

***Not going anywhere? Migration as a social practice in the early Neolithic  
Linearbandkeramik***  
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**Abstract**

This paper argues that personal and group migration (as a subset of mobility) was a central feature of Linearbandkeramik (5500-4900 cal BC) life, and not confined to short-term events along the agricultural frontier. The first part summarises the data currently available on individual migration (mostly interpreted as female exogamy) and the migration of households or groups of households. It is noted that in current models, migratory behaviour is often seen as pertaining to lower-status groups or that it constitutes a crisis response. In the second part of the paper, I outline the evidence, both isotopic and archaeological, for migration as a constant behaviour and show where this has opened up avenues for new research, notably concerning the use of non-loess areas. In turn, narratives suggesting an increase in hierarchical differences throughout the LBK as a whole are challenged. It is argued that migration was an accepted social strategy that could be used to gain status, and counteracted the creation of hereditary and durable social stratification in established settlement sites. Seeing migration as a constant in LBK life can thus lead to a reinterpretation of other aspects of this early farming society.

**Key words:** Linearbandkeramik (LBK), central Europe, early Neolithic, individual migration, group migration, hierarchy

**1. Taking migration seriously**

Mobility is back on the agenda. It has not just returned to archaeological narratives, but has gained a central position in the social sciences more broadly (e.g. Faist 2013; Sheller and Urry 2006; Urry 2007). In a world in which increasing numbers of individuals move, both for work and for leisure, studying the resulting identities, material culture and transitional spaces has become paramount. Recent larger-scale migration streams, often caused by warfare or environmental disaster, have added a further layer to this discourse, and it is with migration (as defined in section 2.) that this paper is primarily concerned.

Migration is not limited to the modern world, as several archaeologists have noted in spite of a theoretical climate long biased against migration (see e.g. Andresen 2004; Anthony 1990; Burmeister 2017; Chapman and Hamerow 1997). In his now widely quoted 1990 paper, David Anthony pleaded for more thorough comparative attention to the modalities of migrations. He drew out in particular the importance of information flow, the likely existence of two-way migration streams and the potential social benefits of migrating first, which he framed in terms of 'apex families' establishing a particularly strong position in the new territories and facilitating the arrival of others. Although he did also suggest a variety of push and pull factors, Anthony remained sceptical regarding the possibility of determining the causes for migration events archaeologically, as these could be complex and also include ideological factors. Instead, he focused on establishing migration as a longer-lasting and complex process, far removed from the one-off, one-direction relocations that often seemed to be suggested. Similarly, Burmeister (2017) criticises archaeologists for having so far focused on a very small subset of what migration may entail – namely establishing whether there was material culture change – thereby neglecting the variety of processes and aspects that could be involved.

In contrast to these reflections, deeply engrained thinking in terms of nation states and closed, homogenous groupings such as cultures – sometimes referred to as 'methodological nationalism' (and critiqued e.g. in Brubaker 2004; Glick-Schiller and Salazar 2014) – has meant that migration is often implicitly framed as atypical and problematic, as well as relatively simple in its workings. For example, archaeogenetic narratives of Neolithic settlers, if they do go into reasons for migration, seem to prefer push factors, such as overpopulation or climate change (e.g. Brandt 2017, 193-97).

These are possible causes, but result in a particular view of migration which frames it as a last resort, as only applicable when sedentism is impossible, and as stopping again when the underlying problem has in one way or another been resolved. This is cast in the light of our experiences of present situations and of a long Western intellectual tradition (e.g. Donecker 2012) in which most people see a sedentary lifestyle as self-evidently preferable. In addition, by using relatively traditional methods of illustration (the dreaded maps with arrows), it is easy to fall back into an unreflected view of migrations as proceeding from a single origin point, along a clear route and with a single end point (as critiqued e.g. by Wiedemann 2017). Where more heroic narratives of migration are developed, notably for later Neolithic situations (e.g. Kristiansen et al. 2017), they involve conquerors sweeping in, more or less effortlessly decimating and/or subjugating the native population and making huge territorial gains. Even here, then, migration proceeds with the aim of eventually settling down for good, and the process itself is rather uncomplicated. This interpretatively barren situation is due to the incredibly fast accumulation of new data pertaining to topics we have severely under-theorised for decades (see also Furholt 2018; Frieman and Hofmann 2019).

In this article, I wish to outline alternatives by questioning assumptions related to the possible reasons of migration and its social significance particularly in the Linearbandkeramik, the first Neolithic culture in much of central Europe (c. 5500-4900 cal BC) (Figure 1). I argue that if we want to take human movement seriously as an interpretative challenge, we first need to actively explore different scenarios in order to create a broader basis for testing and investigation. The first step, then, is to take stock of the narratives of migration offered so far, with a particular view to the proposed reasons and power relations. In a second step, I suggest alternative models that could also explain the observed archaeological data, but work with different views of why and how migration happens, and which will need to be tested. Establishing mobility and migration as a cornerstone of Neolithic life could help us rethink other aspects of social structure, such as hierarchisation, and therefore lead to a wider re-framing of what the LBK phenomenon was like.

## 2. Materials and definitions

The definition of migration remains notoriously difficult, in particular for archaeology, where a variety of often contradictory models has been proposed (see e.g. Koch and Knipper 2014). In general, many scholars distinguish routine movement within a given region, for example as part of a seasonal round, from one-off, but longer-term or permanent relocations. In schemes such as that proposed by Rouse (1986, 9) or Anthony (1997, 29), both aspects are defined as “migration” albeit the former is classed as “local” or “circular” and the latter as “interareal” or “chain” migration. On occasion, specific motivations for migration are added as different subtypes, for example “career” versus “coerced” migration (Anthony 1997, 29), or the size of the group moving is used as a further qualifier, for instance leading Rouse (1986, 9) to distinguish “people migration” from small-group or individual “immigration”.

In this article, the term “mobility” is used to cover all kinds of movement, including routine seasonal changes of residence, while “migration” as a subset of mobility is reserved for longer-term or permanent resettlement. To qualify as a migration, as opposed to simply a relocation event (such as moving to a newly built house on the same site), this movement must also cover a longer distance (more than a few days’ travel) or take place across a social or cultural boundary that would disrupt one’s prior daily interactions. In practice, this means that the term migration covers phenomena at several scales, from individuals (for instance moving to a new community upon marriage) or households moving away from an established site (thus cutting existing ties of daily interaction) to the migration of large groups of people over long distance in the course of colonisation events. This article focuses first and foremost on characterising these different levels and discussing their potential social impact.

Identifying migration archaeologically, and distinguishing it from routine mobility, remains difficult (e.g. Burmeister 2000; Koch and Knipper 2014) and must of necessity rely on further contextual information. For example, where there is evidence for cattle grazing away from loess areas, as most convincingly shown for south-west Germany (Knipper 2011), this could have been

managed as transhumance from lowland sites, and would therefore fall under the label of mobility. Only if new settlements were established away from the loess to permanently exploit upland pastures, for example, would this event be counted as a migration. On the other hand, where individuals were born and spent their early childhood in another geological area from where there were buried, a migration event at some point after tooth mineralisation is more likely.

As the main aim of his text is to broaden the debate surrounding migration in the LBK, quantitative work plays a reduced role. The discussion of burial evidence in section 4.1 relies on a database compiled from published literature during my PhD research, then expanded during the Lifeways project at Cardiff University (see Hedges et al. 2013), and periodically updated since then. It currently holds over 3000 LBK burials from both cemeteries and settlements. The discussion on household migration in section 4.2 is based on the published settlement histories of sites which have seen extensive excavation and where the phasing has been established. The assessment remains qualitative in character.

### **3. Migration in the LBK**

Largely driven by the rapidly accumulating bioarchaeological evidence generated within the last decade or so, narratives of the central European Early Neolithic are now replete with references to 'non-locals', 'Near Eastern DNA' and 'migrant farmers'. Yet while this conjures up images of a wide range of people, from individuals to large groups, being on the move, the repercussions of this for LBK society still need to be considered. Currently, there is a contradiction in how migration is perceived. On the one hand, the fast expansion of the LBK is seen as a success story enabled variously by demographic opportunities (e.g. Shennan 2018, 9) or a "courageous colonial attitude" (Pechtl and Land 2019, 17). On the other hand, a consensus of a rather statically organised system has emerged: a patrilocal lineage-based society, in which plots of land were inherited down the male line and territoriality and hierarchy increased as a result (e.g. Bentley et al. 2012; Bogaard et al. 2011; Jeunesse 2011), whereby the "desired ideal was evidently to maintain stationary settlements for centuries and to use the corresponding agricultural land permanently" (Pechtl and Land 2019, 17). In such scenarios, those who move do so only out of necessity. In some regions of the LBK at least, such increasing hierarchy is sometimes argued to be a crucial factor in the eventual breakdown and dissolution of the LBK (e.g. Amkreutz 2016, 372; Jeunesse 2011).

Yet if there is indeed a contradiction or tension between moving on and staying put, then the issue of power differentials and their longer-term dynamics needs to be further investigated. This applies to larger-scale colonisation movements, but also to the migration of smaller groups or individuals. In line with the mobility paradigm of the social sciences, we need to research not only the who, how and where of a mobility event, but also the inherent issues of power and knowledge (e.g. Fiedel and Anthony 2003; Kaufmann et al. 2004; Urry 2007, 186-98). These questions are closely interwoven with aspects such as gender, ethnicity and social status, and all of them remain to be clearly addressed in an LBK context, where we have so far worked with largely implicit assumptions.

