

Beating ploughshares back into swords: warfare in the *Linearbandkeramik*

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Armed with a number of powerful arguments, the authors invite us to face up to the evidence for violence in early Neolithic Europe. Linearbandkeramik (LBK) people first attacked the hunter-gatherers they encountered and then entered a period of increasingly violent warfare against each other, culminating in an intense struggle in the area of central and western Germany. The building of fortifications, physical mutilation and cannibalism, while no doubt enacted with ritual airs, nevertheless had their context and purpose in the slaughter of enemies.

Keywords: Europe, Neolithic, LBK, fortification, warfare, mutilation, cannibalism

Introduction

The prevalence of conflict or warfare between social groups in prehistory is itself a hotly contested topic at present. Where many prehistorians note evidence for violence in fortifications, skeletal trauma and weapons, others prefer to assign it to ritual or symbolic practice. This intellectual thrust and parry is exemplified in the study of the earliest farming culture of central Europe, the *Linearbandkeramik* (Linear Pottery or LBK) culture. Here, evidence includes a large number of enclosed (and likely fortified) village sites, and an abundance of burial trauma, which might suggest that violence was common and at times abnormally intense among these early European agriculturalists. However, as in many other regions of the world, there have been criticisms of the interpretation of this data as relating to inter-group conflict. We broadly define warfare here as ‘*armed conflict between any social and political units*’ (Keeley & Quick 2004: 110; see Keeley 1996: Chapter 1 for a more in-depth discussion).

It is our purpose to review the evidence for warfare found at LBK archaeological sites, particularly burial trauma and the fortification of sites. We conclude that conflict was highly prevalent, particularly at later period western sites, and, furthermore, that there is increasing evidence to support the claim previously put forth by one of the authors (Keeley 1998) that this conflict not only occurred between LBK communities, but also between LBK farmers and indigenous hunter-gatherers. We wish to place this violence in its proper prehistoric context, as to its frequency and social context at the time of the earliest appearance of agriculture in Central Europe some 7500 years ago.

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Evidence for conflict in the *Linearbandkeramik*

The *Linearbandkeramik* is perhaps the best-studied Neolithic culture in all of Europe, with hundreds of sites having been subjected to excavation over the last century. It was initially believed that the movement of agriculture into central Europe occurred via a process of peaceful migration of peoples deriving from the Near East. Little was made of the fate of indigenous hunting-gathering peoples that had previously occupied central Europe, and no solid evidence existed to demonstrate the occurrence of violence of any kind. It has become clear in recent years that the early Neolithic was in fact a much more complex and sometimes very violent period.

While the idea of a large-scale migration into central Europe by farmers has been criticised recently (see Whittle 1996 for instance), many researchers studying the LBK still hold that physical migration of a substantial number of people offers the best explanation for the sudden appearance of a radically new material culture and subsistence system between 5700 and 4900 calBC (Bogucki 2000; Gronenborn 1999; Keeley & Golitko 2004). A recent review of radiocarbon dates shows that, in contrast to some other regions of Europe, the Mesolithic/Neolithic transition in the LBK region was quite abrupt, with little overlap between dates for the two traditions, though this does not rule out low levels of mixing between populations (Gkiasta *et al.* 2003: 59). While regional chronologies exist, we here accept a four-period division: the oldest phase (with expansion out of Hungary into Austria, the Czech Republic and Slovakia, southern Poland, and eastern and central Germany), two middle phases (expansion through the Rhine Valley into the low Countries, Alsace and the Paris Basin, and in the east into Poland, Romania and the Ukraine), and the youngest phase (regional diversification in already settled areas with significant population growth).

Evidence of traumatic injury

Perhaps the most obvious evidence for past conflicts is provided by the presence of certain types of traumatic injury in burial populations. This is particularly the case if these involve embedded projectile points or traumas indicating blunt instruments. When no healing is evident, the trauma was the probable cause of death (Keeley 1999: 340; Keeley & Quick 2004: 110; Milner *et al.* 1991: 589). In addition, many other types of 'culturally modified' human remains that are found at archaeological sites are most plausibly explained as indirect evidence of inter-group conflict.

