotion de la Recherche Archéologique en Alsace 15, 1–111.

Jeunesse, C. – Lefranc, P. – van Willigen, S. 2009: Die pfälzische Bandkeramik: Definition und Periodisierung einer neuen Regionalgruppe der Linearbandkeramik. In: A. Zeeb-Lanz (ed.), Krisen – Kulturwandel – Kontinuitäten. Zum Ende der Bandkeramik in Mitteleuropa. Beiträge der internationalen Tagung in Herxheim bei Landau (Pfalz) vom 14.–17.06.2007. Internationale Archäologie. Arbeitskreis, Tagung, Symposium, Kongress 10. Rahden/Westfalen: Marie Leidorf, 61–78.

Kaufmann, D. 2001: Kultische Funde und Befunde aus dem linienbandkeramischen Erdwerk von Eilsleben, Bördekreis, westlich von Magdeburg. Preistoria Alpina 37, 125–136.

Kaufmann, D. 2003: Menschenopfer bei den Bandkeramikern? In: E. Jerem – P. Rackzy (eds), Morgenrot der Kulturen. Frühe Etappen der Menschheitsgeschichte in Mittel- und Südosteuropa. Festschrift für Nándor Kalicz zum 75. Geburtstag. Archaeolingua 15. Budapest: Archaeolingua, 193–205.

Keeley, L. H. 1996: War before Civilization. New York – Oxford: Oxford University Press.

Krause, R. 1997: Bandkeramische Grabenwerke im Neckarland: Überraschende neue Erkenntnisse durch Ausgrabungen bei Vaihingen an der Enz, Kreis Ludwigsburg. Vorträge 15. Niederbayerischer Archäologentag, 89–118.

Krause, R. 1998: Die bandkeramischen Siedlungsgrabungen bei Vaihingen an der Enz, Kreis Ludwigsburg (Baden-Württemberg). Bericht der Römisch-Germanischen Kommission 79, 5–105.

Kunkel, O. 1955: Die Jungfernhöhle bei Tiefenellern. Eine neolithische Kultstätte auf dem fränkischen Jura bei Bamberg. München: C.H. Beck.

Langer, A. 2025: Die nicht vollständig zerschlagenen Individuen. In: A. Zeeb-Lanz – A. Langer – L. Frank, Herxheim bei Landau – ein einzigartiger jungsteinzeitlicher Ritualort. Jahrbuch des nassauischen Vereins für Naturkunde 146, 234–240.

Lincoln, B. 1991: Death, War and Sacrifice. Studies in Ideology & Practice. Chicago: The University of Chicago Press.

Link, T. 2012: Stilwandel contra Siedlungskontinuität: Zum Übergang von der Linien- zur Stichbandkeramik in Sachsen. In: R. Gleser – V. Becker (eds), Mitteleuropa im 5. Jahrtausend vor Christus. Beiträge zur Internationalen Konferenz in Münster 2010. Neolithikum und ältere Metallzeiten. Studien und Materialien 1. Berlin: Lit-Verlag, 115–131.

Link, T. 2014: Gewaltphantasien? Kritische Bemerkungen zur Diskussion über Krieg und Krise am Ende der Bandkeramik. In: T. Link – H. Peter-Röcher (eds), Gewalt und Gesellschaft. Dimensionen der Gewalt in ur- und frühgeschichtlicher Zeit/Violence and Society. Dimensions of violence in pre- and protohistoric times. Internationale Tagung vom 14.–16. März 2013 an der Julius-Maximilians-Universität Würzburg. Universitätsforschungen zur prähistorischen Archäologie 259. Bonn: Habelt, 271–286.

Mauss, M. 2016: Die Gabe. Form und Funktion des Austauschs in archaischen Gesellschaften. 11. Auflage. Frankfurt am Main: Suhrkamp.

Meadows, J. – Müller-Scheessel, N. – Cheben, I. – Agerskov Rose, H. – Furholt, M. 2019: Temporal dynamics of Linearbandkeramik houses and settlements, and their implications for detecting the environmental impact of early farming. Holocene 29, 1653–70. https://doi.org/10.1177/0959683619857239

Mecking, O. 2019: Clay analysis of the pottery from Herxheim. In: A. Zeeb-Lanz (ed.), Ritualised Destruction in the Early Neolithic – The Exceptional Site of Herxheim (Palatinate, Germany), Vol. 2. Forschungen zur Pfälzischen Archäologie 8.2. Speyer: Generaldirektion Kulturelles Erbe Rheinland-Pfalz, Direktion Landesarchäologie–Speyer, 41–54.