This paper aims at outlining alternative avenues for further investigation based on a change in how we perceive some fundamental characteristics of this early farming society, notably its propensity for migration. This involves different sizes of groups, from the presumably larger communities spreading the LBK at a continental scale to individual migration histories. I begin by briefly summarised the currently most accepted models, before outlining the evidence for alternative readings and the way these can take debate further. The main goal is to show that the data available so far supports a variety of possible interpretations, and these deserve to be discussed, and subsequently tested, more thoroughly than has been the case.

#### *3.1. Personal*

Personal mobility was certainly necessary, if only to move the many non-local raw materials for the production of tools or ornaments. Yet this need not involve actual migration in the sense of permanent residential changes. Evidence for the latter has so far largely come from strontium isotopes which – when measured on teeth – reflect the sources of an individual's childhood diet,

which can be compared to the signatures of the place of burial. Such evidence is now available for both humans and animals. In the case of the latter, transhumance could occasionally be established on the basis of seasonal fluctuations of isotopes in cattle enamel, but need not have been very far-ranging. In the case of Vaihingen in Baden-Württemberg, the substrates which could have caused the 'non-local' signatures were only a few kilometres away (e.g. Knipper 2011, 278).

Early indicators for human migration came from the Flomborn cemetery, where 64% of the sampled individuals were shown to have originated off the loess substrates on which LBK sites are classically located (Bentley et al. 2002, 800). Similarly, at Vedrovice, five men and women out of the 57 sampled had apparently reached the site from elsewhere during their lifetime (Zvelebil and Pettitt 2008, 199). In both cases, this pattern was initially identified as related to the LBK colonisation movement and the influx of hunter-gatherers into new communities. A more recent large-scale study comprising over 550 individuals from across the southern half of the LBK distribution, between Hungary and Alsace, then revealed that isotopic non-locals are not confined to the early stages of the culture, but occur throughout (Hedges et al. 2013, 365-70). Two main conclusions were drawn. First, women were generally more likely to exhibit non-local origins than men, meaning that they had changed residence between birth and death (concentrating on the six main sites, Hedges et al. 2013, 367 report that 15 out of 152 females were born off the loess, as opposed to 3 out of 147 males; females also show greater variability within the loess signatures of a given site than males). This was interpreted as indicating a patrilocal system of post-marital residence (Bentley et al. 2012), although there are, after all, some migrant men. However, this view has been accepted as the mainstream, and its consequences for female identity and social position remain to be comprehensively studied. Wife taking is occasionally invoked, also with reference to mass graves such as Talheim (Hedges et al. 2013, 368).

Second, and in terms of the non-local males, Bentley and others (2012) proceeded to show that there was a statistically significant correlation between being born locally and receiving a polished stone tool (mostly an axe or adze) as grave good. This implies that childhood origins could influence what was buried with the adult deceased, and therefore introduce a hereditary aspect in access to material culture. This reading, too, has become widely accepted, although it remains partial (see section 4.1).

Overall, then, we have a situation in which individual migrations are largely seen as tied into and determined by a wider and rather rigid social structure. The people who are moving are cast in a subordinate or marginal role: the males are those excluded from access to certain goods and by extension from socially privileged positions. Women on the other hand are seen as moving in a framework that perpetuates the existence of patrilineal descent, with very little explicit interest taken in their consequent experiences and social identities. At the personal level, then, there is very much a link between migration and lower status in our interpretations.

### 3.2. Group

There is also increasing evidence for the mobility not just of single individuals, but of larger groups such as (sets of) households. First indications of this were implicit in the isotopic evidence cited above. As large-scale intermixing with the Mesolithic population now seems unlikely on aDNA grounds, alternative explanations for the origins of isotopic non-locals have to be sought, all the more so since there is increasing evidence from non-cemetery sites for populations living off the loess substrate which has classically been seen as almost synonymous with LBK settlement locations (Sielmann 1972). For instance, at Nieder-Eschbach, Nehlich and colleagues (2009) identified a group of mainly juveniles with non-loess signatures among the settlement burials. However, the most striking example comes from the Late LBK enclosure site at Herxheim. An extensive programme of isotopic work has unexpectedly revealed that the vast majority of the 80 or so individuals sampled did not spend their youth on loess soils, but came from a variety of areas within lower mountain ranges (Figure 2). They are genetically indistinguishable from other LBK individuals, and are thus not 'Mesolithic survivors' in any simple sense (Blöcher et al. 2019; Turck 2019). The implication is that

substantial numbers of people, indeed whole communities, must have lived mostly in the uplands, but occasionally travelled to (and died at) sites on the loess.

There had been some archaeological indications of this. Higher-altitude settlements were for example located in the Swabian Alb (Knipper et al. 2005), the Taunus (Laufer 2002) or the Franconian Alb (Drummer 2016). However, the sites themselves, and presumably any associated fields, were generally located on loess patches, and it is unclear in how far the surrounding geology and drinking water would have influenced isotopic signatures. More intensive modelling of likely values with different constellations of resources is clearly desirable, but as long as cereals were grown on loess this is unlikely to have caused the extremely high strontium values observed in places such as Herxheim, notably since cereals make up the bulk of the LBK diet (Bickle 2018). Thus, in addition to more or less standard agricultural sites which just happen to be at higher elevations, there must have been other communities in upland areas who have so far remained largely archaeologically invisible, and perhaps set different economic priorities.

At Cuiry-lès-Chaudardes in the Paris Basin, different households pursued different economic strategies. While domesticated animals dominate everywhere, this varies dramatically between around 96% to just over 58% (Hachem 2018, 912). Houses low in domesticates tended to rely mostly on pigs as fast meat producers, hunted boar, also yielded fewer cereal grinding stones and were generally shorter, as well as being associated with pottery of various technological traditions. Over time, there are more of the 'herder' houses with predominantly domestic animals (e.g. Gomart et al. 2015; Hachem 2018). In recent models, this has been related to the level of economic maturity of the respective household units, whereby short houses are those of recent arrivals or junior members, who did not yet have the chance to build up viable herds themselves (Gomart et al. 2015; Hachem 2018). This is a welcome departure from the dominant '*Hofplatz*' or yard model (for a recent definition see Zimmermann 2012), in which traditions and behaviours are statically passed down the generations as each house is replaced in the same area of the site. Also, the presence of wild animals as a straightforward indicator of a 'Mesolithic' identity is explicitly rejected (Gomart et al. 2015; Hachem 2018). Nevertheless, the model still casts the use of domesticated resources as preferable, if not always achievable by all.

It is currently unclear whether the Cuiry pattern can be replicated at other LBK sites, in particular because animal bone assemblages are so often poorly preserved. Yet there are other indications of economic variability. Recent work on the sinkholes of the Franconian Alb in Bavaria has yielded pollen indicators for plants associated with grazing, but no evidence for cereals, in spite of favourable preservation conditions. These areas were hence probably used specifically for herding. The sites investigated so far (notably Marktbergel Gipstagebau West II) are rich in pottery, but there are no architectural traces, although in LBK times a thin loess cover may still have existed here (Beigl forthcoming). A single Flomborn-period building was, however, revealed at nearby Ickelheim, in the foothills of the Alb and not on loess. It stands out due to its monumental construction, which could suggest a communal structure used by various groups of people spread throughout the uplands with their cattle, and indeed further off-loess stray finds dated to the LBK are noted in the heritage management data bases (R. Beigl, pers. comm.). Similarly, in the foothills of the Polish Carpathians a monumental building over 41 m in length was excavated at Łoniowa, one of a series of sites in an unusual watershed location in the Wiśnicz hills (Valde-Nowak 2009, 2013). Valde-Nowak suggests a possible greater role for herding and dairying in these settings, although more research is needed and the deposit of a flint sickle in a pit inside the house indicates some role for cereal production. Turck (2019, 393-400) has also collected further indications for an LBK presence at higher altitudes, which must now be investigated more closely.

This evidence is currently throwing up more questions than can be answered, although it fits into an emergent pattern of diversification which saw LBK communities establish sites for instance much further away from water sources than expected (Stäubli 2011, 9-10), or conversely in floodplains (Amkreutz 2016, 365). Clearly, the individuals who were previously sampled isotopically, i.e. mainly those from cemetery sites, may not represent the only way of life possible in Early Neolithic contexts, which was seen as highly loess-focused. We must now find out more about the

character in particular of off-loess and upland occupation, whether its establishment required the permanent relocation of households (and so constitutes migration as defined here, rather than seasonal mobility), and whether the associated economic practices resulted in a more mobile lifestyle or could be sustained from largely permanent sites. In addition, the relations of uplanders and lowlanders require further sustained work. While Robb and Miracle (2007) have pointed out that economic diversity need not bear any direct relation to social or ethnic self-identification, most of the isotopic non-locals are so far known from Herxheim, where they were treated with extreme violence, at least post-mortem. The still heavily debated scenario proposed by Zeeb-Lanz (2019) is that various loess-based LBK communities from different regions each raided for captives in their adjacent uplands and transported their victims to Herxheim. However, this is difficult to discuss in the absence of concrete evidence for the extent of upland settlement (as well as any possible indicators for retaliation which may be discovered there). While Herxheim could thus illustrate substantial intra-LBK tensions and conflicts, we so far lack the data to interpret the implications fully, in particular regarding the correlation, if any, between non-loess isotopic signatures, the extent of mobility of individuals or groups between upland and lowland sites, the timing and extent of any permanent relocation into the uplands, and any power differentials involved.