There are a number of now well known LBK contexts that have demonstrated that violence was often quite severe during the early Neolithic of Central Europe. This was first demonstrated with the publication in 1987 of the mass grave at Talheim (in the middle Rhine valley) (Wahl & König 1987). There, a pit containing LBK cultural material (younger to youngest phase) was found to contain the remains of 34 skeletons, comprising 16 children and infants, 9 adult males, and 7 adult females, representing, in the opinion of the authors, the whole population of a small LBK village. All were killed by blunt force trauma to the head caused by LBK axes or adzes. One adult male skull had evidently been struck by an arrow. There were no signs of resistance in the form of parry fractures (Vencl 1999: 60-61).

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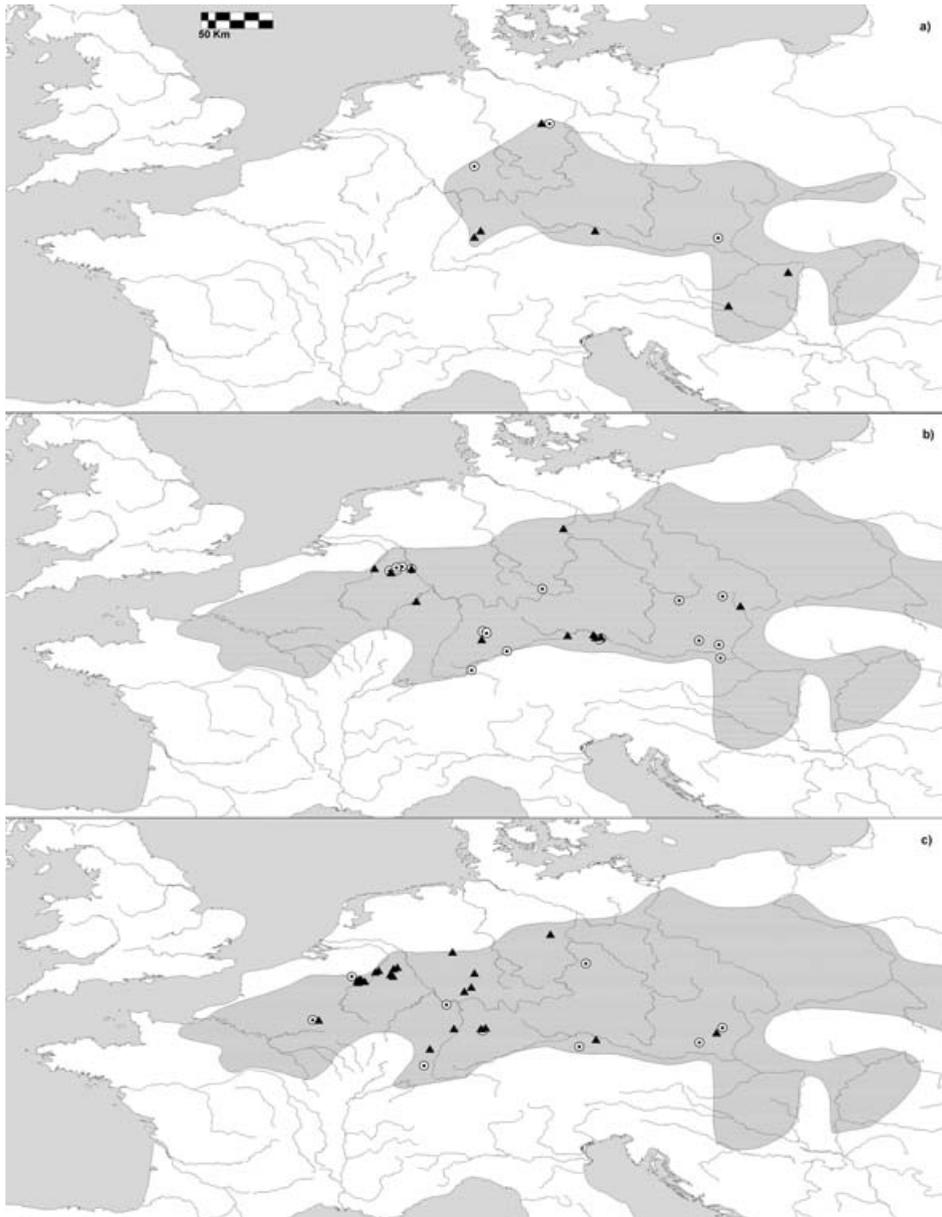


