



MAGICAL, MUNDANE OR MARGINAL?

Deposition practices in the Early Neolithic
Linearbandkeramik culture

edited by
Daniela Hofmann





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Linearbandkeramik culture

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Daniela Hofmann

A publication of the Institute for Pre- and Protohistoric Archaeology (Institut für Vor- und Frühgeschichtliche Archäologie) of the University of Hamburg and the Department of Archaeology, History, Cultural Studies and Religion, University of Bergen.



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Grave goods, refuse or the remains of rituals? Differences in the assemblages from the LBK burials of Arnoldsweiler-Ellebach

Robin Peters and Nadia Balkowski

Abstract

The question whether an artefact in a burial is a grave good, an artefact intentionally buried with the dead, or was simply accidentally included, has been answered in very different ways by archaeologists. Often, the value one assigns to the object is a decisive factor. In this paper, we try to investigate the formation of burial assemblages from a more neutral starting point, although we are of course not claiming to be free from assumptions. As a working hypothesis we distinguish between the finds from the base of burial pits and those from the fills. While the former should be “structured” in the sense of Richards and Thomas (1984), or more specifically, should display intentionality or indicate a “positive selection” (Eggers 1959), the latter have often been ignored. We conclude that the possible interpretations for pottery and stone artefacts are different and that there is no single deposition scenario that suits all materials. In addition, finds from the fill and the base of burials should be accorded more analytical weight in the future.

Keywords: *Neolithic burials; funeral practices; grave finds; taphonomy; positive and negative selection*

Introduction

Archaeologists facing the question whether an artefact found in a burial is a grave good, an artefact intentionally buried with the dead or was simply accidentally included might be tempted to answer this question in terms of the value one assigns to the object. In this paper, we try to investigate the formation of burial assemblages from a more neutral starting point, although we are of course not claiming to be free from assumptions. As a working hypothesis we distinguish between the finds from the base of burial pits and those from the fills. While the former should be “structured” in the sense of Richards and Thomas (1984), or more specifically should display intentionality or indicate a “positive selection” (Eggers 1959), the latter have often been ignored. Using the cemetery site of Arnoldsweiler-Ellebach as an example, we have systematically compared pottery, stone tools and other finds categories from the bases and the fills of graves, trying to identify similarities and differences between these categories and between cemetery and settlement assemblages. This has revealed a rather complex picture which cannot be adequately

described using binary classifications such as structured/unstructured or intentional/unintentional. Instead, while the stone tools recovered from grave fills may indeed be accidentally incorporated knapping waste, the pottery from the same contexts may rather be the result of ritual activities at the graveside. To fully understand these multi-layered processes, it is important to take into account the performative aspects of the burial rite as a whole and to continue collecting detailed data even on apparently unimportant “fill goods”. But first, we will briefly introduce the site of Arnoldsweiler-Ellebach, especially the cemetery.

The site

The site of Arnoldsweiler-Ellebach is situated in the loess region of the so-called Cologne Bay, approximately half-way between the modern cities of Cologne and Aachen. Today, the small Ellebach stream runs directly past the site, but this tributary of the river Rur is not thought to have been water-bearing in Bandkeramik times (Gerlach *et al.* 2011, 65). The well-known Aldenhovener Platte with its cluster of LBK sites, such as Langweiler 8, is about 15 km further west. In the immediate vicinity are the settlements of Merzenich-Morschenich (Gaitzsch and Janssens 2010) and Merzenich-Valdersweg (Cziesla *et al.* 2014).

Arnoldsweiler-Ellebach has been excavated in the years 2009 and 2010 as a rescue excavation in advance of the construction of a motorway. The excavation companies responsible, Wurzel GmbH and Ibeling Archäologie GbR, have already published an extensive overview of the great spectrum of features and finds from Arnoldsweiler, which range from the Palaeolithic to modern times (Cziesla and Ibeling 2014).

The LBK site of Arnoldsweiler-Ellebach comprises different sub-areas (Figure 1): there is an extensive settlement with more than 50 longhouses, four wooden wells and a large cemetery immediately next to the settlement. About 200 m to the east, an enclosure with several ditches and additional houses have been found.

Between 2014 and 2018, a research project under the direction of A. Zimmermann and R. Gerlach, funded by the German Research Foundation (DFG), was concerned with the detailed examination of the LBK features and finds. The project comprised two main parts: in addition to the pottery, N. Balkowski has worked on the settlement features such as houses and pits and on the water supply of Arnoldsweiler, while R. Peters was concerned with the lithic and ground stone material, the features from the cemetery and the enclosure. Besides addressing for instance the chronology and raw material supply of the site, Arnoldsweiler offers the opportunity to examine the relationship between the different sub-areas, which was a particular focus of the project.

Central to this paper is the cemetery with its 229 burials. The majority of the burials are inhumations, but there are seven cremations as well. The total number of buried individuals is difficult to gauge due to the partial preservation of human remains, but besides single inhumations there are at least two double burials and two burials with an inhumation and additional disarticulated bones. In addition to the burials there are other LBK features in the area of the burial ground, notably postholes and pits.

Due to acid soils, bone is usually not preserved at the six LBK cemeteries known so far between Rhine and Meuse (Dohrn-Ihmig 1983; Gaitzsch and Janssens 2010; Gaitzsch *et al.* 2012; Heinen 2005; Heller 2014; Modderman 1970; Richter 2011). Arnoldsweiler-Ellebach is the first site with slightly better