Clear evidence for group or household migration also comes from the settlement sequences at most standard, loess-based LBK sites, which when examined in detail often indicate a degree of dynamic change. This remains little studied, so that the proposed explanations are so far restricted. For instance, based on correlations of relative dating sequences of pottery with house frequencies and climatic data, Gronenborn and colleagues (2014) have proposed that drops in household numbers are generally indicators of social stresses or a decline in social complexity. Elsewhere, relocation events are linked to inequality. At the south-west German site of Vaihingen an der Enz, two sets of 'neighbourhood groups' or 'clans' were identified based on material culture. Analysis of the archaeobotanical data revealed that the clans of the Middle Neckar group spent more effort weeding and manuring their fields than those of the Unterland-Kraichgau group. This was interpreted as indicating that the former group monopolised access to the best land close to the village and could easily reach the plots, while others had less opportunity of doing so and were hence of lower status. This imbalance has been cited as a prime reason why the clans of the Unterland-Kraichgau group eventually left Vaihingen (Bogaard et al. 2011).

Certainly, such evidence poses a challenge to the norm of residential stability and farmstead reproduction so deeply engrained in the *Hofplatz* model. The question is whether this non-correspondence would have been seen as an undesirable option in the past, or is just cast as such in the present. I will explore this further below (section 4.2), but a reading of migration as failure certainly clashes with the way the expansion of the LBK as a whole is often written about.

This latter aspect has largely been discussed with reference to the earliest LBK phase, where migration is seen as a success story. Several authors have pointed out both the risks associated with colonisation events and the many resources needed, not only for the journey, but also to sustain the community until their first own harvest (e.g. Strien 2017a). This 'expensive' nature of the colonisation process is one of the main arguments for a prestige-driven migration (Firdich 2005). Social stability may also have been fostered by sending children who were not in line to inherit the farmstead out as colonisers, showing off one's wealth and removing a potentially disaffected section of the population in the process. As indigenous hunter-gatherers are unlikely to have swelled the ranks of early farming communities – rather, they may have continued to exist in enclaves alongside (see e.g. recent summaries in Gehlen et al. 2017; Hofmann 2015) – the rapidity of the spread is all the more remarkable. Clearly, there were motivations in place for moving, as well as the technical and social means to support these ventures, and migration was not only a viable, but also a sought-after choice.

The more or less tacit assumption (only sometimes explicitly voiced, e.g. Sommer 2001; Pechtl and Land 2019) is that the pace of earliest LBK migration later slowed substantially – once the settlers had established new sites, and the 'frontier' had moved on, people would do their utmost to stay put. This is not just because farmers are generally thought to be 'sedentary', but also because places such as fields – which needed to be cleared, manured and weeded to maintain productivity

(Bogaard 2004, 109-110) – and house plots are assets built up and maintained over a long time, and hence unlikely to be abandoned lightly.

Therefore, in most accounts, migration is positively valued only in a situation of active expansion at the perceived edges of the LBK phenomenon, and for a restricted period of time. After this, and in areas behind the frontier, people only move when they are pushed out – by intra-village tension, climate or if they are married out or caught in raids. Instead, there is increasing hierarchisation, with some clans or households monopolising the best land and other resources, such as polished stone tools. Yet several links in this chain can be questioned.

#### **4. Rethinking migration**

##### *4.1. Personal*

While the majority of people so far classified as non-locals are women, the true prevalence of patrilocal practices in the LBK is not known – movement between different loess patches, even over a greater distance, would simply leave no recognisable isotopic trace. Initial investigations of mtDNA has, however, also shown more diversity between females than males, suggesting that the former originally came from a wider range of hereditary lines and may have ‘married in’ (Szécsényi-Nagy et al. 2014). This can now be checked further using whole-genome analysis. Yet so far, we have barely reflected on what patrilocality implies for the subsequent social standing for women. Work so far tends to discuss women only with regard to the fact of their “marriage”, without taking into account their prior or subsequent situation. Instead, LBK identity and politics are cast as taking place within the framework of patrilines and therefore being controlled by males, who also monopolise the important resource of polished stone tools. The (perhaps unintentionally created) impression is thus that women marrying into a new community would do so effectively at the behest of their male relations, and with little will or agency (see also Nash 2012). Yet again, this systematically underestimates the variety and complexity of such transactions. Ethnographically, there is a wide range of possibilities, both in the involvement of women in their own marriage arrangements and in the rights they enjoy thereafter (see summary in Frieman et al. 2020). Which options apply in the LBK should be a matter of more explicit debate and investigation.

Turning to the narrative for increasing hierarchisation centred on powerful LBK males, this relies on two main arguments (see also summaries in Hofmann 2012; Zeeb-Lanz 2019, 464-65). First, polished stone tools are connected to the inheritance of land and receiving an axe or adze correlates with childhood origin (and inherited status). Second, differential grave good provision increases over time, with some particularly wealthy burials dated to the very end of the LBK sequence (e.g. as developed in Jeunesse 1997, 111-27; most recently Jeunesse 2017, 180). Both arguments are partial. To begin with, the kind of status conveyed by polished tools was not always particularly restricted; overall (using the database described in section 2), around 35% of adult males (i.e. 190 of 540 individuals identified as most likely male) were buried with at least one such item, and it is rather rare to be buried with more (25 of the 190 males overall, mostly receiving two pieces but with one instance of four; the proportions do not change when unsexed burials are taken into account). Even if we see polished stone tools as an item expressing a particular social status (e.g. land owner), rather than one that could be accumulated in larger numbers to simply express wealth, this kind of status was apparently not highly restricted at a global level. However, the provision with polished stone tools as grave goods varies dramatically between regions of the LBK, from less than 1 % of graves in the Paris Basin to almost 30% in the Alsatian Bas Rhin. In areas like the Paris Basin or Hungary, there are also no indications that the degree of inequality increased only in the latest phase, as is occasionally suggested for the LBK as a whole, for instance by Gronenborn (2016, 67). All this implies that the way in which polished tools could be used to negotiate important social positions was not even across the LBK, and that a ‘one size fits all’ model based on just a few sites does not tell the whole story. Similar reflections apply to the presence of imported *Spondylus* shell items in graves, another potential prestige good which also varies between regions, including in its age and gender associations. As no definite isotopic patterns have been associated with its presence, however, its

role in expressing access to prestige or status has become somewhat neglected (but see Windler 2018) (Figure 3).

There are some very well provisioned graves in the later LBK phase which are routinely drawn upon to argue for hierarchisation. The instances generally quoted are the settlement burial from Bajč, a few of the interments from Aiterhofen in Lower Bavaria and isolated examples of rich graves from several sites in Alsace (e.g. Jeunesse 1997, 111-27, 2011, 2017). These burials are unusually well provisioned, but this means they are *not* representative of a general trend towards a greater number of rich inhumations throughout all late LBK burial grounds. They do not even necessarily spawn a series of similarly rich burials on the same site, as one would expect if this was the beginning of a more thorough hierarchisation process with an inherited component.

The narrative for increased hierarchisation expressed in burial and tied to land ownership thus works for some sites in the LBK, and for the restricted time periods these represent. It is not a general phenomenon, but merely one possible trajectory of LBK development which should not blind us to the existence of others. To use regionally diverse mortuary data as the basis for assigning an overall lower status to more mobile individuals thus seems premature. Instead, rich graves of adults (and of some children) are transitory phenomena. Even if they express the attempt to perpetuate status over the generations, they were evidently of limited success (see also Hofmann 2012), working at some sites for a short time. This also ties in rather well with the settlement evidence.

#### 4.2. Households and groups of households

If there was a situation of stable or increasing hierarchisation throughout the LBK, this should also manifest itself at settlement sites, for instance if particularly large buildings which required considerable labour to build were always consistently replaced in the same farmstead area over time, indicating the reproduction of economic inequalities between households. This, too, is not universally the case. Numbers of very long buildings vary between areas of the LBK and may be related to whether the household or site was seen as the most salient dimension of identity (Pechtl 2009). Even where very long buildings are documented, however, their location can shift between farmsteads over time, so that any higher status expressed by building length or architectural elaboration was not maintained between generations. At sites such as Harting in Bavaria, it could even be shown that there is a tendency towards greater homogeneity, rather than greater difference, as the LBK sequence progresses (Hofmann and Lenneis 2017) (Figure 4).

Returning to the situation at Vaihingen, and on the evidence published so far, the putative lower status of the Unterland-Kraichgau group is apparently not reflected in, for example, house length, accessibility of raw materials or indeed diet (Bogaard et al. 2016, 12, 38-43). Differential effort expended on cereal production remains the only indication. Yet this could also relate to different economic strategies rather than constrained opportunities. For instance, while cattle were of equal importance for both 'clans', the Unterland-Kraichgau group appears to have preferred sheep over pigs. One could hence argue that different mobility practices were envisaged from the start, with some willing to make a greater commitment to place and others to resources which were easier to move along (provided, following Bogaard et al. 2016, 17, that pigs are a good choice when paired with permanent fields; this does not mean that pigs cannot, on occasion, move further. I am indebted to Katarina Botić for this suggestion). Whether this is connected to 'status' in any straightforward way remains to be argued. While mitigating social and environmental stresses is one possible reason for migration events, this need not by default imply that the option of moving would be seen as undesirable or seen as 'losing out'. Instead, village fissioning frequently is an explicit strategy to prevent or alleviate any emerging status differences, and it is thus explicitly sought (as documented e.g. in Bandy 2004; Barrier and Horsley 2014; Harris 2014; Metcalf 2010, 252; Rival and Whitehead 2001; Århem 2001). Where part of a site's inhabitants moved on, this could just as well imply a loss in prestige for those who remained put, as it reduced the settlement's overall importance and clout. The links between status, permanence and economic choices are hence far less straightforward than current models generally allow.