Meller, H. 2013: Der Anfang vom Ende. Überlegungen zur Entstehung des Krieges im Neolithikum. In: H. Meller (ed.), 3300 BC. Mysteriöse Steinzeittote und ihre Welt. Begleitbuch zur Sonderausstellung vom14. November 2013 bis 18. Mai 2014. Halle (Saale). Mainz: Nünnerich-Assmus, 239–245.

Meyer, C. – Knipper, C. – Nicklisch, N. – Münster, A. – Kürbis, O. – Dresely, V. – Meller, H. – Alt, K. W. 2018a: Early Neolithic executions indicated by clustered cranial trauma in the mass grave of Halberstadt. Nature Communications 9, 2472. https://doi.org/10.1038/s41467-018-04773-w

Meyer, C. – Kürbis, O. – Dresely, V. – Alt, K. W. 2015b: Das jüngst entdeckte Massengrab von Halberstadt. In: H. Meller – M. Schefzik (eds), Krieg – eine archäologische Spurensuche. Begleitband zur Sonderausstellung im Landesmuseum für Vorgeschichte Halle (Saale), 6. November 2015 bis 22. Mai 2016. Halle (Saale): Landesamt für Denkmalpflege und Archäologie Sachsen-Anhalt und Landesmuseum für Vorgeschichte, 177–178.

Meyer, C. – Kürbis, O. – Dresely, V. – Alt, K. W. 2018b: Patterns of Collective Violence in the Early Neolithic of Central Europe. In: A. Dolfini – J. Crellin – C. Horn – M. Uckelmann, Prehistoric Warfare and Violence. Quantitative and Qualitative Approaches. Cham: Soringer, 21–38. https://doi.org/10.1007/978-3-319-78828-9_2

Meyer, C. – Lohr, C. – Gronenborn, D. – Alt, K. W. 2015a: The massacre mass grave of Schöneck-Kilianstädten reveals new insights into collective violence in early Neolithic Central Europe. Proceedings of the National Academy of Sciences USA 112, 11217–11222. https://doi.org/10.1073/pnas.1504365112

Meyer, C. – Lohr, C. – Kürbis, O. – Dresely, V. – Haak, W. – Adler, C. J. – Gronenborn, D. – Alt, K. W. 2014: Mass Graves of the LBK. Patterns and Peculiarities. Proceedings of the British Academy 198, 307–325.

Morell Rovira, B. in preparation: Nutrition in Herxheim: Analyses of ^{13}C and ^{15}N values of individuals from Herxheim (research in progress).

Müller-Scheeßel, N. – Hukeľová, Z. 2020: The burials and human remains from the LBK and Želiezovce settlement site of Vráble. In M. Furholt – I. Cheben – J. Müller – A. Bistáková – M. Wunderlich – N. Müller-Scheeßel (eds), Archaeology in the Žitava Valley I – The LBK and Želiezovce settlement site of Vráble. Scales of Transformation in Prehistoric and Archaic Societies 9. Leiden: Sidestone, 159–235.

Müller-Scheeßel, N. – Hukeľová, Z. – Cheben, I. – Müller, J. – Furholt, M. 2023: Kopflose Skelette und aufgebahrte Leichen. Die Toten der bandkeramischen Siedlung von Vráble / Südwestslowakei im Vergleich mit gleichzeitigen Kollektiven. In: N. Balkowski – K. P. Hofmann – I. A. Hohle – A. Schülke (eds), Mensch – Körper – Tod. Der Umgang mit menschlichen Überresten im Neolithikum Mitteleuropas. Leiden: Sidestone, 177–201.