Figure 1. a) Enclosed LBK sites of the Oldest Phase b) Older and Younger Phases c) Youngest Phase (▲ = Sites with V-sectioned ditches and/or complex gates ⊙ = Sites without V-sectioned ditches or complex gates, stippling indicates approximate limits of LBK settlement).

A similar massacre occurred at the enclosed site of Schletz-Asparn, near Vienna. The small section of ditch excavated there contained the remains of 66 individuals; almost all had been killed with LBK axes or adzes, though an arrow had killed one individual. The remains were fragmented and showed signs of gnawing, indicating exposure for some time

after death, and, again, the demography suggests that a full village was wiped out. The excavators estimate that had the full ditch been excavated, upward of 300 individuals might have been uncovered (Windl 1999a, 1999b; Teschler-Nicola *et al.* 1996).

At Herxheim, in the Rhine Valley, some 173 skulls and skull-pates were found within two enclosure ditches and the interior settlement. In addition to the skulls, upwards of 334 individuals may be represented by scattered remains, while two articulated skeletons were found sprawled out within the inner ditch. These remains contrast with a number of typical semi-flexed burials found within the settlement area (Häußer 2000: 82; Spatz 1998: 18). The removal of skull-pate at the site seems to have followed a regular procedure involving cutting and slight burning (Haidle & Orschiedt 2001: 147-153).

At Vaihingen, an enclosed LBK site near Stuttgart, a dozen individuals were deposited within two large rubbish pits, while further scattered remains were found throughout the site, contrasting with the typical burials dug into the enclosure ditch at a later time. Most of these individuals appear to have been somewhat unceremoniously dumped into their final burial context, and showed signs of various forms of injury and mutilation. Some of the typical LBK burials in the ditch bore evidence of violence as well, with one individual having suffered a parry fracture, and another killed by a crushing blow to the skull (Krause *et al.* 1998: 93-95; 97-98).

Mutilated remains are known from many sites, for instance skull drinking cups found in the enclosure ditch at Eilsleben, or cannibalised leg bones at the enclosed site of Ober-Högern (Kaufmann 1990: 21-22; Kneipp & Büttner 1988: 494-96; Spatz 1998: 13). Remains bearing evidence of cannibalism are known from a number of sites, many of which were enclosed (Peter-Röcher 1994: 104-108; V encl 1999: 64). While these instances represent quite dramatic examples of violent death, not all are necessarily the *direct* result of inter-group warfare, for instance the skull caches at Herxheim.

Were this the only evidence of skeletal trauma present at LBK sites, it would be easy to dismiss violence as only an occasional or infrequent occurrence. However, evidence from typical semi-flexed LBK burials points towards a more regular presence of conflict in LBK life. In a comprehensive study, Petrasch has calculated the total percentages of LBK individuals who suffered from traumatic injury at some point during their lives. Limiting his study only to those burial populations that have been subjected to pathological examination, he arrives at the staggering figure of almost 20 per cent. Removing the data from Talheim, Schletz-Asparn, and Herxheim, 6.2 per cent of all known burials show evidence for traumatic injury (Petrasch 1999: 508-509). Some of these injuries were survived; several individuals at Talheim, for instance, bore traces of having survived traumatic head injuries, only to be killed later in life (Wahl & König 1987: 177-78). Individuals must have engaged in repeated violent engagements throughout their lives.