It is therefore not surprising that the settlement sequences of many LBK sites actually reveal considerable fluctuation in house numbers. Given the tendency of LBK houses to be rebuilt in each generation in more or less the same area of the site (see most recently Meadows et al. 2019, as against Schmidt et al. 2005), the fate of individual residential groups over time can be traced. Although the apparently simultaneous and thus co-ordinated move of a larger group of households, as at Vaihingen, has so far not been replicated elsewhere, there are ups and downs in household numbers throughout the settlement sequences of many well documented sites. At Langweiler 8, for example, some yards are abandoned and others newly established in almost every settlement phase, and there are similar periods of growth and contraction in adjacent sites of the Merzbach valley (e.g. summarised in Hofmann 2016). At Arnoldswweiler, the site may even have been entirely abandoned for a time (Balkowski 2017).

Previously, such fluctuations were connected to changes in climatic circumstances, notably the degree of rainfall (e.g. Strien and Gronenborn 2005), while more recently a link to social complexity has been proposed (e.g. Gronenborn et al. 2014). Aspects of both models remain problematic. First, there is little information concerning the tolerance levels of prehistoric cereal varieties for particular environmental conditions (Bleicher 2011; Hedges et al. 2013, 345). Second, year-specific climate data derived mostly from tree rings is related to settlement phases dated by relative chronology only, based on pottery seriation within a rigidly defined *Hofplatz* model. Although the end points of the LBK sequence are well attested in many areas, there is now considerable debate over the timing of its beginnings (Bánffy et al. 2018; Jakucz et al. 2016; Strien 2017b) and hence its overall duration, which strongly impacts the tempo of the proposed cycles. Dating by pottery seriation also implies a predictable and constant rate of change largely due to drift and isolation. However, pottery is involved in social negotiations at several levels, from individual to group, and given this role it is just as likely that it will be more deliberately conservative in some settings, and undergo faster changes in others, in which the aim is to create difference (see also section 4.3). Recent applications of Bayesian modelling have indeed revealed much less smooth and predictable sequences of pottery changes, with some longer and some shorter phases (Denaire et al. 2017, 1129-1130). Finally, even accepting seriation-derived dates for the moment, the picture is once again regionally varied. A recent study focusing on Bavaria, for example, could show that in spite of a remarkable degree of fluctuation in precipitation, with several exceptionally dry or exceptionally wet years and rapid oscillation between extremes, rainfall had virtually no impact on well-established settlement regions in areas like Franconia (Pechtl and Land 2019). The situation is different for more marginal zones. For instance, in the Lech valley of south-western Bavaria, LBK sites were established ever closer to the Alpine foreland, near the limits of possibility for cereal agriculture. These sites were not long-lived, as even relatively small changes in temperature or rainfall appear to have caused their abandonment. Nevertheless, they were settled once conditions improved again (Pechtl 2011).

In sum, the connection between drops in household numbers and adverse climatic circumstances is no longer clear and is strongly dependent on regional factors. A model working at least partly with socially driven cycles seems more promising, although its dating framework must be independently checked, and they would not necessarily apply to the LBK as a whole. Also, even the newer models cast periods in which established sites contract in terms of vulnerability, fragility and decline (e.g. Gronenborn et al. 2014, 73). In contrast, as migration and the settling of new lands were positively valued in the earliest LBK, there is no reason to assume that these behaviours suddenly lost their social significance. LBK households and smaller groups apparently moved into new environments, or left existing sites, all the way through the sequence, and the classic *Hofplatz* model will need to be relaxed considerably to accommodate this. Such migrations, not necessarily long-distance, may have been part of deeply engrained strategies which prevented surplus production from being more permanently tied to ownership by individuals or restricted groups, as has been argued for European prehistory more widely (e.g. Risch 2018). This can be characterised as a 'decline' only if we see the permanent and increasing accumulation of socio-economic difference as the goal – not just for a section of society, but in general terms and cast in the positive light of 'complexity' –

and the tension between migration and sedentism as a somehow reductive, simple option. Both premises are debatable.

Given the constant social tensions in early village communities, holding a community together over the long term required constant negotiation. In such settings, maintaining a large group of people is not always possible, and striking out to establish a new site is a frequently chosen option (e.g. Beck 2006; Wiessner 2002; Århem 2001; Leppard 2014). In the LBK, opportunities for migration were also built into the system in this manner, and more research is necessary to establish under what circumstances these were made use of, and when this was not the case (as e.g. at Vrábce, Furholt et al. 2020). Even the pattern of re-establishing a house roughly in every generation provided a possibility to renegotiate one's commitment to remain at a given site. If we see migration as a constant, then LBK settlement dynamics at a regional scale can be re-framed, as indeed can aspects of the initial LBK spread at a continental scale.

#### *4.3. Re-theorising aspects of the spread*

The large-scale expansion of the LBK is often seen as taking part in two distinct and delimited waves. However, fundamental characteristics of this process remain poorly known, notably its overall duration. The prevailing model had been of a fast move as far as the Rhine, largely based on an early  $^{14}\text{C}$  date from Schwanfeld (Lüning 2005). Accordingly, western areas of the earliest LBK would have been reached some time before 5400, with a pause until a second, Flomborn wave of expansion after 5300 cal BC. This cemented the Rhine as a barrier behind which foragers continued to exist; indeed, their active resistance to the LBK has occasionally been quoted as a reason for the break in expansion, as well as for the building of enclosures in western LBK areas once the frontier was crossed (e.g. Golitko and Keeley 2006, 339-40; Lüning et al. 1989, 391). The proposed pause also provided the necessary time for LBK communities to re-organise, to move from a social model based on migration as prestige indicator to one in which territorial possession filled this role (Friedrich 2003; Sommer 2001). The implication is that there were two kinds or modes of LBK society: one that existed during episodes of expansion, at the frontier to hunter-gatherer areas, wherever that was currently located; and one that existed in areas well behind that imaginary moving line, where a settled existence was preferred.

However, the radiocarbon record is not actually sufficient to support this model. Problems with the original Schwanfeld date have been revealed (Fröhlich and Lüning 2017) and a date in the 54<sup>th</sup> century cal BC for the arrival of the earliest LBK in western Germany has been proposed as more likely on the basis of statistically modelled  $^{14}\text{C}$  dates (Jackucs et al. 2016, 323-24). If present at all, the break between earliest LBK and Flomborn migrations is thus considerably reduced, and both can be seen as part of the same phenomenon, in which expansion continued more smoothly but was increasingly paired with regionalisation in material culture. The differences between earliest LBK and Flomborn material remain, as does the frequently observed relocation of settlements between the two phases, but the tempo of these processes must now be better understood. Paired with the cartographic illusion of our often-reproduced maps, in which static lines define the limits of rapid, but contained waves of expansion (as here in Figure 1), we were working with an artificially staged framework that can no longer be sustained.

This provides an opportunity to more fully investigate how the LBK spread worked in detail and whether this differed over time. We will never reach the kind of chronological precision afforded by dendro-dates in the Alpine Foreland, where sites also tend to be of very short duration (around 12–15 years, e.g. Ebersbach 2010) and see a fast rhythm of residential mobility throughout. Nevertheless, we can take patterns of site establishment there as a starting point to frame some expectations for the LBK. In the Alpine Foreland, new sites often begin with a single house, which is joined one or two years later by another few dwellings. Around three or four years into the sequence, there is a construction boom, followed by a slow decrease in the establishment of new houses and the abandonment of some dwellings, until there is a final move away of the last inhabitants. New sites were thus established through the coordinated effort of a multi-household group, with one set of people laying the ground work and others following later. Occasionally, gaps in

the house rows indicate people who never arrived, while single dwellings in the landscape perhaps exemplify those ventures which failed to attract followers (e.g. summarised in Hofmann 2013; Hofmann et al. 2016).

In the LBK, some similar phenomena are indicated. Especially in western areas, the earliest houses in the sequence occasionally stand a little apart from the main cluster (Figure 5). At Fexhe in Belgium, the material culture associated with this building also included pottery of probably local hunter-gatherer origin and different plant material to later houses. This supports an interpretation as a founding building, potentially later used as a meeting place (Bosquet and Golitko 2012). There are several other such cases, and these buildings likely housed the pioneer group – whatever its composition – charged with establishing the site. In the following phases, and in contrast to the Alpine Foreland, such houses remained spatially removed from the main cluster, serving as a visible reminder of the initial migration to this place and indicating the continued relevance of this foundational event. Like in the Alpine Foreland, however, longer-term settlement was not an inevitable outcome. There are (rare) single buildings, apparently inhabited for one phase only, such as the substantial Flomborn period structure at Unterpleichfeld in Bavaria (Schußmann 2004). Other large-scale houses revealed closer to upland areas (see section 3.2) could have housed social groups of a different composition who were exploiting particular resources.