Müller-Scheeßel, N. – Hukeľová, Z. – Meadows, J. – Cheben, I. – Müller, J. – Furholt, M. 2021: New burial rites at the end of the Linearbandkeramik in south-west Slovakia. Antiquity 21, 65–84. https://doi.org/10.15184/aqy.2020.103

Nebelsick, L. D. 1997: Auf Biegen und Brechen. Ekstatische Elemente bronzezeitlicher Materialopfer – ein Deutungsversuch. In: A. Hänsel – B. Hänsel (eds), Gaben an die Götter, Schätze der Bronzezeit Europas. Katalog zur Ausstellung im Museum für Vor- und Frühgeschichte Berlin 1997. Bestandskataloge 4. Berlin: Staatliche Museen zu Berlin – Preußischer Kulturbesitz und Freie Universität, Seminar für Ur- und Frühgeschichte, 35–41.

Orschiedt, J. 1997: Die Jungfernhöhle bei Tiefenellern. Neue Interpretation der menschlichen Skelettreste. Bericht des Historischen Vereins Bamberg 133, 185–198.

Otterbein, K. F. 1989: The evolution of war: a cross-cultural study. New Haven: Human Relations Area Files.

Otterbein, K. F. 1994: Feuding and Warfare. Selected works of Keith F. Otterbein. War and Society Vol. 1. London – New York: Routledge.

Pasda, K. – Arbogast, R.-M. – Jeunesse, C. 2004: Menschliche Knochen der linearbandkeramischen Grube Qu 42 von Zauschwitz (ehem. Gmd. Weideroda, Kr. Borna). In: K. W. Alt – R.-M. Arbogast – C. Jeunesse – S. van Willigen (eds), Archéologie funéraire du Néolithique danubien. Actes de la table ronde de Fribourg-en-Brisgau 17–18 octobre 1998. Cahiers de l'Association pour la Promotion de la Recherche Archéologique en Alsace 20. Zimmersheim: Association pour la Promotion de la Recherche Archéologique en Alsace 121–140.

Petrasch, J. 1999: Mord und Krieg in der Bandkeramik. Archäologisches Korrespondenzblatt 29, 505–516.

Pieler, F. – Teschler-Nicola, M. 2023: Totenbehandlung und Bestattungspraxis in der bandkeramischen Siedlung von Schletz (NÖ): Reflexionen zur Skelettrepräsentation und Taphonomie von Graben-, Gruben- und Gräberfunden. In: N. Balkowski – K. P. Hofmann – I. A. Hohle – A. Schülke (eds), Mensch – Körper – Tod. Der Umgang mit menschlichen Überresten im Neolithikum Mitteleuropas. Leiden: Sidestone, 137–175.

Prieto, G. – Verano, J. W. – Goepfert, N. – Kennett, D. – Quilter, J. et al. 2019: A mass sacrifice of children and camelids at the Hunachaquito-Las Llamas site, Moche Valley, Peru. PLOS ONE 14: e021 1691. https://doi.org/10.1371/journal.pone.0211691

Rähle, W. – Richling, I. – Haack, F. 2019: Shell ornaments from the exceptional Early Neolithic site of Herxheim. In: A. Zeeb-Lanz, Ritualised Destruction in the Early Neolithic – The Exceptional Site of Herxheim (Palatinate, Germany), Vol. 2. Forschungen zur Pfälzischen Archäologie 8.2. Speyer: Generaldirektion Kulturelles Erbe Rheinland-Pfalz, Direktion Landesarchäologie–Speyer, 267–276.

Reinhard, J. – Ceruti, M. C. 2000: Pilgrimage, sacred mountains, and human sacrifice among the Incas. In: J. Carlson (ed.), Pilgrimage and Ritual Landscape in Pre-Columbian America. Washington, D.C.: Dumbarton Oaks, 215–233.

Riedhammer, K. 2019: The radiocarbon dates from Herxheim: archaeological interpretation. In: A. Zeeb-Lanz (ed.), Ritualised Destruction in the Early Neolithic – The Exceptional Site of Herxheim (Palatinate, Germany), Vol. 2. Forschungen zur Pfälzischen Archäologie 8.2. Vol. 2. Forschungen zur Pfälzischen Archäologie 8.2. Speyer: Generaldirektion Kulturelles Erbe Rheinland-Pfalz, Direktion Landesarchäologie–Speyer, 285–303.

Sahlins, M. 2022: The new science of the enchanted universe. An anthropology of most of humanity. Princeton – Oxford: Princeton University Press.

