Research Article

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The Phenomena La Hoguette and Limburg – Technological Aspects

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Abstract: La Hoguette and Limburg pottery and the role their producers played in the Neolithization of western Central Europe are still a matter of debate. These styles exist in parallel to Linearbandkeramik (LBK) but are different from LBK pottery and here called Non-LBK wares. The various Non-LBK styles are mainly defined based on decoration, but this does not coincide with important technological features. Therefore, an technological approach including the parameters of temper, vessel morphology, and firing methods was used for an alternative classification and to trace knowledge transmission networks. It is suggested that several technologically distinguishable Non-LBK pottery traditions of different geographical origins existed contemporaneously in western Central Europe. While the early mineral- and organic-tempered ware shows some similarities with the Earliest and Early LBK, the widespread early bone-tempered pottery with its uniform design cannot be traced back to either Cardial or LBK pottery. This is probably the oldest pottery in western Central Europe. This means that here pottery emerged first as a tradition outside both the LBK and Cardial cultures. Increasing interaction between producers of various Non-LBK wares and LBK pottery makers can then be traced over several centuries. All styles are shown to be diverse and dynamic and to be undergoing substantial internal development. The persistent mutual influencing is a key for understanding the development of Non-LBK pottery, as well as for innovations within LBK ceramic production. Here, a hypothesis is proposed that the makers of Non-LBK wares may be hunter-gatherers, although this cannot currently be proven.

Keywords: La Hoguette, Limburg pottery, Non-LBK pottery, bone temper, LBK

1 Introduction

The Linearbandkeramik (LBK) has been named after its characteristic pottery, which in spite of regional differences in decoration shares basic similarities of manufacturing technology and decorative principles (based on banded patterns of dots and lines) across its area of distribution. However, for the first time in 1936 (Buttler & Haberey, 1936) and increasingly since the 1970s, pottery contemporary to the LBK, but significantly different in decoration and technology, was identified in western Central Europe, mainly within and sometimes outside the distribution area of the LBK (Constantin, Coudart, & Boureux, 1981; Constantin & Demarez, 1981; Jeunesse, 1986, 1987; Modderman, 1970, 1981).

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This came as a surprise because at that time pottery in Central Europe was considered an integral part of the so-called Neolithic package and LBK was the only known Neolithic culture. Several questions arose: Who were the producers of this pottery, could they have been hunter-gatherers? What was their relation to the Neolithic cultures, and which role did their producers play in the process of establishing pottery production in western Central Europe?

Based on differences in decoration, the early Non-LBK pottery traditions were divided into La Hoguette and Limburg styles (Constantin, 1985; Jeunesse, 1986; Modderman, 1970). But regarding technical features, this categorization proved unsatisfactory. In this article, therefore, an alternative approach is used to categorize early Non-LBK pottery according to technical parameters, in addition to decoration. The aim is to identify technological traditions that may inform us on networks of communication.

It is suggested that several technologically distinguishable pottery traditions with different geographical distributions were developed contemporaneously to the Earliest LBK (ca. 5400–5250 calBC) and existed for centuries in western Central Europe side by side with the LBK and even later in Villeneuve-St. Germain (VSG) contexts after the transition from Rubané (the French LBK) to VSG around 4900 calBC. The different aspects of pottery production may indicate different modalities and networks of transmission, with their own historical trajectories. On this basis, it will be discussed to which extent hunter-gatherers could have participated in the production of early pottery.

2 History of Research

2.1 Definition of La Hoguette and Limburg Pottery

La Hoguette pottery was defined by Christian Jeunesse in 1986 (Jeunesse, 1986, 1987). Limburg pottery was defined even earlier by Pieter Modderman and described by Claude Constantin (Constantin, 1985; Modderman, 1970). The defining features for both were oxidizing firing, bone temper, and pointed-based vessels; all these properties differ from the LBK of early periods. The double-dotted decoration of La Hoguette compared to the stroke decorations of Limburg was considered as the main difference between the two styles. The main distribution area of La Hoguette was thought to be located east of the Rhine where it existed already at the same time as the Earliest LBK (ca. 5400–5250 calBC) and in Alsace where it occurred predominantly during the Rubané récent (ca. 5050–4950 calBC). The only exception was the eponymous site in La Hoguette (Normandy, France). Limburg pottery was considered to start later during the Flomborn phase (ca. 5250–5150 calBC) in the Maas valley west of the Rhine and was found until the end of the Rubané in the Paris basin around 4900 calBC (see chronology Table 1) (Lüning, Kloos, & Albert, 1989; Manen & Mazurié de Keroualin, 2003).