We also have little idea how colonists were recruited and how far they travelled. As this is rarely explicitly raised, we must take additional care not to limit ourselves to idea that homogeneous groups from just behind the frontier would have moved a relatively short distance, only to then settle down for good. Rather, indications such as Bavarian elements from pottery in Upper Alsace (Lefranc 2007, 32) and the long distances the LBK settlers of Brandenburg must have covered (at least 100 km; Ismail-Weber 2017), show that large distances were still being traversed even in the later LBK. This could be further substantiated using oxygen isotopes, which could help trace longer-distance movement but currently remains hard to read due to limited sample sizes (Hedges et al. 2013, 365). In addition, establishing a multi-household site may have required the participation of people recruited from different settlements and whose material culture, behaviours and customs may have differed to some extent at the outset. In this light, the relatively swift creation of regionally distinctive material culture in newly settled western areas is significant. In the earliest LBK, a largely unified material culture helped to maintain links with the origin communities, as well as providing a suitable common basis to interact with others over large distances. Within a framework of increasing regionalisation, later LBK settlers in contrast more rapidly created new, regionally distinctive material vocabularies, as in the Paris Basin. These could potentially unite colonists who came from different communities and whose allegiance to the new identity group was substantially shaped by the migration itself. Indeed, in many cases migration processes are linked to the creation of new group identities, not least a new ethnic identity (see e.g. summaries in Brubaker 2014; Hu 2013, 372; Voss 2015).

Ultimately, this tendency to distinguish oneself as much as possible from one's origin point is linked to a rise in diversity within the LBK as a whole, also affecting long-settled regions. Where this involves many different aspects of life, such as burial, house architecture and elements of social structure, alongside pottery decoration, an interpretation as an ethnic boundary seems possible. Such marked breaks do exist at several locations within the LBK, notably in Bavaria (Pechtl 2016), between upper and lower Alsace (Lefranc 2007, 26-30) and in Hessen (Kerig 2010) and may increasingly have structured or channelled the available possibilities of moving through the landscape. A social process that initially facilitated migrations could, in other situations, come to curtail them.

## 5. Conclusions

The increasing evidence for migration in the LBK provides an opportunity to rethink key aspects of this early farming culture, from the personal to the group level. Yet there has been a tendency to associate mobility, and migration in particular, with subaltern groups. In these models, women's

migrations experiences remain largely neglected, lower-status sections of the community are pushed out from a site, or migration is seen as a response to crisis situations, whether social, demographic or environmental. Alternative, more positively connoted views of migration exist mainly for the earliest LBK expansion, which prominently features both single heroic figures (e.g. the 'hunter-warrior' from Schwanfeld, Lüning 2005) and economically successful clans or communities.

These readings remain partial. On the one hand, they are coloured by modern preconceptions regarding the nature of farming societies, the reasons for which people migrate and the notion that a settled lifestyle would be uniformly more desirable. On the other hand, they tend to treat isolated and well-investigated instances, such as the settlement at Vaihingen or the rich burials from Aiterhofen, as if they were representative over the vast geographical span of the LBK. This paper has shown that the evidence linking, for example, individual mobility patterns and indicators for socio-economic status is far less clear-cut than is often made out. Similarly, the reasons for why households or other groupings do move in traditional societies are wide-ranging and migration is not exceptional. Alternative interpretative avenues should hence also be explored for the LBK, where there is considerable archaeological and isotopic evidence for migration at several social scales.

At the personal level, female exogamy is the most widely cited. Yet it also remains the least thoroughly studied, relying on stereotypical models of male political agency in moving females. Approaching women's roles and experiences in more detail could take the form of renewed attention to regionally variable cemetery assemblages, as well as in-depth reflection on pottery production. Pottery making is generally assumed to be the domain of women, and ceramic styles are seen as central to identity negotiation more broadly, with pottery decoration used to define regional communication groups. Women's labour and its organisation were hence critical for displaying community cohesion. The changing degrees of standardisation and variation, the precise technological networks evident in pottery production and the elaboration of motifs (for a summary so far see Pechtl 2015) can now be investigated from the point of view of women's active involvement in and influencing of their post-marital residence communities.

At the group level, LBK migration was more or less constant throughout the sequence, at least in well-investigated areas such as the Rhineland. Here, the potential of out-migration could have functioned as an accepted strategy to gain status, as well as to circumvent increasing hierarchisation in one's origin community. As a consequence, rigid and hereditary social hierarchies were impossible to sustain over the long term. This is consistent with both the cemetery and the settlement evidence, with neither rich graves nor overly long houses being reliably replicated for the same group over many generations. Land ownership was thus not the sole basis for prestigious social positions. In all likelihood, everyday political reality in LBK settlement sites was considerably more messy, with migration as an important outlet to mitigate tension.

In addition, in some areas communities in traditional farming settlements evidently coexisted with groups living off the loess, perhaps in more mobile settings. More data are urgently needed to assess how relationships between uplands and lowlands were structured, and whether indications of violence directed specifically against such groups (as at Herxheim) were more widespread. The presence of LBK groups in upland areas would also have framed (and may have been framed by) the possibilities of movement for residual hunter-gatherer populations, whose presence still needs to be accurately dated and quantified in most areas. As already argued by Whittle (1997), in the Neolithic multiple forms of mobility (including migration) interleaved.

The distinction between upland and lowland communities also raises the question of emerging ethnic diversity within the LBK and the role of migration, other forms of mobility and material culture within this. In an influential model, Sommer (2001) already identified a link between the possibility for migration and diversification in material culture. However, this was based on the strict two-stage chronological premises which are now being questioned, and it relied on an absence of migration in areas behind the frontier. The original formulation can now be expanded. Continued and sometimes long-distance relocations drove the LBK westward expansion long past the earliest LBK stage, and here the creation of new material culture preferences increasingly stressed the cohesion of the potentially internally diverse migrating group over links to origin communities. It can now be

investigated whether this also applied to household and group migration further behind the frontier, where rather stark boundaries were sometimes put in place, limiting or directing migration flows. In contrast, considerable interleaving of Vinča and LBK characteristics is indicated at the south-eastern edge of the LBK (Jacukcs et al. 2016) indicating much more permeable boundaries, as also discussed elsewhere in this volume. Once again, a close comparison between LBK regions is warranted to characterise these processes further.

In sum, recent propositions which link migration, status and hierarchisation in a limited number of ways do not do justice to the full range of data we currently possess. Further in-depth studies of regional sequences are the necessary next step to test for variability across the LBK distribution. These studies should be backed up with absolute dates to ease comparison. On this basis we can further assess how possibilities for migration in different areas intersected with any evidence for temporary social inequality (from settlements and graves) or with evidence for violence and rupture. While we still have a long way to go in untangling the changing and regionally specific trajectories of LBK social life, migration emerges as a possible strategy which contributed to the balancing out of social inequalities over the longer term. Migrating groups could improve their social prestige by establishing a new site elsewhere, but at the same time the potential threat of out-migration from established communities, and the concomitant loss in prestige, limited hierarchisation. The variability of LBK economic choices can also be read in this light. Placing migration and mobility centre-stage thus prises apart the cracks in existing interpretations. Indeed, for a phenomenon of the size and complexity of the LBK, there is most likely more than one answer.

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### **Figure captions**

Figure 1: Overall distribution of the LBK, with main sites mentioned in the text. Base map after Midgley 2005, 14.

Figure 2: Strontium isotope signatures of the first molars of the individuals sampled at Herxheim (n=73). The majority does not correspond to the local range. After Turck 2019, fig. 40 (reproduced with kind permission of R. Turck).

Figure 3: Percentages of graves in the different regions in which either polished stone tools or imported shell have been found. Numbers behind abbreviations are the numbers of graves included for each region. HUN=Hungary; MOR=Moravia; SLO=Slovakia; AUT=Austria; BOH=Bohemia; EGR=Eastern Germany; PUK=Poland and Ukraine; BAV=southern Bavaria; BWS=Baden-Württemberg and Swabia; FRH=Franconia and Hessen; RLS=Rhineland and Lower Saxony; BRH=Bas Rhin; HRH=Haut Rhin; PAB=Paris Basin.

Figure 4: Phased plan of Harting, Lower Bavaria, showing that architectural indicators for hierarchy became less exclusive over time. In phases IV-VIII, there is only one house per phase that is particularly long (i.e. over 33 m; shaded) and has three internal architectural parts (black outline). In the latest phase, internal architectural complexity and length are no longer always correlated, and several contemporary yards have houses falling into one of the categories. Base map and phasing after Herren (2003, 129, 134-136).

Figure 5: Spatial segregation of pioneer houses at two Belgian sites. Redrawn after Bosquet and Golitko 2012, figs 4 and 5.