Schimmelpfennig, D. 2019: The lithic material from Herxheim with special emphasis on the 2005–2008 excavations and the latest LBK phase (the "ritual phase" at Herxheim). In: A. Zeeb-Lanz (ed.), Ritualised Destruction in the Early Neolithic – The Exceptional Site of Herxheim (Palatinate, Germany), Vol. 2. Forschungen zur Pfälzischen Archäologie 8.2. Speyer: Generaldirektion Kulturelles Erbe Rheinland-Pfalz, Direktion Landesarchäologie–Speyer, 81–138.

Stäuble, H. 2014: Die Krise am Ende der Linienbandkeramik? Oder ist es am Ende eine Krise der Bandkeramik-Forschung? Ein archäologisches Feuilleton. In: T. Link – D. Schimmelpfennig (eds), No future? Brüche und Ende kultureller Erscheinungen. Beispiele aus dem 6.–2. Jahrtausend v. Chr. Focus Jungsteinzeit. Berichte der AG Neolithikum 4. Kerpen-Loogh: Welt und Erde, 10–49.

Stavreva, V. 2017: Unusual Burial Practices in the Late Eneolithic in Bulgaria. Studia Archaeologica Universitatis Serdicensis 7, 5–74.

Sutter, R. C. – Cortez, R. 2005: The nature of Moche human sacrifice. A bioarchaeological perspective. Current Anthropology 46, 521–549. https://doi.org/10.1086/431527

Teschler-Nicola, M. – Gerold, F. – Kanz, F. – Lindenbauer, K. – Spannagl, M. 1996: Anthropologische Spurensicherung. Die traumatischen und postmortalen Veränderungen an den linearbandkeramsichen Skelettresten von Asparn/Schletz. In: H. Windl (ed.), Rätsel um Gewalt und Tod vor 7000 Jahren: eine Spurensicherung. Ausstellung im Museum für Urgeschichte Asparn a. d. Zaya. Katalog des Niederösterreichischen Landesmuseums, N.F. 393. Wien: Amt der NÖ Landesregierung Kulturabt, 4–12.

Thevenet, C. 2016: L'enceinte rubanée de Menneville Derrière le Village et les structures associées (Aisne, France): de la diversité du traitement des défunts à la cohérence d'un système. Gallia Préhistoire 56, 32–92. https://doi.org/10.4000/galliap.341

Thevenet, C. – Ilett, M. – Hachem, L. – Baillieu, M. – Hamon, C. – Allard, P. 2023: Nouvelles explorations, nouvelles observation sur l'enceinte rubanée de Menneville 'Derrière le Village' (Aisne). In: P. Lefranc – C. Croutch – A. Denaire, Les Enceintes Néolithiques du Nord-Ouest de l'Europe. Dijon: Éditions Universitaires de Dijon, 158–173.

Thorpe, I. J. N. 2003: Anthropology, archaeology, and the origin of warfare. World Archaeology 35, 145–165.

Turck, R. 2019: Where did the dead from Herxheim originate? Isotopic analyses of human individuals from the find concentrations in the ditches. In: A. Zeeb-Lanz (ed.), Ritualised Destruction in the Early Neolithic – The Exceptional Site of Herxheim (Palatinate, Germany), Vol. 2. Forschungen zur Pfälzischen Archäologie 8.2. Speyer: Generaldirektion Kulturelles Erbe Rheinland-Pfalz, Direktion Landesarchäologie–Speyer, 313–421.

Turck, R. – Kober, B. – Kontny, J. – Haack, F. – Zeeb-Lanz, A. 2012: „Widely travelled people" at Herxheim? Sr isotopes as indicators of mobility. In: E. Kaiser – J. Burger – W. Schier (eds), Population Dynamics in Prehistory and Early History. New Approaches Using Stable Isotopes and Genetics. TOPOI. Berlin Studies of the Ancient World 5. Berlin – Boston: De Gryter, 149–163.

Tylor, E. B. 1873: Die Anfänge der Cultur. Untersuchungen über die Entwicklung der Mythologie, Philosophie, Religion, Kunst und Sitte Bd. 1. Leipzig: C. F. Winter'sche Verlagshandlung.