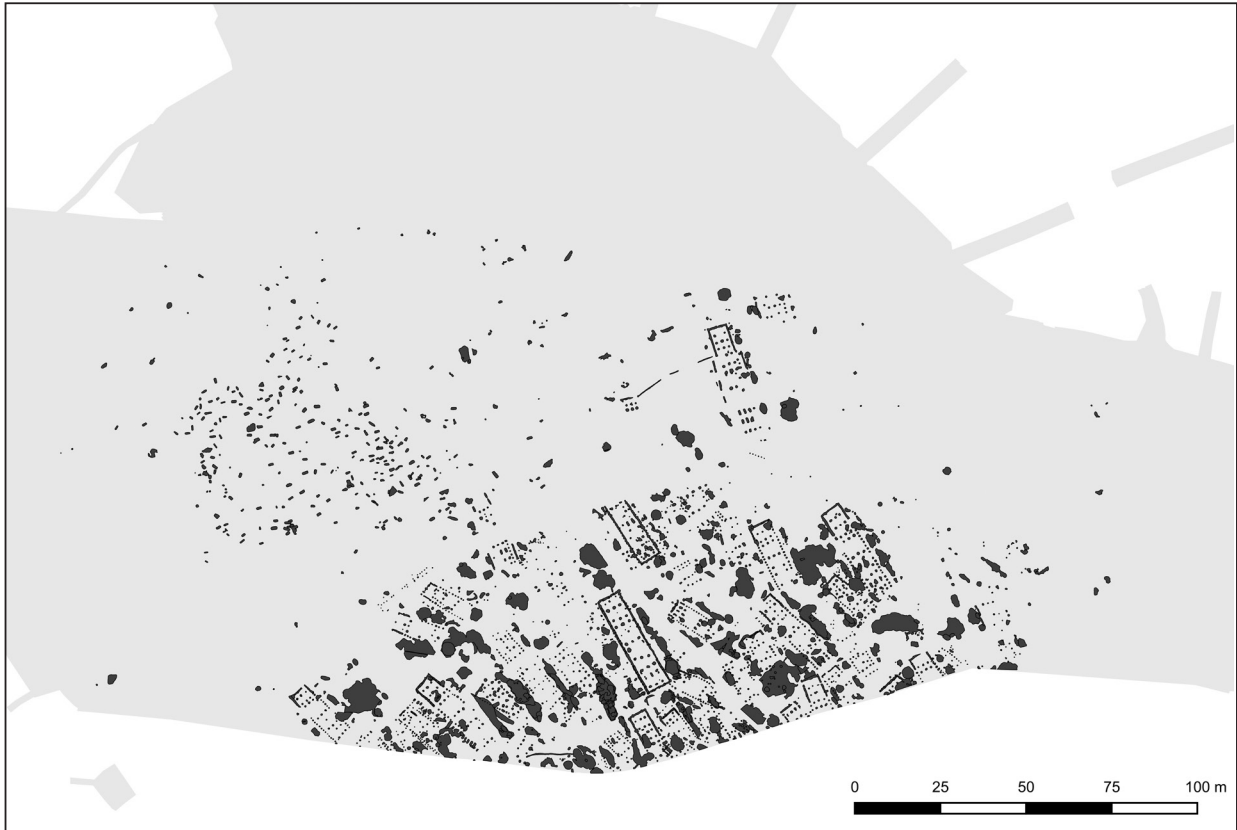


Figure 1. Partial plan of the excavated area (grey shading) with LBK features at the site of Arnoldsweiler-Ellebach. The cemetery is situated in the north-west of the site, immediately next to the settlement.

bone preservation. Therefore, for the first time there is an LBK burial ground in the Rhineland where it is possible to shed light on the age, sex and body position of a larger group of interred individuals.

In spite of the limitations imposed by a rescue excavation, the excavators were careful to distinguish between finds from the base of the inhumation pits and finds from the fill. This is why our approach is not to interpret all finds from the burials *a priori* as grave goods but to investigate the formation of these sub-assemblages. In addition, we wish to establish whether the pottery from the base as well as the pottery from the fill can be used for dating the burials (Balkowski 2014).

Theoretical framework

As a starting point we will outline two theoretical approaches to the overarching questions of intentionality and ritual. The first is the concept of positive and negative selection which is commonly used by German archaeologists and part of most archaeology curricula at German universities (Eggers 1959; Eggert 2008). The second is the notion of “structured deposition” which has gained huge popularity in Great Britain since the 1980s (Garrow 2012; Richards and Thomas 1984, 191; Thomas 1999, 80–5).

Already in the 1950s Eggers contemplated the “geistige Ursachen” (*i.e.* the mental causes) of, as he envisaged, the three major categories of prehistoric features, namely burials, hoards and settlements (Eggers 1959, 264–5). According to Eggers, finds from burials and hoards can be viewed as a “completely subjective

partial sample of the entirety of finds” (Eggers 1959, 265)¹. Therefore, finds from these two categories of features represent a positive selection, which “prehistoric people have deliberately chosen” (Eggers, 1959, 267)² from the once-present material culture. In settlements, on the other hand, “the selection is negative, because we are only given what people did not choose when they left their place of residence” (Eggers 1959, 267)³. Eggers’ distinction between a selection for known reasons (burials, settlements) and unknown reasons (hoards) is less important for our problem. Although the rigorous separation between finds from burials and settlement finds and the notion that all settlement features are of a mundane origin are no longer appropriate, as shown by several papers in this volume, we still regard Eggers’ concept as worth considering.

The term “structured deposition” was coined by the British archaeologists Colin Richards and Julian Thomas in a paper on Late Neolithic henge monuments in Wessex (Richards and Thomas 1984). Richards and Thomas investigated find distributions for patterns and regularities, “structure” in their own words. Their initial hypothesis was that repeating patterns in the find distribution point towards ritual activities: “the performance of ritual involves formalised repetitive actions which may be detected archaeologically through a highly structured mode of deposition” (Richards and Thomas 1984, 215).

The idea of “structured deposition” was very well received in British archaeology and has been applied to numerous other case studies. Garrow (2012) provides a very useful history and critical review of this term. His main criticism includes that the concept so far lacks a clear definition or a heuristic to recognise structured depositions. Furthermore, both find distributions and suspicious single finds (“odd deposits”) are characterised as “structured” (Garrow 2012, 96, 105). Another important point of criticism is that features and finds are often viewed from a timeless, synchronic perspective, while source criticism and the study of site formation processes are neglected. Moreover, the question arises why only ritual activities should lead to regular distributions and patterning (Garrow 2012, 109). We also believe that it is problematic to interpret gradual differences in find compositions in terms of binary oppositions such as nature/culture, life/death and so on, as for instance Thomas (1999, fig. 4.9, 80–5) has done.

But all in all, there are some similarities between the British post-processual approach and Eggers’ reflections. Fundamentally, both take a positive view towards the question whether identifying ritual activity is within the possibilities of archaeological inference. We think that the two parties would agree that in certain circumstances ritual activities might become visible through the investigation of find distributions and an intra-site analysis. Secondly, the underlying principle of both concepts seems to be the same — intentionality. While this notion is quite clear in Eggers’ writings it is not so pronounced in the paper by Richards and Thomas. But expressions like “controlled”, “deliberate” or “purposeful deposition” do also imply intentionality (Richards and Thomas 1984, 204, 214). However, the aim of this paper is not to redefine the concepts by Eggers or by Richards and Thomas, although we worry that the term “structured deposition” has become a catch-all category with little analytical

1 Original: “völlig subjektiven Ausschnitt aus dem Typenvorrat [anzusehen]“ (Eggers 1959, 265). All translations in this text are by the authors.

2 “[die] der vorgeschichtliche Mensch bewußt ausgewählt hat” (Eggers 1959, 267).

3 “die Auslese [ist] negativ, weil uns nur das erhalten ist, was der Mensch beim Verlassen seines Wohnortes [...] nicht ausgewählt hat” (Eggers 1959, 267).

strength, comparable to the term “ritual” criticised by Richards and Thomas in the 1980s (Richards and Thomas 1984, 189). Therefore, we aim at strengthening the analytical value of the concept by concentrating on the proxy level of the investigation and the question of how to identify a structured or positively selected deposit.

Turning to our case study, we will investigate the find distribution and composition of two assemblages, the finds from the burial fill and the finds made at the basal level of the graves. Scholars commonly interpret finds from the base of grave pits as grave goods, but sometimes the fill finds are also seen in the context of the burial (*e.g.* Nieszery 1995, 106). Our initial hypothesis is that the burial finds display strong patterning and regularity and are “structured” in the sense of Richards and Thomas (1984). Whether this holds true for the finds from the grave fill will be investigated by comparing this sub-assemblage to the settlement finds on the one hand and the finds from the basal level of the graves on the other. As far as we are aware, such a thorough investigation of the fill finds from LBK burials has not yet been attempted.