Violence was evidently more intense in the western LBK area (roughly from central Germany westwards), the upper value being a staggering 32 per cent. This compares with only 2 per cent of skeletons in the east having suffered injuries (Milisauskas 2002: 178). While 2 per cent is representative of a society in which conflict is prevalent, the western LBK is comparable to the most violent known societies, in which conflict is a constant preoccupation (Keeley 1996: Tables 6.1 & 6.2; LeBlanc & Register 2003: 224). The arrow wounds at Schletz-Asparn and Talheim suggest that this rate may have been even higher at

times, as upwards of 70 per cent of all arrow wounds produce no skeletal trauma (Milner 2005: 150). While Petrasch does not separate his data by gender, the under-representation of women in the population at Schletz-Asparn (Windl 1999a: 43) may indicate that they were taken alive, suggesting that men suffered the majority of injuries. While trauma seems to have been most frequent in later western LBK contexts, including the material from Talheim and Herxheim, the material recovered at Vaihingen (Flomborn phase) and Schletz-Asparn (Notenkopf phase) indicates that violence was not unknown in earlier LBK contexts. It has even been suggested that violence in the later western LBK was so extreme as to entail a 'crisis' period (Spatz 1998).

LBK enclosures: evidence for fortification

The existence of enclosed LBK settlements has been known since the early twentieth century, with the first large-scale excavation being carried out by Buttler and Haberey at Köln-Lindenthal between 1929 and 1934. While most are ditched enclosures, there are also a number of sites that are surrounded only by palisades. These early researchers interpreted enclosures as fortifications, but the function of these installations was questioned in later years. A number of recent authors have been highly critical of the assignment of a defensive function to these places. Whittle, for example, has referred to them as '*formalized communal space*' (Whittle 1996: 174), while in a recent textbook it is claimed that '*not all (indeed, perhaps very few) bandkeramik enclosures were defensive in nature . . .*' (Scarre 2005: 411). The denial of a defensive function has been based on a number of lines of evidence, none of which are backed by ethnographic or historical data. While comprehensive reviews of such sites have been published by Lüning (1988) and Höckmann (1990), these are rarely cited when it comes to making broad statements about 'all' such enclosures. Thus, it has been variously argued that LBK enclosures cannot represent defensive installations because their ditches are too shallow (in the order of one metre), enclose too small an area, have limited evidence of internal settlement, or contain evidence of ritual activity (often cannibalism or other skeletal manipulation). As a result, LBK enclosures have sometimes been interpreted as cattle kraals or ritual/symbolic enclosures (Kaufmann 1997: 46).

While few researchers now support the 'cattle kraal hypothesis', due to the unnecessarily large amount of labour required to construct them (Keeley & Cahen 1989: 170), many have assigned a ritual function to them, particularly for enclosures of the type that Kaufmann labels the 'Langweiler type', i.e. those that have little evidence of internal settlement (Kaufmann 1997: 66-67). However, as demonstrated by a review of historically and ethnographically known fortifications, none of these arguments necessarily rules out the assignment of a basic defensive function to LBK enclosures. The Roman military, for instance, dug the perimeter ditches of their legionary camps to a depth of only *c.* 0.9m, though the preferred depth for more permanent installations was over 2m, i.e. slightly deeper than a person is tall (see Polybius & Pseudo Hyginus 1994; Josephus 1970; Grant 1974: 300; Lawrence 1979: 80-81, 309, 340-341; Keeley *et al.* in press). There is no particular absolute size below which an enclosure cannot function as a fortification. In fact, smaller refuge fortifications without substantial interior settlement may require less manpower to defend than ones that enclose larger settlements, and are well documented historically and ethnographically

(Keeley 1996: 57-58). The presence of 'ritual' activity is well evidenced at enclosed LBK sites, but the meaning of this ritual is seldom discussed. The practice of ritual at an enclosed site in no way inherently implies a non-defensive function; the symbolic importance of a particular location often derives from its prosaic function – if an enclosure symbolises exclusion, social solidarity, or any of a number of other things, it often does so because it provides a real physical deterrent against entry by outsiders (Keeley 2003: 252). Furthermore, there are many examples of fortifications enclosing ritual areas – as these areas may be particularly important to protect (Keeley *et al.* in press).