Valde-Nowak, P. 2002: Siedlungsarchäologische Untersuchungen zur neolithischen Nutzung der mitteleuropäischen Gebirgslandschaften. Internationale Archäologie 69. Rahden/Westfalen: Verlag Marie Leidorf.

Verano, J. W. 2008: Trophy Head-Taking and Human Sacrifice in Andean South America. In: H. Silverman – W. H. Isbell (eds.), Handbook of South American Archaeology. New York: Springer, 1045–1058. https://doi.org/10.1007/978-0-387-74907-5_52

Wahl, J. – König, H. G. 1987: Anthropologisch-traumatologische Untersuchung der menschlichen Skelettreste aus dem bandkeramischen Massengrab bei Talheim, Kreis Heilbronn. Fundberichte aus Baden-Württemberg 12, 65–193. https://doi.org/10.11588/fbbw.1987.0.39499

Wahl, J. – Trautmann, I. 2012: The Neolithic massacre at Talheim: a pivotal find in conflict archaeology. In: R. Schulting – L. Fibiger (eds), Sticks, Stones and broken Bones. Neolithic Violence in a European Perspective. Oxford: Oxford University Press, 77–100.

Weninger, B. 2020: Barcode seriation and concepts of Gauge Theory: the ^{14}C-Chronology of Starčevo, LBK, and early Vinča. Quaternary International 560–561, 20–37. https://doi.org/10.1016/j.quaint.2020.04 .031

Windl, H. J. 2001: Erdwerke der Linearbandkeramik von Asparn a. d. Zaya/Schletz, Niederösterreich. Preistoria Alpina 37, 137–144.

Wild, E. M. – Stadler, P. – Häßer, A. – Kutschera, W. – Steier, P. – Teschler-Nicola, M. – Wahl, J. – Windl, H. J. 2004: Neolithic massacres: Local skirmishes or General Warfare in Europe? Radiocarbon 46, 377–385. https://doi.org/10.1017/S0033822200039680

Zeeb-Lanz, A. 2009: Gewaltszenarien oder Sinnkrise? Die Grubenanlage von Herxheim und das Ende der Bandkeramik. In: A. Zeeb-Lanz (ed.), Krisen – Kulturwandel – Kontinuitäten. Zum Ende der Bandkeramik in Mitteleuropa. Beiträge der internationalen Tagung in Herxheim bei Landau (Pfalz) vom 14.–17.06.2007. Internationale Archäologie. Arbeitskreis, Tagung, Symposium, Kongress 10. Rahden/Westfalen: Marie Leidorf, 87–102.

Zeeb-Lanz, A. 2010: Die bandkeramische Grubenanlage von Herxheim (Südpfalz) – ein überörtlicher Ritualort und sein Umfeld. In: I. Matuschik – Ch. Strahm et al. (eds.), Vernetzungen. Festschrift für Helmut Schlichtherle. Freiburg i.Br.: Lavori, 63–73.

Zeeb-Lanz, A. 2011: Besondere Schädel und mehr. Der rätselhafte bandkeramische Ritualplatz von Herxheim (Pfalz). In: A. Wieczorek – W. Rosendahl (eds.), Schädelkult. Kopf und Schädel in der Kulturgeschichte des Menschen. Begleitband zur Sonderausstellung „Schädelkult – Kopf und Schädel in der der Kulturgeschichte des Menschen". Publikation der Reiss-Engelhorn-Museen 41. Regensburg: Schnell & Steiner, 46–51.

Zeeb-Lanz, A. 2014: Gewalt im Ritual – Gewalt an Toten. Die Krise am Ende der Bandkeramik im Spiegel außergewöhnlicher Befunde. In: T. Link – H. Peter-Röcher (eds), Gewalt und Gesellschaft. Dimensionen der Gewalt in ur- und frühgeschichtlicher Zeit. Internationale Tagung vom 14.–16. März 2013 an der Julius-Maximilians-Universität Würzburg. Universitätsforschungen zur Prähistorischen Archäologie 259. Bonn: Habelt, 257–270.