From these theoretical considerations, various possibilities of interpretation of the finds from the burial fills arise, of which we will examine three scenarios more closely. We will investigate whether finds from the grave fills are:

1. Grave goods placed intentionally in the burial (positive selection)
2. Settlement refuse or “noise” (negative selection)
3. Remains of rituals or activities at the graveside, either during the burial of an individual or as a kind of “ritual noise” with a greater temporal depth

Of course, these are idealised, schematic simplifications and it has to be borne in mind that we primarily consider not the individual find, but a kind of assemblage average.

Pottery

Concerning the pottery from graves, the typical interpretation depends on the position in the grave (base or fill) and the presumed context. For instance, complete vessels from the base are usually interpreted as a positive selection and may be seen in the context of food offerings. In accordance, Fridrich (2003, 555) understands vessels or parts of them only as grave goods if they were found at the base of the grave pit next to the buried person.

For the sherds from the fill, different interpretations exist. For example, Nieszery (1995, 121) argues that it is unknown whether these sherds are contemporaneous to the vessels that were found at the base of the grave. Similarly, it is believed that the sherds were deposited accidentally and may therefore represent a negative selection. Another idea concerning the sherds from the fill is that they originally belonged to whole vessels which were destroyed by erosion or intentionally (Nieszery 1995, 138–40). Sometimes, a ritual context is also discussed (Peschel 1992, 225–7). This means that there are different concepts regarding the interpretation of pottery from burials. Besides the already mentioned location in the grave, the practices of the mourners need to be considered to decide whether the pottery was put in the grave intentionally or ended up there accidentally.

While attempting to date the graves of the Arnoldsweiler cemetery (Balkowski 2014), the question arose whether only the pottery from the base of the grave can be used for this purpose, and if the commonly used interpretative scheme for pottery from burials can be applied to the finds from Arnoldsweiler. Several observations caused us to question this scheme, as will be shown by some of the aspects drawn out here. An analysis of the whole pottery assemblage from the site

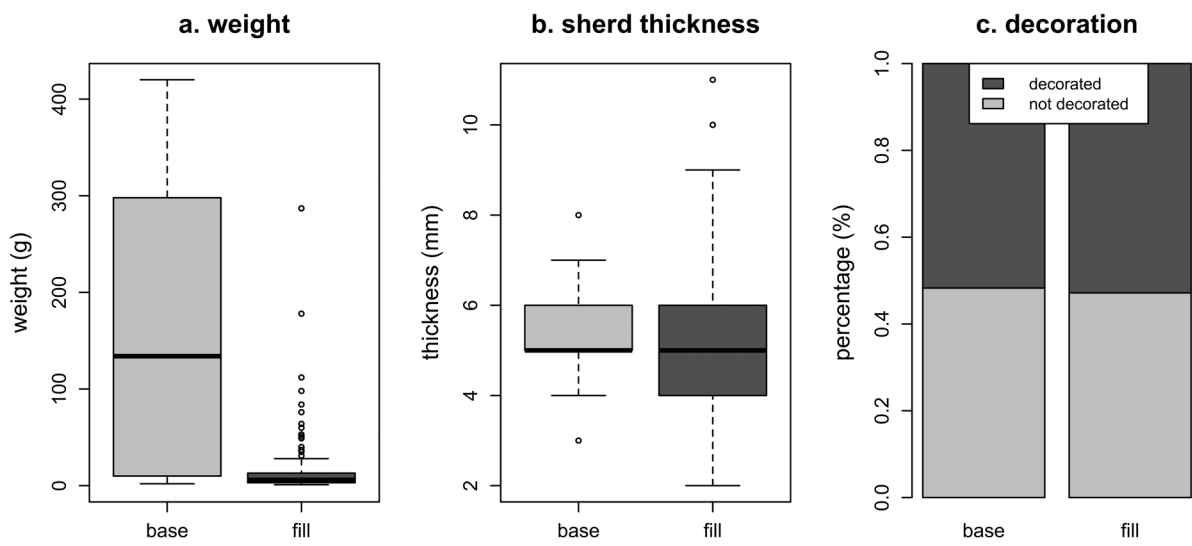


Figure 2. Attributes of the pottery from the cemetery of Arnoldsweiler-Ellebach, differentiated by location in the grave.

of Arnoldsweiler with a systematic comparison of all attributes of the pottery from the different sub-areas is presented in Balkowski (2018).

In total, 251 vessel units from graves have been recorded. The majority, more than three quarters, originate from the fill and only 29 vessel units are from the base of the graves. Following the common interpretative scheme, it could be assumed that the latter comprise complete vessels as a positive selection, while the finds from the fill are composed of smaller sherds and vessel fragments which could be interpreted as a negative selection, perhaps in form of settlement noise. Indeed, looking at the weight of the vessel units, there definitely is a clear difference between pottery from the base and from the fill (Figure 2a). The sherds from the fill weigh 13 g on average, whereas the average weight of vessel units from the base is about 193 g and therefore considerably higher. But it is worth noting that there are heavy and well-preserved pots in the fill, just as there are vessels with a low weight from the base. How can this observation be interpreted?

As demonstrated by the weight of the pottery, the vessels from the graves of Arnoldsweiler show quite different degrees of preservation. There are only a few complete vessels alongside large parts of whole vessels or only a few sherds of one vessel unit. Concerning the possible relation between the completeness of vessels and their position in the grave, it can be stated that there are also complete or nearly complete vessels from the fill, which cannot easily be dismissed as settlement noise. In addition, in two burials there are sherds from the fill and the base which could be assigned to almost complete vessels. Five other vessel units from four graves also combine sherds that were found at the base and in the fill. This shows that pottery from different locations need not necessarily belong to different vessels. Moreover, it is striking that only a small proportion of the whole pottery assemblage consists of nearly complete vessels — consequently only a few vessels can be regarded as typical grave goods.

Another noticeable observation is the proportion of decorated and undecorated vessels (Figure 2c). Decorated pottery makes up approximately 50 % both at the base and in the fill. In contrast, only about 20 % of the pottery from the settlement

is decorated (Balkowski 2018). Likewise, the sherd thickness shows that vessels from both categories have an average thickness of 5 mm, which is typical for fine ware of the LBK (Figure 2b). Again, this is not the case in the settlement material, where there is more coarse ware.

Finally, the main motifs from each grave can be analysed. These typical elements of LBK pottery decoration represent the basis of the chronological classification of the LBK in the Rhineland (*e.g.* Stehli 1994). Features with at least two main motifs are included in a correspondence analysis, which results in a sequence of features that is interpreted in terms of relative chronology. If some vessel units from burials are settlement noise and do not belong to the grave itself, then pottery from different phases could be expected to occur in one grave. For example, there could be a difference in date between base and fill. But the Arnoldsweiler graves do not regularly show such differences in dating, which could have been recognised in the outlying position of graves in the correspondence analysis of main motifs (Balkowski 2018). Thus, the pottery from grave fills and bases does not show a considerable temporal difference.