Of particular relevance to the present discussion, are several features for which only a military function is appropriate: V- or Y-sectioned enclosure ditches, and complex forms of gates: baffled, offset, crab-claw, labyrinthine or screened. V or Y-sectioned ditches are impractical for any domestic purpose, as they erode more quickly than any other form and are more difficult to dig, but they represent an ideal form for purposes of defence against human attack, since they offer maximum exposure of any would-be attacker to defensive projectile fire from above. By contrast, U-sectioned or flat-bottomed ditches may serve a variety of functions (earth extraction, drainage, etc.), one of which may be defence (moats for instance are often flat-bottomed with straight walls or U-sectioned to minimise erosion). When *backed* by an internal berm and/or palisade, it is certain that a defensive purpose was intended (Keeley *et al.* in press). At some Neolithic ceremonial sites in Ireland, for instance, ring ditches with outer berms (a non-defensive arrangement likely indicative of only ritual function) were altered during the Bronze Age to incorporate an inner berm, palisade, and other defensive features at the same time that warfare intensified (Champion *et al.* 1984: 294-95).

Similarly, complex gate arrangements such as baffles or screens are counter-productive as entrances for cattle kraals or for purposes of daily activity (making it pointlessly difficult to enter or exit), but are known as classic defensive features at numerous sites stretching across thousands of years of history. The primary functions of such gates are to limit the number of attackers that may enter at once, to prevent direct use of projectile weapons against those inside, and to force attackers to adopt a non-defensive body positioning (i.e. turned to the side) when entering (Keeley *et al.* in press).

Our review of the literature indicates that there are at present 84 sites known with evidence of enclosure that are securely dated to the LBK, six of which evidence multiple phases of enclosure (see database at <http://www.uic.edu/depts/anth/faculty/keeley>). We have recorded data on location, chronological phase, area/length excavated, ditch form, width, and depth, number and type of gates/interruptions, presence or absence of berms and/or palisades, settlement and wells or cisterns, available radiocarbon dates, and the presence or absence of human remains. In some cases, data was available for only certain site features. (When data was not available, sites were removed from the total list for purposes of computing percentages).

The greatest number of enclosed sites date to the younger or youngest phases of the LBK, with fewer dating to middle stages, and very few to the oldest LBK (47 per cent *v.* 41 per cent *v.* 12 per cent respectively, $n = 78$). Furthermore, the majority (62 per cent, $n = 84$) of such sites are found in the western portion of the LBK distribution. Seventy-five per cent ($n = 75$) of all known enclosures include defensive ditches. Some palisades without associated ditches

may be small enclosures best described as pens or kraals (Bedburg-Garsdorf and Zwenkau-Harth, for instance), while others clearly enclosed a larger settlement area and included complex defensive gate arrangements (Sittard, Elsloo, and Köln-Lindenthal I (palisade P), for instance). Limited excavation makes it difficult to determine in some cases.

Fifty-nine per cent of all known enclosure ditches are V- or Y-sectioned ($n = 56$), and 41 per cent U-sectioned or flat-bottomed. Many times, as at sites such as Darion-Colia, Waremme-Longchamps, or Stephanspöshing, ditches are shallower and U-sectioned away from gates, and deeper and V-sectioned near gates. Limited excavation may therefore be an issue in terms of identifying defensive features. These ditches average 2.8m wide and 1.6m deep. Given that all LBK sites have experienced some degree of erosion, typically 0.5-1m, most of these ditches would have been easily as deep or deeper than the height of any potential early Neolithic attacker in their original form. Fifty-four per cent of all known enclosures at which at least one gate or interruption was excavated ($n = 48$, including palisaded sites) possess defensive gate arrangements. Combining both lines of data, the total number of LBK enclosed sites that possess defensive features as here defined is 51, or 70 per cent of the total number (73) for which sufficient data are available.