Zeeb-Lanz, A. (ed.) 2016a: Ritualised Destruction in the Early Neolithic – The Exceptional Site of Herxheim (Palatinate, Germany), Vol. 1. Forschungen zur Pfälzischen Archäologie 8.1. Speyer: Generaldirektion Kulturelles Erbe Rheinland-Pfalz, Direktion Landesarchäologie–Speyer.

Zeeb-Lanz, A. 2016b: The contents of the find concentrations – selected examples in comparison. In: A. Zeeb-Lanz (ed.), Ritualised Destruction in the Early Neolithic – The Exceptional Site of Herxheim (Palatinate, Germany), Vol. 1. Forschungen zur Pfälzischen Archäologie 8.1. Speyer: Generaldirektion Kulturelles Erbe Rheinland-Pfalz, Direktion Landesarchäologie–Speyer, 119–152.

Zeeb-Lanz, A. 2017: Herxheim bei Landau (Pfalz): einzigartiger Schauplatz jungsteinzeitlicher Zerstörungsrituale mit Menschenopfern. In: M. Koch (ed.), Archäologie in der Großregion: Beiträge des internationalen Symposiums zur Archäologie in der Großregion in der Europäischen Akademie Otzenhausen vom 14.–17. April 2016, Archäologentage Otzenhausen Band 3. Nonnweiler: Europäische Akademie Otzenhausen, 101–122. https://doi.org/10.11588/propylaeum.798.c10530

Zeeb-Lanz, A. (ed.) 2019a: Ritualised Destruction in the Early Neolithic – The Exceptional Site of Herxheim (Palatinate, Germany), Vol. 2. Forschungen zur Pfälzischen Archäologie 8.2. Speyer: Generaldirektion Kulturelles Erbe Rheinland-Pfalz, Direktion Landesarchäologie–Speyer.

Zeeb-Lanz, A. 2019b: The Herxheim ritual enclosure – a synthesis of results and interpretative approaches. In: A. Zeeb-Lanz (ed.), Ritualised Destruction in the Early Neolithic – The Exceptional Site of Herxheim (Palatinate, Germany), Vol. 2. Forschungen zur Pfälzischen Archäologie 8.2. Speyer: Generaldirektion Kulturelles Erbe Rheinland-Pfalz, Direktion Landesarchäologie–Speyer, 423–482.

Zeeb-Lanz, A. 2019c: Anthropomorphic and theriomorphic figurine fragments and other small clay finds from the ritual enclosure of Herxheim. In: A. Zeeb-Lanz (ed.), Ritualised Destruction in the Early Neolithic – The Exceptional Site of Herxheim (Palatinate, Germany), Vol. 2. Forschungen zur Pfälzischen Archäologie 8.2. Speyer: Generaldirektion Kulturelles Erbe Rheinland-Pfalz, Direktion Landesarchäologie–Speyer 55–80.

Zeeb-Lanz, A. 2025a: Befunde und Funde im Überblick. In: A. Zeeb-Lanz – A. Langer – L. Frank, Herxheim bei Landau – ein einzigartiger jungsteinzeitlicher Ritualort. Jahrbuch des nassauischen Vereins für Naturkunde 146. Wiesbaden: Nassauischer Vereins für Naturkunde, 227–231.

Zeeb-Lanz, A. 2025b: Die menschlichen Skelettreste. In: A. Zeeb-Lanz – A. Langer – L. Frank, Herxheim bei Landau – ein einzigartiger jungsteinzeitlicher Ritualort. Jahrbuch des nassauischen Vereins für Naturkunde 146. Wiesbaden: Nassauischer Vereins für Naturkunde, 231–233.

Zeeb-Lanz, A. in print: Regionalstile der Bandkeramik: wirklich „regional"? – Bericht über einen Keramik-Workshop an der Universität Heidelberg im Jahr 2024. Archäologische Informationen.

Zeeb-Lanz, A. – Arbogast, R.-M. – Bauer, S. – Boulestin, B. – Coupey, A.-S. – Denaire, A. – Haack, F. – Jeunesse, C. – Schimmelpfennig, D. – Turck, R. 2016: Human Sacrifice as „Crisis Management"? The Case of the Early Neolithic Site of Herxheim, Palatinate, Germany. In: C. Murray (ed.), Diversity of Sacrifice. IEMA Proceedings Vol. 5. Albany: State University of New York Press, 171–189.