## References

- Amkreutz, L., 2016. Better to burn out than to fade away: a comparative perspective on the diversity in LBK endings in the Rhine-Meuse region, in: Amkreutz, L., Haack, F., Hofmann, D., Van Wijk, I. (Eds.), *Something out of the ordinary? Interpreting diversity in the early Neolithic Linearbandkeramik and beyond*. Cambridge Scholars Publishing, Newcastle, pp. 357-397.
- Andresen, M., 2004. *Studien zur Geschichte und Methodik der archäologischen Migrationsforschung*. Waxmann, Münster.
- Anthony, D.W., 1990. Migration in archaeology: the baby and the bathwater. *American Anthropologist* 92, 895–914.
- Anthony, D.W., 1997. Prehistoric migration as social process, in: Chapman, J., Hamerow, H. (Eds.), *Migrations and invasions in archaeological explanation*. Archaeopress, Oxford, pp. 21-32.
- Balkowski, N., 2017. From Merzbachtal to the Graetheide? Mobility at the end of the Linear Pottery Culture, in: Scharl, S., Gehlen, B. (Eds.), *Mobility in prehistoric sedentary societies*. Marie Leidorf, Rahden, pp. 119-128.
- Bandy, M.S., 2004. Fissioning, scalar stress and social evolution in early village societies. *American Anthropologist* 106, 322–333.
- Banffy, E., Bayliss, A., Denaire, A., Gaydarska, B., Hofmann, D., Lefranc, P., Jakucs, J., Marić, M., Oross, K., Tasić, N., Whittle, A. 2018. Seeking the Holy Grail. Robust chronologies from archaeology and radiocarbon dating combined. *Documenta Praehistorica* 45, 120-137.
- Barrier, C.R., Horsley, T.J., 2014. Shifting communities: demographic profiles of early village population growth and decline in the central American Bottom. *American Antiquity* 79, 295–313.
- Beck, R., 2006. Persuasive politics and domination at Cahokia and Moundville, in: Butler, B.M., Welch, P.D. (Eds.), *Leadership and polity in Mississippian society*. Southern Illinois University, Carbondale, pp. 19-42.
- Beigl, R., forthcoming. Die Linearbandkeramik im Gipskarst in der Windsheimer Bucht, in: Pechtl, J., Link, T., Husty, L. (Eds.), *Neue Materialien des Bayerischen Neolithikums 3*. Würzburg University Press, Würzburg.
- Bentley, R.A., Price, T.D., Lüning, J., Gronenborn, D., Fullager, P.D., 2002. Prehistoric migration in Europe: strontium isotope analysis of early Neolithic skeletons. *Current Anthropology* 43, 799–804.
- Bentley, R. A., Bickle, P., Fibiger, L., Nowell, G. M., Dale, C. W., Hedges, R. E. M., Hamilton, J., Wahl, J., Francken, M., Grupe, G., Lenneis, E., Teschler-Nicola, M., Arbogast, R.-M., Hofmann, D., Whittle, A., 2012. Community differentiation and kinship among Europe's first farmers. *PNAS* 109, 9326–9330.
- Bickle, P., 2018. Stable isotopes and dynamic diets: the Mesolithic-Neolithic dietary transition in terrestrial central Europe. *Journal of Archaeological Science Reports* 22, 444-451.
- Bleicher, N., 2011. Einige kritische Gedanken zur Erforschung des Zusammenhangs von Klima und Kultur in der Vorgeschichte, in: Daim, F., Gronenborn, D., Schreg, R. (Eds.), *Strategien zum Überleben. Umweltkrisen und ihre Bewältigung*. RGZM, Mainz, pp. 67-79.
- Blöcher, J., Figarska, S., Burger, J., 2019. Genomic analysis of early Neolithic samples from Herxheim, Germany, in: Zeeb-Lanz, A. (Ed.), *Ritualised destruction in the Early Neolithic — the exceptional site of Herxheim (Palatinate, Germany)*, Vol. 2. Generaldirektion Kulturelles Erbe, Speyer, pp. 305-312.
- Bogaard, A., 2004. *Neolithic farming in Central Europe. An archaeobotanical study of crop husbandry practices*. Routledge, London.

- Bogaard, A., Krause, R., Strien, H.-C. 2011. Towards a social geography of cultivation and plant use in an early farming community: Vaihingen an der Enz, south-west Germany. *Antiquity* 85, 395–416.
- Bogaard, A., Arbogast, R.-M., Ebersbach, R. Fraser, R.A., Knipper, C., Krahn, C., Schäfer, M., Styring, A., Krause, R., 2016. The Bandkeramik settlement of Vaihingen an der Enz, Kreis Ludwigsburg (Baden-Württemberg): an integrated perspective on land use, economy and diet. *Germania* 94, 1-60.
- Bosquet, D., Golitko, M., 2012. Highlighting and characterising the pioneer phase of the Hesbayan Linear Pottery culture (Liège province, Belgium), in: Wolfram, S., Stäuble, H., Cladders, M., Tischendorf, T. (Eds.), *Siedlungsstruktur und Kulturwandel in der Bandkeramik. Beiträge der internationalen Tagung "Neue Fragen zur Bandkeramik oder alles beim Alten?!"*. Landesamt für Archäologie, Leipzig, pp. 91-106.
- Brandt, G., 2017. *Beständig ist nur der Wandel! Die Rekonstruktion der Besiedlungsgeschichte Europas während des Neolithikums mittels paläo- und populationsgenetischer Verfahren*. Landesmuseum für Vorgeschichte, Halle.
- Brubaker, R., 2004. *Ethnicity without groups*. Harvard University Press, Cambridge.
- Brubaker, R., 2014. Beyond ethnicity. *Ethnic and Racial Studies* 37, 804-808.
- Burmeister, S., 2000. Archaeology and migration: approaches to an archaeological proof of migration. *Current Anthropology* 41, 539-567.
- Burmeister, S., 2017. The archaeology of migration: what can and should it accomplish? In: Meller, H., Daim, F., Krause J., Risch, R. (Eds.), *Migration und Integration von der Urgeschichte bis zum Mittelalter*. Landesmuseum für Vorgeschichte, Halle, pp. 57–68.
- Chapman, J., Hamerow, H. (Eds.), 1997. *Migrations and invasions in archaeological explanation*. Archaeopress, Oxford.
- Denaire, A., Lefranc, P., Wahl, J., Bronk Ramsey, C., Dunbar, E., Goslar, T., Bayliss, A., Beavan, N., Bickle, P., Whittle, A., 2017. The cultural project: formal chronological modelling of the Early and Middle Neolithic sequence in Lower Alsace. *Journal of Archaeological Method and Theory* 24, 1072-1149.
- Donecker, S., 2012. The ambivalence of migration in Early Modern thought: comments on an intellectual history of human mobility, in: Messer, M., Schroeder, R., Wodak, R. (Eds.), *Migrations: interdisciplinary perspectives*. Springer, New York, pp. 227-237.
- Drummer, C., 2016. Die Bandkeramik in Oberfranken. Gradiometerprospektion und Auswertung der Befunde und Keramikfunde aus der Ausgrabungskampagne 2014 in der linearbandkeramischen Siedlung Ebermannstadt-Eschlipp, Lkr. Forchheim, in: Husty, L., Link, T., Pechtl, J. (Eds.), *Neue Materialien des bayerischen Neolithikums 2*. Würzburg University Press, Würzburg, pp. 11-18.
- Ebersbach, R., 2010. Vom Entstehen und Vergehen – Überlegungen zur Dynamik von Feuchtbodenhäusern und -siedlungen, in: Matuschik, I., Strahm, C. (Eds.), *Vernetzungen. Aspekte siedlungsarchäologischer Forschungen. Festschrift für Helmut Schlichtherle zum 60. Geburtstag*, Lavori, Freiburg, pp. 41-50.
- Feist, T., 2013. The mobility turn – a new paradigm for the Social Sciences? *Ethnic and Racial Studies* 36, 1637-1646.
- Fiedel, S., Anthony, D., 2003. Deerslayers, pathfinders and Icemen. Origins of the European Neolithic as seen from the frontier, in: Rockman, M., Steele, J. (Eds.), *Colonization of unfamiliar landscapes: the archaeology of adaptation*. Routledge, London, pp. 144-168.
- Frieman, C., Hofmann, D., 2019. Present pasts in archaeology of genetics, identity and migration in Europe: a critical essay. *World Archaeology*, <https://doi.org/10.1080/00438243.2019.1627907>
- Frieman, C., Teather, A., Morgan, C., 2020. Bodies in motion. Narratives and counter-narratives of gendered mobility in European later prehistory. *Norwegian Archaeological Review* 52, 148-169.
- Frirdich, C., 2003. Strukturen im Wandel. Ein bandkeramisches Gräberfeld entsteht, in: Eckert, J., Eisenhauer, U., Zimmermann, A. (Eds.), *Archäologische Perspektiven. Analysen und Interpretationen im Wandel. Festschrift für Jens Lüning zum 65. Geburtstag*. Marie Leidorf, Rahden, pp. 545-559.