Table 1: Chronology of LBK and synchronization between German, Dutch, and French chronology (simplified based on Gomart, 2014, p. 41)

	German chronology	Dutch chronology	French chronology
			Rubané terminal Rubané final
4950 calBC	Latest LBK	Modderman IId	
5050 calBC	Late LBK	Modderman IIb/c/d	Rubané récent
5150 calBC	Middle LBK	Modderman Id/Ila	Rubané moyen
5250 calBC	Early LBK (Flomborn)	Modderman Ib/c	Rubané ancien
	Earliest LBK	Modderman Ia	

Soon the attribution to La Hoguette and Limburg decoration patterns had to be readjusted because of inconsistencies, and Limburg pottery was split into a northern Rheno-Mosan and a southern Sequano-Scaldic branch (van Berg, 1990). Additional categories of Non-LBK ware were defined and designated “Begleitkeramik” (Jeunesse & Sainty, 1991, p. 20) and “Cannelured Begleitkeramik” (Brounen & Hauzeur, 2010). Some scholars considered these as part of La Hoguette (Cziesla, 2015), others as part of Limburg (Gomart & Burnez-Lanotte, 2012, p. 241), and still others as separate categories (Petitdidier et al., 2013). Constantin and colleagues consider them as a development out of La Hoguette (Constantin, Allard, & Demarez, 2010b, p. 17). But there still existed other sherds which did not fit into these extended categories (Amkreutz, Vanmontfort, De Bie, & Verbeek, 2010; Crombé, Sergeant, Perdaen, Meylemans, & Deforce, 2015, p. 34; Jeunesse, 1987, p. 9; van de Velde, 2010, p. 73). The original technological definition was also expanded because pottery with mineral or organic temper was attributed to La Hoguette or Limburg (Constantin, 1985, p. 88; Maletschek, 2010). The distribution areas of all these potteries also overlapped. La Hoguette pottery was found as far as the Atlantic coast, far west of the Limburg distribution area (Ghesquière & Aubry, 2013, p. 517; Rousseau, Forré, Hamon, & Querré, 2015), whereas newly found sherds in Alsace were attributed to Limburg pottery (Lefranc & Michler, 2015, Figure 19). Other examples were classed by their authors as La Hoguette, although neither the decoration pattern nor the temper fulfilled the original definition (Altörfer & Hartmann, 2018). But although the definitions became more and more inclusive, the designations were used as if they represented pottery groups with a defined territory, suggesting the existence of cultural units (see discussion in Manen & Mazurié de Keroualin, 2003, p. 135f; as an example see the map in Jeunesse & van Willigen, 2010, Figure 10). In 2010, Constantin, Ilett, and Burnez-Lanotte (2010a) expressed fundamental doubts about the established opinions. Therefore, it might be worthwhile to investigate these potteries from a different angle, from a technological aspect using selected elements of the production process. As technological traditions depend on deeper sorts of learning networks than, for example, the imitation of decorative techniques (Gosselain, 2002, p. 11), this can provide a fruitful alternative way of categorization.

2.2 Corpus of Sites with La Hoguette and Limburg Pottery and Begleitkeramik

2.2.1 La Hoguette Pottery

At least 79 sites of La Hoguette pottery are mentioned in the literature (see list 1.1 in the Appendix). Compared to the map in the pioneering summary by Manen and Mazurié de Keroualin (2003, p. 118), this is an increase of 29 sites. Most sites have only one or two sherds and can only contribute a dot on the distribution map. On 21 sites, more than 10 sherds were found or even the reconstruction of a vessel was possible. About 48 sites (61%) are LBK settlements, 27 sites (34%) have no connection to any LBK context. In all LBK settlements, the number of La Hoguette sherds is always very small when compared to the LBK sherds.