To summarise the analysis of pottery from graves, it can be noted that the pottery from the cemetery of Arnoldsweiler does not fit the common interpretative scheme, as only a few vessels can be interpreted as grave goods. These vessels are preserved completely or in large parts and they can be found mostly on the bases, but also in the fill of the graves. Concerning the smaller sherds from graves, especially from the fill, it can be shown that they differ from the nearly complete pots in Arnoldsweiler, but also show similarities to them, such as sherd thickness or the proportion of decoration. Therefore, these sherds cannot be interpreted as settlement noise, as a lot of attributes deviate from settlement pottery. That is why it seems probable that much of the pottery from the base and the fill should be interpreted in the context of the burial, maybe as part of a burial ceremony. Alongside the observations of the location in the grave and the possible associated practices, it is therefore necessary to look at the attributes of the pottery, too. For example, the completeness, the frequency and the dating of the sherds can be recorded and can open up different possibilities for interpretation (Balkowski 2014, 87–8). In addition, the practices in the context of the burial should be focussed on in more detail, as the analysis of pottery showed that a large part of the pottery assemblage relates to ritual activities beyond the simple deposition of grave goods.

Indeed, the observations concerning the pottery from Arnoldsweiler are not unique, but can be found in other LBK burials, too. For example, in about 7 % of the graves recorded in the dataset of D. Hofmann (Hofmann in prep.), complete pots in the fill of the graves are documented. On top of that, sherds in the fill occur quite often — more than half of all graves contain pottery sherds in the fill, which shows that this is a frequent phenomenon. Interestingly, the number of sherds in the fill is not higher in settlement graves, which can be understood as another argument against the interpretation of pottery finds from the fill as settlement noise. This means that the presence of pottery in the fill is on average the same in cemetery burials and in settlement graves and could therefore hint at practices in the context of funerary rites.

Stone artefacts

The lithic assemblage from the burials of Arnoldsweiler-Ellebach comprises 111 flint artefacts. All objects were studied macroscopically and recorded using the scheme developed by the DFG project “Siedlungsarchäologie der Aldenhovener Platte” (SAP, Löhner *et al.* 1977; Zimmermann 1988). Half of the lithics ($n = 56$) have been recovered from the basal level of the burials, the other half consists of finds from the grave fill ($n = 55$) (Figure 3a). In this section, we compare and characterise these two sub-assemblages using an attribute analysis.

The majority of chipped stone from both the fill and basal assemblages belongs to the so-called Rijckholt flint type, which is a variety of the west European Cretaceous flint and can be found in the Dutch/Belgian limestone area at a distance of c. 50 km from Arnoldsweiler (De Grooth 2011). The lithics from the fill are slightly more heterogeneous in raw material than those from the basal level of the burial.

Lithics in the fill are on average smaller than pieces from the base of the grave (Figure 3b). All in all, 85 % of the artefacts from the grave fill are smaller than 3 cm, while this holds true for only 55 % of the lithics from the base of the burials. The high proportion of small artefacts (< 3 cm) in the fill is comparable to that of LBK features believed to contain knapping refuse (*e.g.* feature 4734 in Erkelenz-Kückhoven, Kegler-Graiewski 2004, 368–70). A large share of small artefacts can, however, also be considered as an indicator of careful excavation (Peters 2018).

There is a very pronounced difference concerning the blanks of the two sub-assemblages. Flakes dominate the grave fill with 81 %, while at the base of the burial pits the share of flakes and blades is balanced (Figure 3c). Furthermore, most artefacts in the fill (89 %) are unmodified pieces — so-called “debitage” — while at the base two thirds of the artefacts are tools (Figure 3d). The preform parts are different as well. The majority of flakes and blades at the base of the grave pits are medial fragments, which are commonly interpreted as the aim of LBK lithic production (Löhner *et al.* 1977, 202). In the fill there is no selection towards medial fragments, but a random distribution of preform parts (Figure 3e).

Cortical pieces make up half of the assemblage from the fills (Figure 3f). At the basal level there are considerably fewer pieces with cortex (14 %), which originate from an early stage of the chaîne opératoire. Two tablet cores (“Kernscheiben”) in the fill are also indicators for flint tool production. Finally, burnt pieces are restricted to the grave fill and absent at the base of the pits.

The tool inventory at the basal level consists almost exclusively of arrowheads, sickle blades, end- and side-scrapers. Three arrowheads, a side-scraper and a splintered piece were recovered from the grave fill.

The inventory of colourants, ground and polished stone consists of 47 artefacts from the basal level of the burials and only eight from the grave fills. This difference in numbers already hints at a different formation of the assemblages. Due to the small numbers involved, a quantitative attribute analysis is not possible, but we can investigate what kinds of artefacts have been found at the base and in the fill of the burials. At the basal level the majority of ground stone artefacts are amphibolite or basalt adzes, but there are also some red ochre pieces, a grinding stone, a hammerstone and an unmodified flake. Adzes are completely absent in the fill of the burials, but there are two red ochre pieces and another hammerstone. It must be pointed out that the ochre pieces from the fill are considerably smaller than the pieces at the base of the grave. Saddle querns, which are commonly found in LBK burials, are absent