Nevertheless, we do not believe that a defensive role can be ruled out for many of the remaining ditched enclosures that display neither complex gates nor V- or Y-sectioned ditches. Schletz-Asparn II, at which there is perhaps the most direct evidence of actual violent conflict, possesses neither of these features, yet we strongly suspect that it was built to deter human attack, though it tragically failed its occupants in that capacity.

The intentional enclosure of a dependable water supply in the form of wells or cisterns is also an occasional feature (8 per cent, $n = 84$) of LBK enclosures (Jadin & Cahen 1998: 125), further supporting their probable use as fortifications. Almost all LBK sites are located within sight of water, usually second- or third-order streams. Only the anticipated denial of access to adjacent streams would necessitate the labour of digging and lining wells and cisterns to secure an internal source.

Discussion

Given the almost exact chronological and geographical correlation between prevalence of burial trauma and the frequency of construction of enclosures with obvious defensive purpose, such constructions must represent a material response to violence. There is abundant ethnographic evidence indicating that fortification is a response to violence often taken by sedentary farming groups (Keeley 1996: 56-57; LeBlanc & Register 2003: Chapter 6). Where violence in LBK society was relatively subdued (early and in later eastern contexts), there was a corresponding lesser need to construct fortifications. Where violence was extremely intense, a greater need for fortification was felt (later western contexts).

There is a distinct association between enclosed sites and not only remains that can be taken as immediate evidence of conflict (i.e. Schletz-Asparn and Vaihingen), but also with skeletal material that has been modified in a way described by many researchers as 'ritualistic', as at Ober-Hörgern, Herxheim and elsewhere. However, even if ritual practice were involved, many researchers seem to view it as an exclusive alternative explanation to warfare: the implication is that the victims of the violent rituals were come by via peaceful means.

However, ritual is rarely purely epi-phenomenal, but instead relates to other practices within society (e.g. Malinowski 1961; Turner 1967), and in this case is strongly related to other evidence for warfare. Turning again to the ethnographic record, there are a number of reasons for resorting to such gruesome activities. Starvation or culinary cannibalism is documented, but results in human remains that show butchery and cooking marks identical to those on other animals consumed. This does not match the data from LBK sites. Far more common is 'ritual' cannibalism, in which portions of an enemy's body are consumed, typically in a proscribed way as to which portions are eaten (Keeley 1996: 103-106; LeBlanc & Register 2003: 60). Given the nature of the remains from the sites mentioned, there emerges a pattern of consumption and manipulation of particular portions of the human body, for instance left legs at Ober-Hörgeren, or skulls and skull-pates at a number of sites. While these were undoubtedly 'ritual' activities, archaeology indicates that such activities were related to warfare, and ethnography indicates that the most likely victims of such activity were captured enemies.

The remains from Schletz-Asparn and Talheim, as well as numerous other sites, indicate beyond a doubt that, much of the time, these enemies came from other LBK villages. The crushing blows to the head that killed most individuals at these sites were inflicted by LBK-style axes and adzes. Furthermore, the researchers who studied the remains at Talheim were able to determine that the attributes of all the skeletons present were consistent with those individuals having belonged to an LBK population in terms of skeletal robustness, dentition, stature and skull form (Wahl & König 1987). While the topic of causes is difficult to address archaeologically, it is to be presumed that in a tribal agricultural society, reasons for fighting were numerous, and motives may have included revenge for prior attacks, land disputes, poaching, prestige, capture of slaves or capture of women (Keeley 1996: Table 8.1), as the under-representation of young women at Schletz-Asparn likely indicates. The intensification of such warfare seen during the latest western LBK has been linked to a number of causes, including environmental degradation (which would not explain why violence remained less intense in the east) or over population (Spatz 1998: 14-15).