Beside the site La Hoguette itself, until 2003, the sites of Bruchenbrücken, Dautenheim, Filderstadt-Bernhausen, Hailfingen (Lüning et al., 1989), Bad Cannstatt-Wilhelma (Strien & Tillmann, 2001), Bischoffsheim-Village, and Bavans (Jeunesse, 1987) were most often cited in discussions. The two vessels from Dautenheim became the prime example of a La Hoguette vessel. After 2003, three French sites substantially expanded the corpus: Choisey (Pétrequin, Martineau, Nowicki, Gauthier, & Schaal, 2009), Alizay (Ghesquière & Aubry, 2013), and Machecoul (Rousseau et al., 2015). All these are situated outside the distribution area of LBK pottery and moved the center of the La Hoguette distribution area to the west. The publications on the pottery from Choisey and Machecoul provided very detailed information about the production process. Sehndorf (Fritsch, 2000a), Liestal (Sedlmeier, 2003), Ittervorth (Brounen, Drenth, & Schreurs, 2010a), and Soest-Burgtheaterplatz (Knoche, 2010), all outside LBK contexts, provided additional insights into the technological variety of La Hoguette pottery. The detailed monograph on Rottenburg-Fröbelweg (Bofinger, 2005) demonstrated the association of La Hoguette pottery with the Earliest LBK. Gächlingen-

Goldäcker (Altorfer & Hartmann, 2018) yielded La Hoguette pottery from a later period. The site Rosheim-St. Odile was included in a technological investigation by Gomart (2014, p. 237ff).

2.2.2 Limburg Pottery

At least 119 sites of Limburg pottery are known (see list 1.2). About 17 of them have more than 10 sherds. About 93 sites (79%) are LBK settlements, 21 sites (18%) are outside any LBK context, and two sites are dated to the VSG. Eight sites also have La Hoguette pottery. The number of Limburg sherds is always much smaller than the number of LBK sherds.

In comparison with the map in Manen and Mazurié de Keroualin (2003, p. 121), the number of sites nearly doubled. In the early discussions, the vessels from Kesseleyk-Keuperheide (Modderman, 1974), Köln-Lindenthal (Buttler & Haberey, 1936), Geleen-Station, Elsloo-Koolweg, Stein-Heideveldweg, Rosmeer (Modderman, 1981), Liege-St. Lambert (Rouselle, 1984), Aubechies, and Cuiry-lès-Chaudardes (Constantin, 1985) were the most cited examples. The increase of knowledge since 2003 is nearly exclusively the side-effect of LBK excavations west of the Rhine, as in the Moselle-Lorraine area (Hauzeur, 2006; Petitdidier et al., 2013) and Alsace (Lefranc & Michler, 2015, p. 41), in the Seine-Yonne area (Dupont, Irribaria, & Liagre, 2010; Meunier, 2012), the Aisne valley (Ilett & Constantin, 2010, p. 247), the late LBK settlement cluster in Normandy (Billard, Bostyn, Hamon, & Meunier, 2014; Ghesquière, Le Maux, Lepaumier, & Marcigny, 2018), and in Hainaut (Constantin et al., 2010b, pp. 16–20; Constantin et al., 2018; Deramaix, Zeebroek, Jadin, & Denis, 2018). The publication of Aubechies (Constantin et al., 2010b) provided additional technological knowledge about Limburg pottery. In the Graetheide LBK settlement cluster, Geleen-Janskamperveld is of particular interest as an early site west of the Rhine, mainly occupied in the Flomborn period (van de Velde, 2007), the neighboring site of Maastricht-Klinkers proves the diversity of Limburg pottery during all periods (Van Wijk, Amkreutz, & van de Velde, 2014). A technological investigation about the origin of clay materials was carried out for the Hesbaye site of Fexhe-le-Haute-Clocher (Bosquet & Golitko, 2012). Five important sites with Limburg sherds were included in the technological studies of Gomart (2014) about the LBK west of the Rhine.

2.2.3 Begleitkeramik

The list of Begleitkeramik is based on the information given in Brounen and Hauzeur (2010) and Petitdidier et al. (2013) with some additions. It lists 43 sites (see list 1.3). About 25 sites (58%) are LBK settlements, 18 sites (42%) are outside a LBK context. On 23 sites, there were additional sherds of La Hoguette or Limburg pottery or even both. Nearly all of the Begleitkeramik sites have only very few sherds. Only Haelen-Broekweg (Bats et al., 2002), outside an LBK context, had many sherds, even in connection with late Mesolithic lithic material. But a reconstruction of the vessel was not possible, as was the case for all the other Begleitkeramik sherds.

2.2.4 Other Non-LBK Potteries

There exist other potteries contemporary to the LBK which are not attributed to any defined category. The first one is a ware with fossil shell temper and little decoration. It is mentioned by Jeunesse (1987, p. 9) and is found in LBK contexts but also to the south outside the LBK distribution area (see list 1.4.1). This pottery has technological similarities with fossil shell-tempered La Hoguette pottery as in Bischoffsheim-Le Village, pit 68 (Jeunesse & Sainty, 1991), Rosheim-St. Odile (Jeunesse & Lefranc, 1999), and Orconte-Les Noues (Tappret & Villes, 1996).