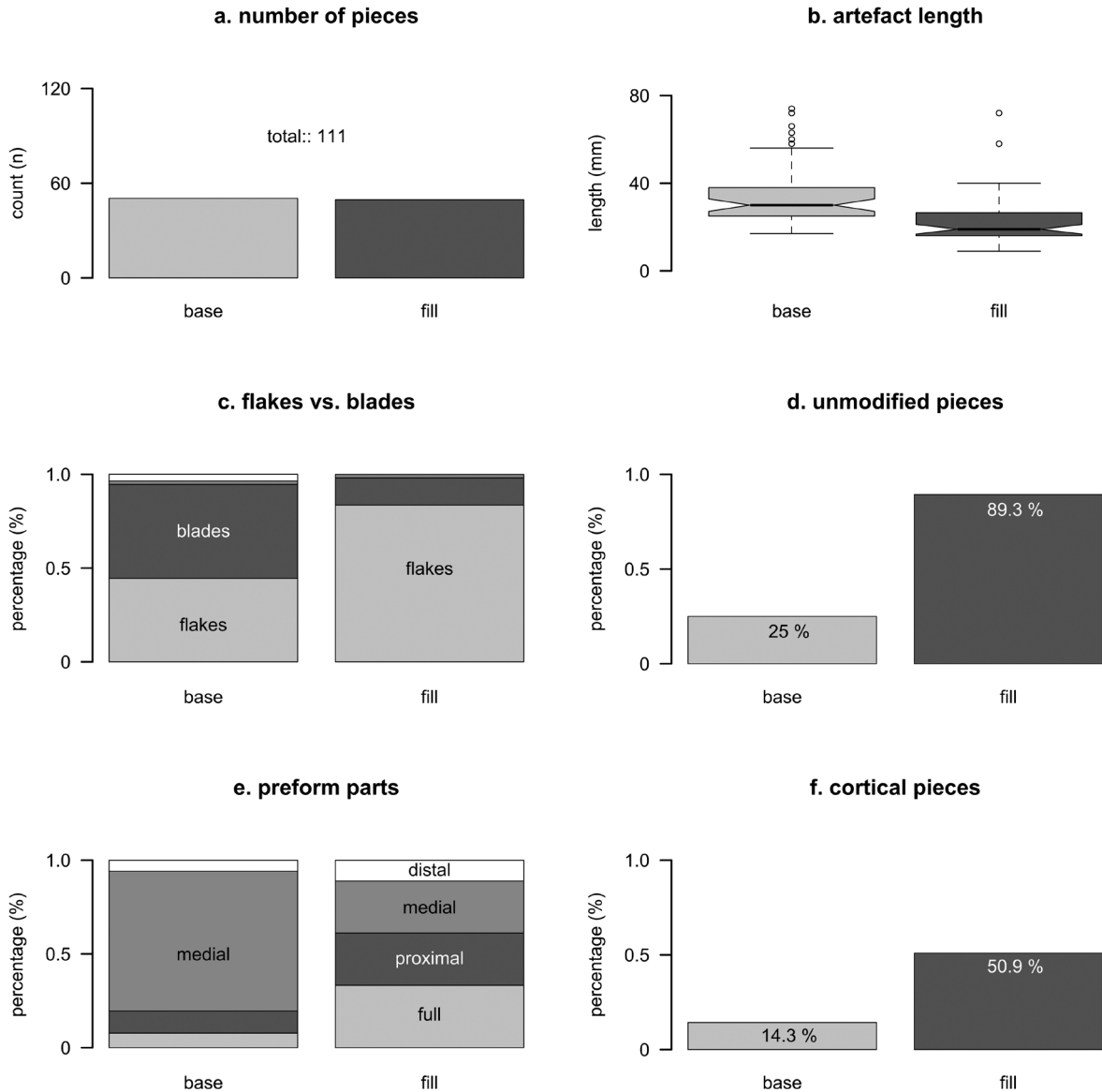


Figure 3. Attributes of the lithics from the cemetery of Arnoldsweiler-Ellebach, differentiated by location in the grave.

in Arnoldsweiler, as are ochre scatters. Considering that querns are known from the nearby cemeteries at Altdorf A, Niedermerz 3, Jüchen-Holz, Bergheim-Zieverich and Elsloo (Heinen 2005; Heller 2014; Hoyer 2009; Modderman 1970; Richter 2011) their absence in Arnoldsweiler is quite surprising.

All in all, lithics from the fill and from the base of the burial pits differ in size, in the type of blanks used, in the proportion of tools, the amounts of cortical and burnt pieces and the type of tools. Differences in the type of ground stone artefacts are apparent as well. It is very likely that these differences are due to a different taphonomy of the assemblages. The artefact size and the large proportion of medial fragments and tools at the basal level are indicators of a “positive selection”. In contrast, the large number of unmodified flakes and cortical pieces in the grave fill can be interpreted as “negative selection” in the terms of Eggers. Finally, it has to be said that there are great similarities between the assemblage from the grave fills and the assemblage recovered from the settlement pits (Peters 2018).

	distance to settlement	lithics (n)	unmodified flakes (n)	unmodified flakes (%)
Arnoldsweiler-Ellebach	< 15 m	111	44	39.6
Elsloo	c. 50 m	80	16	20.0
Altdorf A	c. 250 m	32	0	0
Niedermerz 3	c. 500 m	162	15	9.3

Table 1. Distance to settlement and proportion of unmodified flakes in the burial assemblages of Arnoldsweiler-Ellebach, Elsloo, Altdorf A and Niedermerz 3 (data from Heller 2014; Hoyer 2009; Modderman 1970; Peters 2018).

Although the assemblage from the grave fills has been characterised as “refuse” in the broadest sense, there remain multiple scenarios of how the assemblage came into being. For example, are the stone artefacts in the fill the remains of rituals conducted during the funeral or are they the remains of activities not connected to the burial in question? One way to approach this difficult issue might be to think about the time range over which an assemblage formed. As a working hypothesis one can assume that remains from a single event should be more homogeneous than those from several events. Accordingly, refuse from the funeral itself would be less heterogeneous than an inventory accumulated over a longer time span. The assemblages from the grave fills are indeed quite heterogeneous in several aspects. For example, from most grave fills lithics of several raw material types were recovered, and burnt and unburnt pieces were frequently found intermixed. The small number of artefacts per burial is an argument against the idea of knapping at the open grave, as this would have produced hundreds of flakes. Due to the small artefact size and small number of tools, the thought that tools used during the funeral were disposed of in the fill of the graves is also unlikely. The red ochre fragments found in the grave fill, on the other hand, might indeed be remains of funeral ceremonies. The two arrowheads in the fill can be regarded as unusual as well. Then again, dealing with general categories like basal and fill finds we have to expect a certain error margin due to excavation difficulties or disturbance by animals.

In order to compare Arnoldsweiler-Ellebach to other cemeteries between Rhine and Meuse we have to investigate the burial finds as a whole, as fill goods and basal goods were not always systematically differentiated for the other sites. This means we will treat the two sub-assemblages at Arnoldsweiler as one. Since the stone assemblages of the cemeteries of Niedermerz 3, Altdorf A and Arnoldsweiler-Ellebach have been analyzed using a single recording scheme, the datasets can be compared easily and will be supplemented by the assemblage from the cemetery of Elsloo, which has been adapted to the SAP recording scheme (Heller 2014; Hoyer 2009; Modderman 1970).

It becomes obvious that neither at Elsloo nor at Niedermerz 3 or Altdorf A is the share of unmodified flakes as large as in Arnoldsweiler-Ellebach (Table 1). Considering the question whether the debitage can be connected to funeral or settlement activities, it is interesting to investigate the relationship between cemeteries and settlements. There seems to be a correlation between the distance to the settlement and the proportion of unmodified flakes. In Arnoldsweiler-Ellebach the cemetery is immediately adjacent to the settlement and unmodified flakes make up c. 40 % of the assemblage. At Elsloo the cemetery is at a distance of c. 50 m and the share of debitage is about 20 %; finally, in Niedermerz 3 and Altdorf A, which are some hundreds of metres from the next settlement, the proportion of unmodified flakes decreases to 9 % in the former case, while there are no unmodified flakes in Altdorf A at all. Due to the very small number of cases, the correlation is not statistically significant, but nonetheless the idea is worth pursuing. In the

future, the dataset could be enlarged by the analysis of the cemeteries at Bergheim-Zieverich, Jüchen-Holz and Merzenich-Morschenich (Gaitzsch and Janssens 2010; Gaitzsch *et al.* 2012; Heinen 2005; Richter 2011). Of course, large distances between cemetery and settlement might be due to research bias. But for example in the case of Niedermerz 3 in the Merzbach valley, large areas have been investigated and the researchers are confident that there is no settlement close to the cemetery.

The presence of stone artefacts in grave fills is documented at other LBK cemeteries as well, though far less often than pottery sherds in the fill (Hofmann in prep.). Whether this disparity is due to a research bias and a certain neglect towards stone artefacts is not clear. To broaden the scope of this analysis we will briefly review some examples. So far, stone artefacts have been found in grave fills at the cemeteries of Elsloo, Niedermerz 3, Schwetzingen, Bruchstedt, Derenburg, Aiterhofen and Essenbach (Brink-Kloke 1990, 446; Dohrn-Ihmig 1983, 61; Fritsch *et al.* 2011, 62, 79; Gerling 2012, 16; Hofmann in prep.; Kahlke 2004, 74–8, 83–4; Modderman 1985, 95; Nieszery 195, 68, 110; Veit 1996, 98). However, in most cases it is just mentioned that stone artefacts have been found in the grave fill. This statement is usually not followed by an explicit analysis of these finds or further information whether the fill yielded chipped or ground stone artefacts or whether the finds are tools or just unmodified pieces (“debitage”).