- Frirdich, C., 2005. Struktur und Dynamik der bandkeramischen Landnahme, in: Lüning, J., Frirdich, C., Zimmermann, A. (Eds.), Die Bandkeramik im 21. Jahrhundert. Symposium in der Abtei Brauweiler bei Köln vom 16.9.–19.9.2002. Marie Leidorf, Rahden, pp. 81–109.
- Fröhlich, N., Lüning, J., 2017. Neue Untersuchungen zur absoluten Datierung des Männergrabes und der Siedlung auf dem ältestbandkeramischen Fundplatz Schwanfeld, Ldkr. Schweinfurt, Unterfranken. *Germania* 95, 43–91.
- Furholt, M., 2018. Massive migrations? The impact of recent aDNA studies on our view of third millennium Europe. *European Journal of Archaeology* 21, 159–191.
- Furholt, M., Müller-Scheeßel, N., Wunderlich, M., Cheben, I., Müller, J. 2020. Communitarity and discord in an Early Neolithic settlement agglomeration: the LBK site of Vrábce, southwest Slovakia. *Cambridge Archaeological Journal* (early view), doi:[10.1017/S0959774320000049](https://doi.org/10.1017/S0959774320000049).
- Gehlen, B., with Fischer, A.-L., Koch, I., Richter, T., Schneid, N., Schön, W., Vogl, K., Zickel, M., 2017. Foragers and farmers during the Neolithic transition in western central Europe: searching for evidence of mobility and intercultural networks, in: Scharl, S., Gehlen, B. (Eds.), *Mobility in prehistoric sedentary societies*. Marie Leidorf, Rahden, pp. 39–73.
- Glick Schiller, N., Salazar, N.B., 2014. Introduction. Regimes of mobility across the globe, in: Salazar, N.B., Glick Schiller, N. (Eds.), *Regimes of mobility. Imaginaries and relationalities of power*. Routledge, London, pp. 1–18.
- Golitko, M., Keeley, L., 2006. Beating ploughshares back into swords: warfare in the Linearbandkeramik. *Antiquity* 81, 332–342.
- Gomart, L., Hachem, L., Hamon, C., Giligny, F., Ilett, M., 2015. Household integration in Neolithic villages: a new model for the Linear Pottery culture in west central Europe. *Journal of Anthropological Archaeology* 40, 230–249.
- Gronenborn, D., 2016. Some thoughts on political differentiation in early to young Neolithic societies in western central Europe, in: Meller, H., Hahn, H.P., Jung, R., Risch, R. (Eds.), *Rich and poor – competing for resources in prehistoric societies*. Landesmuseum für Vorgeschichte, Halle, pp. 61–75.
- Gronenborn, D., Strien, H.-C., Sietrich, S., Sirocko, F., 2014. ‘Adaptive cycles’ and climate fluctuations: a case study from Linear Pottery Culture in western Central Europe. *Journal of Archaeological Science* 51, 73–83.
- Hachem, L., 2018. Animals in LBK society: identity and gender markers. *Journal of Archaeological Science: Reports* 20, 910–921.
- Harris, O., 2014. (Re)assembling communities. *Journal of Archaeological Method and Theory* 21, 76–97.
- Hedges, R.E.M., Bentley, R.A., Bickle, P., Cullen, P., Dale, C., Fibiger, L., Hamilton, J., Hofmann, D., Nowell, G., Whittle, A., 2013. The supra-regional perspective, in: Bickle, P., Whittle, A. (Eds.), *The first farmers of central Europe. Diversity in LBK lifeways*. Oxbow, Oxford, pp. 343–384.
- Herren, B., 2003. Die alt- und mittelneolithische Siedlung von Harting-Nord, Kr. Regensburg/Oberpfalz. *Berfunde und Keramik aus dem Übergangshorizont zwischen Linearbandkeramik und Südostbayerischem Mittelneolithikum (SOB)*. Habelt, Bonn.
- Hofmann, D., 2012. Bodies, houses and status in the western Linearbandkeramik, in: Kienlin, T. (Ed.), *Beyond elites*. Habelt, Bonn, pp. 183–196.
- Hofmann, D., 2013. Living by the lake. Domestic architecture in the Alpine foreland, in Hofmann, D., Smyth, J. (Eds.), *Tracking the Neolithic house in Europe – sedentism, architecture and practice*. Springer, New York, pp. 197–227.
- Hofmann, D., 2015. What have genetics ever done for us? The implications of aDNA data for interpreting identity in early Neolithic central Europe. *European Journal of Archaeology* 18, 454–476.
- Hofmann, D., 2016. Keep on walking: the role of migration in Linearbandkeramik life. *Documenta Praehistorica* 43, 235–251.



- Hofmann, D., Lenneis, E., 2017. Size matters? Exploring exceptional buildings in the central European early Neolithic, in: Bickle, P., Cummings, V., Hofmann, D., Pollard, J. (Eds.), *The Neolithic of Europe. Papers in honour of Alasdair Whittle*. Oxbow, Oxford, pp. 145-158.
- Hofmann, D., Ebersbach, R., Doppler, T., Whittle, A., 2016. The life and times of the house: multi-scalar perspectives on settlement from the Neolithic of the north Alpine foreland. *European Journal of Archaeology* 19, 596-630.
- Hu, D., 2013. Approaches to the archaeology of ethnogenesis: past and emergent perspectives. *Journal of Archaeological Research* 21, 371–402.
- Ismail-Weber, M., 2017. ...100 km from the next settlement... Mobility of Linear Pottery groups in Brandenburg, north-eastern Germany, in: Scharl, S., Gehlen, B. (Eds.), *Mobility in prehistoric sedentary societies*. Marie Leidorf, Rahden, pp. 75-117.
- Jakucs, J., Bánffy, E., Oross, K., Voicsek, V., Bronk Ramsey, C., Dunbar, E., Kromer, B., Bayliss, A., Hofmann, D., Marshall, P., Whittle, A., 2016. Between the Vinča and Linearbandkeramik Worlds: The Diversity of Practices and Identities in the 54th–53rd Centuries cal BC in Southwest Hungary and Beyond. *Journal of World Prehistory* 29, 267-336.
- Jeunesse, C., 1997. *Pratiques funéraires au Néolithique ancien. Sépultures et nécropoles danubiennes 5500-4900 av. J.-C.* Editions Errance, Paris.
- Jeunesse, C., 2011. Pratiques funéraires et tensions sociales dans le Rubané, in: Hauzeur, A., Jadin, I., Jungels, C. (Eds.), *5000 ans avant J.-C., la grande migration? Le Néolithique ancien dans la collection Louis Éloy*. Service du Patrimoine culturel de la Fédération Wallonie-Bruxelles, Brussels, pp. 63-68.
- Jeunesse, C., 2017. From Neolithic kings to the Staffordshire hoard. Hoards and aristocratic graves in the European Neolithic: the birth of a “Barbarian” Europe? In: Bickle, P., Cummings, V., Hofmann, D., Pollard, J. (Eds.), *The Neolithic of Europe. Papers in honour of Alasdair Whittle*. Oxbow Books, Oxford, pp. 175–187.
- Kaufmann, V., Bergmann, M.M., Joye, D., 2004. Motility: mobility as capital. *International Journal of Urban and Regional Research* 28, 745–756.
- Kerig, T., 2010. Grenzen ziehen: zur Chronologie regionaler und sozialer Unterschiede im hessischen Altneolithikum, in: Gronenborn, D., Petrasch, J. (Eds.), *Die Neolithisierung Mitteleuropas*. Internationale Tagung Mainz, 24.-26. Juni 2005. RGZM, Mainz, pp. 475-486.
- Knipper, C., 2011. *Die räumliche Organisation der linearbandkeramischen Rinderhaltung: naturwissenschaftliche und archäologische Untersuchungen*. Archaeopress, Oxford.
- Knipper, C., Harris, S., Fisher, L., Schreg, R., Giesler, J., Nocerino, E., 2005. The Neolithic settlement landscape of the southeastern Swabian Alb (Germany). *Journal of Neolithic Archaeology* 2005, <https://doi.org/10.12766/jna.2005.12>
- Koch, J., Knipper, C., 2014. Mobilität, in: Mölders, D., Wolfram, S. (Eds.), *Schlüsselbegriffe der prähistorischen Archäologie*. Waxmann, Münster, pp.191-195.
- Kristiansen, K., Allentoft, M., Frei, K., Iversen, R., Johannsen, N., Kroonen, G., Pospieszny, Ł., Price, T.D., Rasmussen, S., Sjögren, K-G., Sikora, M., Willerslev, E., 2017. Re-theorising mobility and the formation of culture and language among the Corded Ware culture in Europe. *Antiquity* 91, 334-347.
- Laufer, E., 2002. Ein spätbandkeramisches Erdwerk bei Usingen im Taunus. *Journal of Neolithic Archaeology* 2002, [doi.org/10.12766/jna.2002.77](https://doi.org/10.12766/jna.2002.77)
- Lefranc, P., 2007. *La céramique du Rubané en Alsace. Contribution à l'étude des groupes régionaux du Néolithique ancien dans la plaine du Rhin supérieur*. Université Marc Bloch, Strasbourg.
- Leppard, T., 2014. Mobility and migration in the Early Neolithic of the Mediterranean: questions of motivation and mechanism. *World Archaeology* 46, 484-501.
- Lüning, J., 2005. Bandkeramische Hofplätze und absolute Chronologie der Bandkeramik, in: Lüning, J., Fridrich, C., Zimmermann, A. (Eds.), *Die Bandkeramik im 21. Jahrhundert*. Symposium in der Abtei Brauweiler bei Köln vom 16.9.-19.9.2002. Marie Leidorf, Rahden, pp. 49-74.
- Lüning, J., Kloos, U., Albert, S., 1989. Westliche Nachbarn der bandkeramischen Kultur: La Hoguette und Limburg. *Germania* 67, 355–420.