Zeeb-Lanz, A. – Arbogast, R.-M. – Haack, F. – Haidle, M. N. – Jeunesse, C. – Orschiedt, J. – Schimmelpfennig, D. – Schmidt, K. – van Willigen, S. 2006: Die bandkeramische Siedlung mit „Grubenanlage" von Herxheim bei Landau (Pfalz). Erste Ergebnisse des DFG-Projektes. In: H.-J. Beier (ed.), Varia Neolithica IV. Weissbach: Beier & Beran, 63–81.

Zeeb-Lanz, A. – Gramsch, A. 2023: Herxheim unchained: a reply to Chapman et al. Germania 101, 188–195. https://doi.org/10.11588/ger.2023.108259

Zeeb-Lanz, A. – Haack, F. 2016a: History of research at Herxheim – an „interpretative thriller". In: A. Zeeb-Lanz (ed.), Ritualised Destruction in the Early Neolithic – The Exceptional Site of Herxheim (Palatinate, Germany), Vol. 1. Forschungen zur Pfälzischen Archäologie 8.1. Speyer: Generaldirektion Kulturelles Erbe Rheinland-Pfalz, Direktion Landesarchäologie–Speyer, 1–13.

Zeeb-Lanz, A. – Haack, F. 2016b: Diversity in Ritual Practice at the end of the LBK. In: L. Amkreutz – F. Haack – D. Hofmann – I. van Wijk (eds), Something Out of the Ordinary? Interpreting Diversity in the Early Neolithic Linearbandkeramik and Beyond. Cambridge: Cambridge Scholars Publishing, 247–279.

Zeeb-Lanz, A. – Haack, F. 2020: Ritual und Gewalt in Herxheim (Pfalz). In: H. Meller – R. Risch – K. W. Alt – F. Bertemes – R. Micó (eds), Rituelle Gewalt – Rituale der Gewalt. 12. Mitteldeutscher Archäologentag vom 10.–12. Oktober 2019 in Halle (Saale). Tagungen des Landesmuseums Halle 22(1). Halle (Saale): Landesamt für Denkmalpflege und Archäologie Sachsen-Anhalt und Landesmuseum für Vorgeschichte, 181–196.

Zeeb-Lanz, A. – Haack, F. – Arbogast, R.-M. – Haidle, M. N. – Jeunesse, C. – Orschiedt, J. – Schimmelpfennig, D. 2007: Außergewöhnliche Deponierungen der Bandkeramik – die Grubenanlage von Herxheim. Germania 85, 199–274.

Zeeb-Lanz, A. – Haack, F. – Arbogast, R.-M. – Haidle, M. N. – Jeunesse, C. – Orschiedt, J. – Schimmelpfennig, D. – van Willigen, S. 2009: The LBK settlement with pit enclosure at Herxheim near Landau (Palatinate). First results. In: D. Hofmann – P. Bickle (eds), Creating Communities. New advances in Central Europe Neolithic research. Oxford: Oxbow Books, 202–215.

Zeeb-Lanz, A. – Haack, F. – Bauer, S. 2014: Menschenopfer – Zerstörungsrituale mit Kannibalismus – Schädelkult: Die außergewöhnliche bandkeramische Anlage von Herxheim in der Südpfalz. In: A. Zeeb-Lanz – F. Haack – S. Bauer – A. Gramsch (eds.), Menschenopfer – Zerstörungsrituale mit Kannibalismus – Schädelkult. Der jungsteinzeitliche Ritualplatz von Herxheim. Herxheim: Museum Herxheim, 5–55.

Zeeb-Lanz, A. – Reymann, A. 2019: Löwenmenschen und Schamanen. Magie in der Vorgeschichte. Darmstadt: Wissenschaftliche Buchgesellschaft.

Zinko, M. (ed.) 2020: Krieg und Ritual im Altertum. 17. Grazer Althistorische Adventsgespräche. Graz, 14.–15. Dezember 2027. Graz: Leykam.

ANDREA ZEEB-LANZ, General Directorate for Cultural Heritage Rhineland-Palatinate, Directorate of State Archaeology, Kleine Pfaffengasse 10, D-67 346 Speyer, Germany; zeeblanz@outlook.de