Another pottery without any attribution is described by Amkreutz and colleagues in the lower Maas valley (Amkreutz et al., 2010). For this pottery, the connection with Mesolithic sites is stressed (see list 1.4.2).

Similar sites are mentioned by Crombé and colleagues for the lower Scheldt valley (Crombé et al., 2015, p. 34). The sherds are often bone tempered and were even found in early Swifterbant sites (see list 1.4.2).

All these potteries are technologically different from LBK sherds in one way or the other. Therefore, all these potteries (La Hoguette and Limburg pottery, Begleitkeramik, and other potteries) will be subsumed under the designation “Non-LBK.” This has to be understood as a technological designation to suggest new analytical approaches and does not exclude possible LBK influences or the partial attribution to the sphere of LBK culture.

3 Technological Approach

Roux (2011) describes four main stages in the production of ceramics. The first stage is the selection and preparation of the clay material including the choice of temper. The second stage is the fashioning of the vessel. The third stage is the finishing of the vessel’s outer layers. The last stage is the firing. Of course, the selection of technical processes can be influenced by cultural traditions, but at first, they are the technological know-how of the producer group.

Temper is necessary. It serves as the structure of bigger particles that bind the small clay particles (Rice, 1987, p. 74). Temper can be a component of the selected clay matrix or can be added intentionally. Because the technological effect is the same, this difference is not of importance for our study. With mineral tempers such as quartz, calcite, or fossil shells, it is not always recognizable whether the tempers are inclusions in the clay matrix. But for other temper materials such as bone, grog, or plants, it is obvious that they have been added intentionally. Under the conditions of early pottery production with firing temperatures of only 750°C at most, the production of high-quality pottery requires specific know-how. Some tempering agents indicate that dealing with thermal stress during firing was the issue, as which quartz, grog, and organic temper (Rice, 1987, p. 229). The use of grog was an efficient technological innovation to minimize the problems of thermal expansion (Rice, 1987, p. 229). On the other hand, tempers, such as calcite, bone, or hematite, act as a flux and support the development of stable high-temperature modifications already at rather low temperatures (Rice, 1987, p. 94). The use of a specific temper can, therefore, indicate a technological tradition.

The different techniques and methods of fashioning can be dependent on the form and size of the vessel, but they can also be characteristic of distinct social groups (Roux, 2011, p. 81). Using the coiling technique, the fashioning of the wall is a characterizing element even if the coiling method of the rim or the bottom could differ (Gomart, 2014, p. 280).

The decoration can be applied prior to or after firing. Decoration is a means of communication, often interpreted as expressing identity or reflecting social change, whereas technological parameters allow to identify the transfer of technological traditions (Lemonnier, 1993).

The technological choices are normally not visible on the outside of the vessel and cannot be easily copied, so that the transfer of this know-how requires direct contact. In contrast to decoration, which can be imitated and adopted relatively readily even after cursory contact, a technological change would require lengthier learning opportunities (Gosselain, 2002, p. 11). An approach that explicitly compares these two possible routes of transmission as separate phenomena can thus shed new light on how pottery traditions may have been communicated between communities, and what was transmitted at which point in time.

3.1 Technological Traditions in the LBK

Based on this approach, one can identify different technological traditions in the LBK. The Earliest LBK is characterized by organic plant temper and a firing process in a reductive atmosphere (Cladders, 2001, p. 39; Strien, 2018).

At the transition from Earliest LBK to Flomborn, there is a marked technological change (Cladders & Stäuble, 2003). The organic temper of the Earliest LBK is replaced by a quartz-based mineral temper, but the firing process remains reductive.