- Meadows, J., Müller-Scheeßel, N., Cheben, I., Agerskov Rose, H., Furholt, M., 2019. Temporal dynamics of the Linearbandkeramik houses and settlements, and their implications for detecting the environmental impact of early farming. *The Holocene* 29, 1653-1670.
- Metcalf, P., 2010. *The life of the longhouse: an archaeology of ethnicity*. Cambridge University Press, Cambridge.
- Midgley, M., 2005. *The monumental cemeteries of prehistoric Europe*. Tempus, Stroud.
- Nash, C., 2012. Gendered geographies of genetic variation: sex, power and mobility in human population genetics. *Gender, Place & Culture. A Journal of Feminist Geography* 19, 409-428.
- Nehlich, O., Montgomery, J., Evans, J., Schade-Lindig, S., Pichler, S.L., Richards, M.P., Alt, K.W., 2009. Mobility or migration: a case study from the Neolithic settlement of Nieder-Mörlen (Hessen, Germany). *Journal of Archaeological Science* 36, 1791-1799.
- Pechtl, J., 2009. A monumental prestige patchwork, in: Hofmann, D., Bickle, P. (Eds.), *Creating communities. New advances in central European Neolithic research*. Oxbow Books, Oxford, pp. 186-201.
- Pechtl, J., 2011. Am Rande des Machbaren: zwei gescheiterte linienbandkeramische Kolonisationswellen im Lechtal, in: Doppler, T., Ramminger B., Schimmelpfennig, D. (Eds.), *Grenzen und Grenzräume? Beispiele aus Neolithikum und Bronzezeit*. Welt und Erde, Kerpen-Loogh, pp. 37–51.
- Pechtl, J., 2015. Linearbandkeramik pottery and society, in: Fowler, C., Harding, J., Hofmann, D. (Eds.), *The Oxford handbook of Neolithic Europe*. Oxford University Press, Oxford, pp. 555-572.
- Pechtl, J., 2016. From distribution maps to 'ethnic' diversity within the southern Bavarian LBK, in: Amkreutz, L., Haack, F., Hofmann D., Van Wijk, I. (Eds.), *Something out of the ordinary? Interpreting diversity in the Early Neolithic Linearbandkeramik and beyond*. Newcastle, Cambridge Scholars Publishing, 283–311.
- Pechtl, J., Land, A., 2019. Tree rings as a proxy for seasonal precipitation variability and Early Neolithic settlement dynamics in Bavaria, Germany. *PLoS ONE* 14, e0210438.
- Risch, R., 2018. Affluent societies of later prehistory, in: Risch, R., Meller, H., Gronenborn, D. (Eds.), *Surplus without the state – political forms in prehistory*. Landesmuseum für Vorgeschichte, Halle, pp. 45-65.
- Rival, L., Whitehead, N. 2001. Forty years of Amazonian anthropology: the contribution of Peter Rivière, in: Rival, L., Whitehead, N. (Eds.), *Beyond the visible and the material: the Amerindianization of society in the work of Peter Rivière*, Oxford University Press, Oxford, pp. 1–18.
- Robb, J., Miracle, P., 2007. Beyond 'migration' versus 'acculturation': new models for the spread of agriculture, in: Whittle, A., Cummings, V. (Eds.), *Going over: The Mesolithic-Neolithic transition in north-west Europe*. British Academy, Oxford, pp. 99-115.
- Rouse, I., 1986. *Migrations in prehistory: inferring population movement from cultural remains*. Yale University Press, New Haven.
- Schmidt, B., Gruhle, W., Rück, O., Freckmann, K., 2005. Zur Dauerhaftigkeit bandkeramischer Häuser im Rheinland (5300-4950 v. Chr.) – eine Interpretation dendrochronologischer und bauhistorischer Befunde, in: Gronenborn, D. (Ed.), *Klimaveränderung und Kulturwandel in neolithischen Gesellschaften Mitteleuropas, 6700-2200 v. Chr.* RGZM, Mainz, pp. 151-170.
- Schußmann, M., 2004. Ein Haus der Älteren Linearbandkeramik aus Unterpleichfeld, Landkreis Würzburg, Unterfranken. *Das Archäologische Jahr in Bayern* 2003, 13-15.
- Sheller, M., Urry, J., 2006. The new mobilities paradigm. *Environment and Planning A: Economy and Space* 38, 207-226.
- Shennan, S., 2018. *The first farmers of Europe. An evolutionary perspective*. Cambridge University Press, Cambridge.
- Sielmann, B., 1972. Die frühneolithische Besiedlung Mitteleuropas, in: Schwabedissen, H. (Ed.), *Die Anfänge des Neolithikums vom Orient bis Nordeuropa*. Va. Westliches Mitteleuropa. Böhlau, Köln, pp. 1-65.

- Sommer U., 2001. 'Hear the instructions of thy father, and forsake not the law of thy mother'. Change and persistence in the European Early Neolithic. *Journal of Social Archaeology* 1, 244–270.
- Stäuble, H., 2011. Die ersten Bauern in Sachsen. Hunderte Siedlungen in nur drei Regionen. *Archaeo* 8, 4-13.
- Strien, H.-C., 2017a. Occupation and settlement of land in the Linear Pottery culture: reflections on the organisation and logistics, in: Scharl S., Gehlen, B. (Eds.), *Mobility in prehistoric sedentary societies*. Marie Leidorf, Rahden, pp. 129-133.
- Strien, H.-C., 2017b. Discrepancies between archaeological and 14C-based chronologies: problems and possible solutions. *Documenta Praehistorica* 44, 272-281.
- Strien, H.-C., Gronenborn, D., 2005. Klima- und Kulturwandel während des mitteleuropäischen Altneolithikums (58./57.-51./50. Jahrhundert v. Chr.), in: Gronenborn, D. (Ed.), *Klimaveränderung und Kulturwandel in neolithischen Gesellschaften Mitteleuropas, 6700-2200 v. Chr.* RGZM, Mainz, pp. 131-149.
- Szécsényi-Nagy, A., Keerl, V., Jakucs, J., Brandt, G., Bánffy, E., Alt, K.W., 2014. Ancient DNA evidence for a homogeneous maternal gene pool in sixth millennium cal BC Hungary and the central European LBK, in: Whittle, A., Bickle, P. (Eds.), *Early farmers*. The view from archaeology and science. British Academy, Oxford, pp. 71-93.
- Turck, R., 2019. Where did the Herxheim dead come from? Isotope analyses of human individuals from the finds concentrations in the ditches, in: Zeeb-Lanz, A. (Ed.), *Ritualised destruction in the Early Neolithic — the exceptional site of Herxheim (Palatinate, Germany)*, Vol. 2. Generaldirektion Kulturelles Erbe, Speyer, pp. 313-421.
- Urry, J., 2007. *Mobilities*. Polity Press, Cambridge.
- Valde-Nowak, P., 2009. Early farming adaptation in the Wiśnicz Foothills in the Carpathians. Settlements at Łoniowa and Żerków. *Recherches Archéologiques Nouvelle Serie* 1, 15-35.
- Valde-Nowak, P., 2013. Short settled Neolithic sites in the mountains – economy or religious practice? Case studies from the Polish Carpathians and German mid-mountains, in: Kerig, T., Zimmermann, A. (Eds.), *Economic archaeology: from structure to performance in European archaeology*. Habelt, Bonn, pp. 215-25.
- Voss, B.L., 2015. What's new? Rethinking ethnogenesis in the archaeology of colonialism. *American Antiquity* 80, 655-670.
- Whittle, A., 1997. Moving on and moving around: Neolithic settlement mobility, in: Topping, P. (Ed.), *Neolithic landscapes*. Oxbow, Oxford, pp. 15-22.
- Wiedemann, F., 2017. Zirkuläre Verknüpfungen. Völkerwanderungen und das Motiv der Wiederkehr in den Wissenschaften vom Alten Orient um 1900, in: Wiedemann, F., Hofmann K., Gehrke, H.-J. (Eds.), *Vom Wandern der Völker. Migrationserzählungen in den Altertumswissenschaften*. Topoi, Berlin, pp. 137-160.
- Wiessner, P., 2002. The vines of complexity. Egalitarian structures and the institutionalization of inequality among the Enga. *Current Anthropology* 43, 233-269.
- Windler, A., 2018. Der Austausch von *Spondylus gaederopus* in Europa zwischen 5500 und 5000 v. Chr. Eine ökonomische Analyse. Marie Leidorf, Rahden.
- Zeeb-Lanz, A., 2019. The Herxheim ritual enclosure. A synthesis of results and interpretative approaches, in: Zeeb-Lanz, A. (Ed.), *Ritualised destruction in the Early Neolithic — the exceptional site of Herxheim (Palatinate, Germany)*, Vol. 2. Generaldirektion Kulturelles Erbe, Speyer, pp. 423-482.
- Zimmermann, A., 2012. Das Hofplatzmodell – Entwicklung, Probleme, Perspektiven, in: Smolnik, R. (Ed.), *Siedlungsstruktur und Kulturwandel in der Bandkeramik. Neue Fragen zur Bandkeramik oder alles beim Alten?! Sächsische Bodendenkmalpflege*, Dresden, 11-19.
- Zvelebil, M., Pettit, P., 2008. Human condition, life and death at an Early Neolithic settlement. Bioarchaeological analyses of the Vedrovice cemetery and their biosocial implications for the spread of agriculture in central Europe. *Anthropologie* 46, 195-218.

Århem, K. 2001., From longhouse to village: structure and change in the Colombian Amazon, in: Rival, L., Whitehead, N. (Eds.), *Beyond the visible and the material: the Amerindianization of society in the work of Peter Rivière*. Oxford University Press, Oxford, pp. 123–155.