There is also evidence, however, to justify the argument previously put forward by one of us that at times this conflict occurred between LBK farming groups and indigenous Mesolithic peoples (Keeley 1998). While many researchers are quite content to cite ethnographic examples of trade and acculturation between farmers and foragers (Gregg 1988: Scarre 2005: 407), this ignores an equally substantial body of ethnographic data that demonstrates that conflict is another common form of interaction (Keeley 1996: 131-38; Keeley & Cahen 1989: 171-72). The 'Mesolithic' argument is based on a number of lines of archaeological evidence. Many fortified sites cluster along the limits of LBK settlement, particularly during the earliest phases (Keeley 1996: 137-39). The short periods of use of many fortifications indicates that they were constructed to counter a threat that quickly disappeared, which may have been the case if farmers at far higher settlement density quickly killed or incorporated local hunter-gatherers living at extremely low population density. The only multi-phase enclosure for which we have good data regarding trauma, Schletz-Asparn, demonstrates that the second-phase ditch was built to counter the threat of other LBK communities. There is a *c.* 20-25km wide 'no-man's land' between LBK sites and final Mesolithic sites in the Hesbaye region of Belgium (Keeley 1996: 139). According to LeBlanc (1999: 69) 'that such

areas existed is an extremely strong line of evidence for warfare, because it is unlikely that people would have given up their use of an area without a very good reason'. Kaufmann (1990: 25) mentions the disappearance of Mesolithic sites in the vicinity of Eilsleben at the time of first LBK settlement, as does Jochim (2000: 195-196) in south-western Germany, in the vicinity of fortified sites such as Vaihingen. The possibility exists, though is by no means proven, that buffer zones existed in areas other than the Hesbaye as well.

The only 'Mesolithic' style artefacts found at many LBK sites are projectile points, while the only LBK artefacts typically found at Mesolithic sites are axes or adzes, for both of which there is evidence to suggest their use as weapons (Keeley 1998: 309). Milisauskas has previously suggested that the far higher frequency of projectile points in western LBK assemblages as contrasted with those in the east is indicative of their use as weapons, as there is no similar evidence to suggest that hunting was more frequently practised in one area than another (Milisauskas 1986: 4; 143). In fact, the hunting of game declined with time (Gronenborn 1999: 162-63), while the frequency of projectile points did not. The frequency of projectile points is, however, correlated geographically with the frequency of burial trauma and fortification. We would add to the previous points the recent discovery at Vaihingen that individuals buried in rubbish pits show greater skeletal robusticity than those recovered from formal burial contexts (Krause *et al.* 1998: 96), suggesting that they belonged to a separate population, likely of hunter-gatherers. Strontium isotope analysis of skeletons from Vaihingen has demonstrated that there are 'non-local' individuals present in both settlement and ditch contexts, but it is unclear whether any of these were the same individuals found in non-typical burial contexts (Bentley *et al.* 2003: 479-82).

Conclusion

The archaeological evidence, coupled with ethnographic analogy, demonstrates that warfare was a frequent occurrence during the earlier phases of LBK expansion, while in later western contexts its frequency seems to have been comparable to that found amongst the most violent tribal types of society known ethnographically. Given the correlation that exists between the level of this violence and the frequency of LBK enclosures both spatially and chronologically, as well as the presence of defensive features in the majority of such enclosures, it is most appropriate to speak of them as fortifications. We stress that this does not rule out the practice of ritual at these sites, nor the use of them for secondary functions such as penning animals. In fact, much of this ritual (skeletal manipulation and cannibalism) is probably related to conflict. While much of this violence seems to have involved LBK communities fighting each other, as indicated by the mass graves at Talheim and Schletz-Asparn, we argue that a number of lines of evidence point towards conflict during early stages of settlement with local hunter-gatherers.

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