The observations on burial 606 made by D. Schimmelpfennig at the cemetery of Derenburg correspond most closely to our results (Fritsch *et al.* 2011, 79). He recorded 22 stone artefacts in the fill of this single grave, of which eleven are non-flakedebitage/shatter (“artifizielle Trümmer”, Andrefsky 2005, 84), eight are unmodified flakes and one is an unmodified blade. Some of these artefacts could be refitted, which led Schimmelpfennig to the conclusion that thedebitage of a single knapping event was deposited in the grave fill (Fritsch *et al.* 2011, 79). In regard to the morphology of the lithics, this observation is in line with the characterisation of the Arnoldsweiler-Ellebach lithics asdebitage. However, the timescale is different, as a single event rather than the accumulation over a long time span is proposed. These results show that a meticulous analysis of stone artefacts from grave bases and fills is worthwhile and should be a standard procedure in LBK cemetery analysis.

Wood

Charred wood or layers of charcoal have been found in eleven burials at Arnoldsweiler-Ellebach (Figure 4). The charred remains are up to 1 m long and during excavation some gave the impression of wooden planks (Cziesla *et al.* 2013, 269–72; Ungerath 2014, 142–3). The charcoal that could be recovered “en bloc” was studied anthracologically and in regard to the wood microstructure (Tegtmeier 2011). In eight cases the type of wood could be determined as oak (*Quercus*), but no artefacts could be recognised in the laboratory (Tegtmeier 2011, 1). Unfortunately, oak is quite ubiquitous in the Linearbandkeramik and was used as construction timber, firewood or for tools, meaning that identification of this species does not shed any light on the function of the remains. The analysis also revealed that the wood had been burnt in an oxidising atmosphere. The position of the wooden remains in relation to the buried body is interesting. In seven cases charred wood or charcoal was found immediately above the skeleton. Especially the cases where the wooden remains seem to cover the skull of the deceased raise the question whether the wood was used to cover the corpse or to seal the burial pit (Figure 4). An accidental incorporation of the wood into the burial

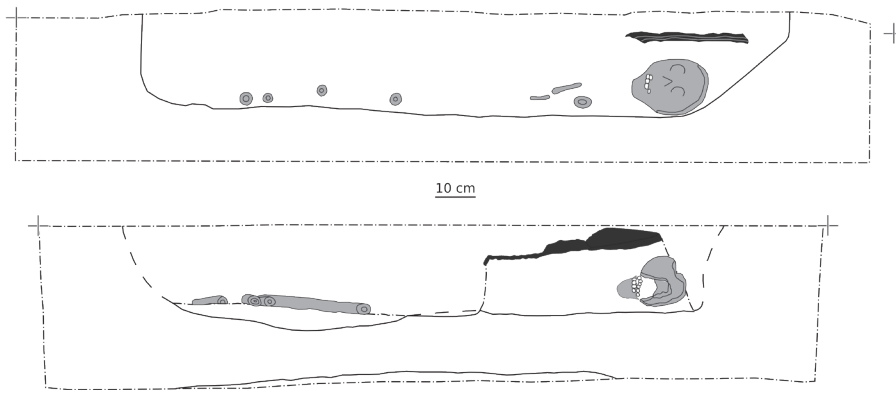


Figure 4. Section drawings of burial features 5831 (top) and 3360 (bottom) with burnt wood / a charcoal layer immediately above the skull of the interred individuals.

fill seems unlikely due to the specific patterning of the charred wood. For example, in burial feature 3354 the wooden remains cover the leg area of the skeleton and the upper and lower jaw of a second individual were found resting on top of the wood. In this case the wooden remains seem to cover one individual and serve as support for the remains of another one.

In Arnoldsweiler-Ellebach there is only one case of wood underneath the skeleton which could, in analogy to the features at the LBK cemetery of Rutzing, be interpreted as a bier (“Totenbrett”, Kloiber and Kneidinger 1970, 24). The only other wooden structures in an LBK grave known so far are the possible traces of a log coffin at Dresden-Nickern (Baumann 1960, 62–4). Regarding the cemetery of Aiterhofen, Nieszery does mention some charcoal layers beneath or next to the skeleton and interprets these as remains of wooden grave constructions (Nieszery 1995, 67–8). The greatest similarities for the wooden remains from Arnoldsweiler are found in the observations made by Modderman at the cemetery of Elsloo. He describes layers of charcoal in the fill of four burials and arrives at the conclusion that after the burial the grave pits were filled with wooden branches and twigs (Modderman 1970, 69; 1985, 100). In Arnoldsweiler-Ellebach charred wood or wooden remains are only associated with adults ($n = 8$) and male burials ($n = 3$), but χ^2 -tests of independence and a Fisher–Yates test show that this might be a result of small sample size.

Returning to the question of basal and fill finds, the seven burials with wooden remains above the skeleton could be particularly interesting. Does the wood act as a dividing line between fill finds and those at the base? Surprisingly it does not, as pottery is found only in the fill of these burials ($n = 5$). Stone artefacts are found at the base ($n = 2$) and in the fill ($n = 1$) but there is no single case with finds in both locations.

Animal bones

Due to the poor bone preservation in Arnoldsweiler-Ellebach, animal bones and teeth are most likely underrepresented. There are only six animal remains from the basal levels and two from the grave fill. The assemblage from the grave fills consists of a sheep/goat tooth and a burnt undetermined bone. There are no burnt bones at the level of the base. However, two unburnt bones from the basal level stand out due to their unusual position, respectively in front of the skull and of the jaw of the deceased. These two cases might be interpreted as a kind of food offering, though one of the bones, a cattle metatarsus or metacarpus, is not usually a prime meat-bearing bone (Arbogast 2013; Fritsch *et al.* 2011, 61; Kahlke 2004, 60; Neugebauer-Maresch and Lenneis 2015, 88; Nieszery 1995, 200).

All bones belong to domesticates such as sheep/goat or cattle. Tools or ornaments made from bone or shell are not present in Arnoldsweiler-Ellebach. Whether the absence of shell ornaments is due to the poor preservation conditions of the acid soils in the Rhineland or a social phenomenon remains an open point.

Finds in context

At this point it seems appropriate to investigate the contexts of the burial finds. Are there recurrent associations between finds and are there any differences in age or sex of the individuals buried with objects at either the basal level or in the fill? In the following we will concentrate on the major find categories: pottery and stone.

Overall, pottery is present in 107 graves, while only 65 graves yielded stone artefacts. Pottery has been recovered exclusively from the basal level of nine burials and in a further 17 burials it is present both at the base and in the fill. In contrast, chipped and ground stone artefacts are far more common at the base (39 graves) and there are also six burials with stone artefacts both at the base and in the fill. Therefore, burials with pottery in the fill are far more common than burials with stone artefacts in the fill.

In most burials without stone artefacts pottery is missing as well. But there are also many burials without stone artefacts, but with pottery in the fill. As the χ^2 -test residuals show, stone artefacts at the basal level are more often associated with pottery at the basal level than one would expect, a hint at their possible function as so-called grave goods. The combination of stone artefacts from the fill and pottery at basal level is underrepresented and occurs only in one burial. Due to the small sample size, these results are not statistically significant. There is, however, no relationship between the number of finds in the fill and the number of finds at the base. Burials with many finds at their bases do not regularly have more finds in the fill.

Several scholars have pointed out the phenomenon of empty graves or grave-like features at LBK cemeteries (Lenneis 2010, 161–3; Neugebauer-Maresch and Lenneis 2015, 74–5; Pavúk 1972, 124; Veit 1996, 99–101). Therefore, one could assume that there might be a relationship between fill and basal finds and the presence of human remains in a grave. For example, are fill finds only present in graves without a skeleton? But surprisingly, 80 % of the burials with stone artefacts in the fill and 78 % of the burials with pottery in the fill are “proper” burials with evidence for an inhumation.

Turning to the sex and age of the deceased, overall there are roughly as many female (n = 16) as male burials (n = 18) in Arnoldsweiler. The sex of 14 burials with pottery and 15 with stone artefacts could be determined anthropologically. Regarding the pottery and stone finds from the fill, the sex ratio is balanced (Table 2). In contrast, stone artefacts at the basal level are slightly more often associated with male burials, but the difference is not significant. The approximate age of the buried individuals could be determined for 57 burials with pottery and for 42 with stone artefacts. Children (< 12 years) are generally underrepresented in Arnoldsweiler-Ellebach and account for only 24 %. This holds true for both burials with fill finds and those with finds at the base. The χ^2 -test shows no deviations between the observed and the expected frequency (Table 3). All in all, there seems to be no relationship between finds at the base and fill finds and the sex and age of the buried individuals.

The spatial distribution of burials with fill finds is also of interest. The similarity between the lithics from the burial fills and those found in the pits of the settlement raises the question whether burial pits with fill finds are more frequently located close

		male (n)	female (n)	expected	male residual	female residual	χ^2	p-value	significant?
burial with pottery	base	2	0	1	1	-1	2.00	0.16	no
	fill	7	5	6	0.41	-0.41	0.33	0.56	no
burial with stone	base	8	3	5.5	1.07	-1.07	2.27	0.13	no
	fill	2	2	2	0.00	0.00	0.00	1.00	no

Table 2. χ^2 goodness-of-fit test. Sex of individuals buried with pottery/stone finds at the base or in the fill.

		adult (n)	child (n)	adult expected	child expected	adult residual	child residual	χ^2	p-value	significant?
pottery	base	8	1	7.6	1.4	0.2	-0.4	0	1.00	no
	fill	40	8	40.4	7.6	-0.1	0.2			
stone	base	28	3	28	3	0	0	0	1.00	no
	fill	10	1	10	1	0	0			

Table 3. χ^2 test-of-independence. Age of individuals buried with pottery/stone finds at the base or in the fill.

to the settlement. In other words, does the number of burials with fill finds decrease with increasing distance from the settlement? All burials with pottery and stone in the fill were plotted and kernel density estimates calculated using the “spatstar” package in R (Baddeley *et al.* 2015). The most important variables regarding a kernel density estimation are the bandwidth and the observation window. As observation window we used a section of the excavation area and the bandwidth was estimated assuming a cox point process (Baddeley *et al.* 2015, 449–59).

From the results shown in Figure 5 it is obvious that there is no relationship between the density of burials with fill finds and the distance to the settlement. Both the distribution of burials with pottery and the distribution of burials with stone artefacts are not gradual but grouped. But although both pottery and stone artefacts are clustered, their distributions are quite different. Whereas the pottery from the fill has a very extensive spread, and there are several concentrations, most stone artefacts from the fill are part of one clearly delimited cluster with a diameter of c. 15 m. These different distributions point at a different taphonomy in the formation of the sub-assemblages. While pottery in the fill is ubiquitous, stone artefacts in the fill are limited to a certain area. Concerning the concentration of burials with stone artefacts in the fill, different scenarios can be suggested. The cluster could hint at practices limited to this group of graves. In regard to the results of the attribute analysis and the fact that the burials are not contemporaneous (Balkowski 2014), it is plausible that an activity area connected to lithic production existed here before the establishment of the cemetery.

Conclusion

Our approach to investigate the formation of the sub-assemblages from the bases and the fills of the burials at the site of Arnoldsweiler yielded some interesting and surprising results. Concerning the pottery from graves, it could be shown that there are substantial differences (Figure 2). There are a few more or less complete pots mostly found on the bases of the graves, but also in the fill. These can best be interpreted as a positive selection or intentional grave goods. On the other end of the spectrum, there are sherds that often cannot be reconstructed to whole vessels.

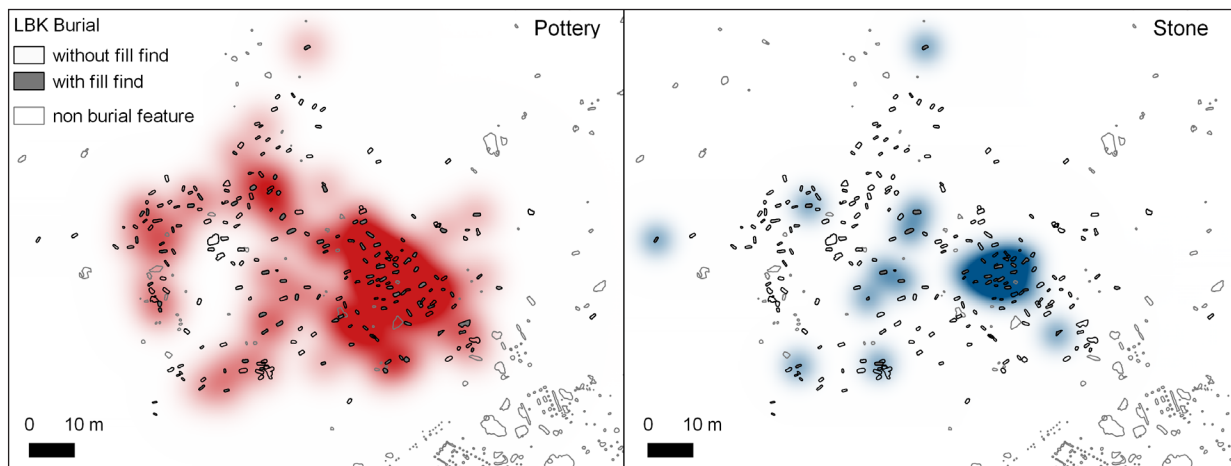


Figure 5. Distribution and kernel density estimation of pottery (red) and stone artefacts (blue) in the burial fill of the graves of Arnoldsweiler-Ellebach.

An important observation regarding these sherds or vessel fragments concerns the similarities to the complete pots — for example in terms of the proportion of decoration or the average sherd thickness. In addition, the pottery assemblage from graves as a whole seems to differ clearly from the sherds from settlement pits. Therefore, it is argued that the smaller sherds, especially from the fill, cannot be understood as some kind of negative selection, as items which simply accumulated over a longer time span. Rather the pottery from graves, and therefore from both the base and the fill, belongs to the context of the burial and can best be interpreted in relation to ritual activities in the cemetery.

On the other hand, there is a striking difference between the lithic and ground stone material in the fill and at the bases of the burial pits (Figure 3). The size, the prevalence of unmodified flakes and the share of cortical and burnt pieces are reasons enough to confidently characterise the lithic assemblage from the fill as “debitage”. In its composition, the assemblage bears similarities to the lithic inventory from the settlement pits and could have accumulated over a longer time span. A major difference between the fill and the settlement assemblage is the smaller size of the fill finds, although this could be due to the more careful excavation of the burials. All in all, the formation of the lithic assemblage from the bases and from the fills seems to be caused by different factors. In comparison to other cemeteries in the Rhine-Meuse region, the inventory from Arnoldsweiler-Ellebach exhibits a large proportion of unmodified flakes. This observation was tentatively related to the short distance between settlement and cemetery, a hypothesis that needs to be tested in the future.

The observation of burnt wood or charcoal layers covering some skeletons in Arnoldsweiler-Ellebach is quite extraordinary and could shed new light on LBK funerary practices (Figure 4). However, due to the absence of burials with wood and finds at both the base and in the fill, these features do not provide any clues regarding the interpretation of the finds.

Due to preservation issues animal bones are rare in Arnoldsweiler. Two cases of bones near the skull of the deceased could be interpreted as possible meat offerings or as a token for food. Besides these two unambiguous grave goods, the restricted assemblage of only six animal remains is much too small to assess its formation further.

As a next step, we investigated the context of the basal and fill finds. It could be established that both sub-assemblages (fill and base) are commonly associated with actual inhumation burials and rarely found in empty graves or grave-like

features. In the LBK cemetery of Rixheim, sherds in the fill are claimed to be associated with male and child burials (Peschel 1992, 226). At Aiterhofen, flint flakes have only been found in the fills of male graves (Nieszery 1995, 68; Hofmann 2009, 227). However, at Arnoldsweiler the presence of fill finds is not associated with the sex and age of the buried person. The spatial distribution of the fill finds yielded some interesting results as well (Figure 5). Whereas pottery in the fill is widespread, stone artefacts from the fill concentrate in a clearly delimited zone. This observation supports the result of the attribute analysis indicating a different formation process for the two sub-assemblages.

Summing up our results from the different materials, it could be shown that there are different possibilities to interpret finds from graves. Once again it has to be repeated that not the individual find, but a kind of assemblage average, the “average find” has been considered here. In line with other scholars, we envisage many of the finds from the base of the pits as grave goods. The possible formation scenarios regarding the fill finds are more complex. We regard the formation of the pottery fill assemblage in the context of ritual practices during the funeral as the most likely scenario. In contrast, the more heterogeneous formation of the stone assemblage seems not to have taken place as part of a temporarily limited event and is not directly associated with the funeral. In addition to considering the assemblage average, single finds — for example the red ochre in the fill — should not be neglected and may also represent remains of rituals. To summarise, the interpretation scenarios for pottery and stone artefacts are different and there is no single deposition scenario that suits all materials.

In the terminology of Eggers (1959), many of the finds from the base are evidence of a “positive selection”, while they could also be described as being “structured” in the sense of Richards and Thomas (1984). The stone artefacts from the fill can be characterised as “not structured” and likely represent a case of “negative selection”. The pottery finds from the fill do not seem to fit the strict concepts of either Eggers or Richards and Thomas. On the one hand, they are positively selected, on the other hand their attributes differ from the basal finds. This case illustrates the limits of the aforementioned binary concepts. Therefore, the polar oppositions of positive and negative selection or structured and unstructured deposition appear insufficient in detail. As another result of our analysis it became clear that the concepts of cemetery finds have to be broadened. Alongside grave goods and finds without any relation to the funeral, another kind of find has to be considered. Although ritual activities are hard to grasp archaeologically, we can expect that some remains of rituals could have become incorporated in the burial fill.

Finally, we will try to paint a picture of the course of events during a LBK funeral as we envisage it. Of course, any such attempt is hypothetical and subjective, but in our opinion thinking about such specific scenarios or chains of operation is very helpful. In this scenario we focus on the finds, a more detailed account concerning burial pit morphology, body posture and so on is given elsewhere (Peters 2018).

The first episode of the funeral that is archaeologically visible is the digging of the burial pit. Burial pits are not just like any other pit but show distinct characteristics concerning size, depth and morphology that indicate that they are a specific type of Linearbandkeramik architecture (Peters 2018). In Arnoldsweiler-Ellebach there is no evident lining of the bases of the pits, the body of the deceased seems to have been placed on the ground surface without any further preparation. Presumably after the laying down of the body, objects were placed next to the deceased. As the two cases of animal bones next to skulls illustrate, some of these items were placed in reference to

certain body parts. Along with items attached to the interred person, such as personal adornments, these objects make up most of the inventory we call grave goods. But already at this point we have to take into account a small number of finds introduced into the burial pit as the remains of rituals or for other reasons. After these events, at least in some cases in Arnoldsweiler, the body was covered with burnt wood or a layer of charcoal. These covers might have acted as a support for further grave goods, as has been suggested for the graves in the Paris Basin (Thévenet 2004, 822, fig. 8). In Arnoldsweiler-Ellebach in one case a human jaw was placed on a piece of burnt wood. Additional items, especially pottery, could have been deposited on steps in the side of the pit (“Erdbänke”, “Absätze” or “banquettes”), as known from other sites (Allard *et al.* 1997; Bonnabel *et al.* 2003; Dohrn-Ihmig 1983, 154). Then the burial pit was backfilled and pottery sherds as remains of ritual activities became part of the burial fill. During this refilling process, finds, especially lithics, which were probably present on the surface and in the top soil layer were introduced into the backfill of the burial. This could also mean that we have to imagine the cemetery surface not as an area devoid of objects, but with finds scatters. We have no indication, however, that this infilling of the burial pit was carried out at a time far removed from the funeral event. To the contrary, pottery refits and the contemporaneity of pottery motifs rather indicate a proximity in time. Finally, due to the small number of intercutting burials, we assume that the burial was marked or at least visible for a longer time span.

Reviewing our interpretative scheme, it turned out that there are certain characteristics, such as fragmentation, the size of artefacts or the distribution of finds, which can be interpreted in terms of “structured deposition” and “positive selection”. As heuristic tool, we focused on an attribute analysis, a quantitative way to approach this issue, but a qualitative approach focussing on “odd” cases or refits is also valid. Returning to the discussion on structured deposition, some problems have been recognised. The concept of structured deposition lacks a clear definition and the scientific debate seems to be stuck at a mere descriptive “interpretation level”, while proxies or analytical methods of how to identify structured assemblages are rarely discussed. From our point of view it is important to focus on both proxies and interpretation and to distinguish between them. Another important point is that, from our perspective, the concept of structured deposition always needs a “reference assemblage”. In our case we compared the sub-assemblages from the burials to each other and to the settlement assemblage.

To conclude, not all finds in burials should be *a priori* interpreted as grave goods. The distinction between finds from the fill and the base of burials is appropriate and should be accorded more analytical weight in the future. Excavators of (LBK) cemeteries should directly address this issue. Where circumstances permit, a three-dimensional recording of every find in the burial is advisable.

By now we know a lot about the single LBK burial, while the cemeteries are still a relatively uncharted territory. Regarding the place where LBK individuals were interred, a lot of open questions remain. Where were the cremation sites? Were there any burial markers? How long would a burial be remembered? Were there any buildings or trees in the burial ground? Was there a demarcation between settlement and cemetery? Is there evidence for non-funerary activities or a change in the use of the cemetery? The often neglected finds from the fill could provide information on non-funerary practices before, during or after burials and the use of the cemetery in general and this could lead to a more holistic perspective on cemeteries, seeing them as more than a concentration of burials.

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