In the Flomborn period, the LBK expands west across the Rhine river, moving both north (Rubané du Nord-Ouest) along the Maas river and south (Rubané du Sud-Ouest) into Alsace (Jeunesse, 1995). It finally reaches the Paris basin forming the Rubané récent du Bassin parisien (RRBP) at about 5000 calBC (Blouet et al., 2013; Constantin & Ilett, 1997; Lefranc, 2013; Meunier, 2012). The pottery of the northern branch is characterized by a mineral temper with a share of grog in the coarse ware. The use of grog as temper commences already in the Earliest LBK, where it, for example, reaches a share of 13% at Rottenburg-Fröbelweg (Bofinger, 2005, p. 77, Figure 41). In the LBK coarse ware at Aubechies, this rises to 60% (Constantin et al., 2010b, p. 14). In the late period in the Hainaut and the western Hesbaye, bone temper in LBK coarse ware can reach 10% or even more, but this remains a regional trend (Constantin et al., 2010b, p. 16). In contrast, the pottery of the southern branch has quartz temper without grog in Rosheim-St.Odile in the east (Gomart, 2014, p. 248) and a temper of fossil shells or calcite in the final phase in the west, e.g. at Cuiry-lès-Chaudardes (Gomart, 2014, pp. 84, 89, 94).

By investigating the *chaîne opératoire* on eight LBK sites, Gomart tried to shed light on how these innovations spread. The eight sites were carefully selected to cover the whole period and area of the LBK west of the Rhine (Gomart, 2014, pp. 40, 41). Gomart used fashioning techniques as the leading parameter and distinguished three main categories, namely O-configuration (where the coils are just set one above the other), S-configuration (where elongated coils overlap alternatively), and oblique external configuration (where elongated coils are overlapping only outside) each with minor variants (Gomart, 2014, p. 61ff, Gomart & Burnez-Lanotte, 2012).

Gomart states that the westward expansion of the Rubané du Nord-Ouest and du Sud-Ouest is characterized by the S-configuration with minor, but consistent differences in the northern and southern branch (Gomart, 2014, p. 289).

Later in the Rubané récent, the O-configuration is adopted. For example, at Fexhe-le-Haut-Clocher in the Western Hesbaye the S-configuration dominates by 70:20% during the pioneer settlements, whereas later in the Rubané final, the O-configuration dominates by 70:20% (Gomart, 2014, p. 180, Tables 39 and 40). In the RRBP in Cuiry-lès-Chaudardes, this change can be traced throughout the different phases of occupation and is here interpreted as the arrival of new LBK settlers (Gomart, Hachem, Hamon, Giligny, & Ilett, 2015). It is interesting to note that in LBK the O-configuration is not correlated with temper and that the change from S-configuration to O-configuration in LBK sites is not connected with a change of temper.

The oblique external configuration plays only a minor role and only in the final period of the LBK with a share of 3% in the examples investigated by Gomart (2014, p. 280).

3.2 Categorizing Non-LBK Pottery According to Technological Parameters

So far early Non-LBK pottery has mainly been categorized according to decoration patterns. They are the main distinguishing features between La Hoguette, Limburg, and other styles (see Section 2). From a technological aspect, temper, the coiling technique, and the firing process will now be placed center stage.

The literature was searched for information about technical parameters of Non-LBK pottery from more than 200 sites (see list 3). It is a study exclusively based on literature and has to deal with all the inconsistencies, inaccuracies, and missing information involved, but the results should nevertheless give indications for future research priorities.

Overall, 79 sites with La Hoguette pottery, 119 sites with Limburg pottery, and 43 sites with Begleitkeramik were included (see lists 1.1–1.3). Compared to the LBK, this is still a very small basis of information.

Temper is used as the leading criterion to categorize Non-LBK pottery, as it is frequently reported upon and as the choice of different tempers has different outcomes for firing and use (see earlier). On a first level, bone temper, organic temper, and mineral temper can be identified. Grog temper is a subgroup of all three;

it is important because it indicates a later technological development and is intentionally added (see Table 2).

Table 2: Sites with Non-LBK pottery, categorized according to temper

Temper	La Hoguette	Limburg	Begleitkeramik
Known sites	79	119	43
Sites with temper known	59	94	38
Bone (bone + grog)	30 (9)	49 (18)	4
Organic (organic + grog)	13 (3)	19	9 (1)
Mineral (mineral + grog)	28 (11)	40 (13)	24 (7)

For La Hoguette pottery, information about temper is available for 59 of 79 sites (see list 1.1). Bone-tempered pottery occurs on 30 sites, pottery with an organic temper on 13 sites. These include four sites where both tempers were used in the same vessel. Mineral temper occurs on 28 sites and is mostly quartz, only sometimes calcite. On four sites, there are sherds with the temper of fossil shells. Grog temper can be found on 19 sites. In nine cases, it is paired with bone temper, in 11 cases with quartz temper and in three cases with organic temper.

For Limburg pottery, the temper is known for 94 of the 119 sites (see list 1.2). Bone-tempered sherds are on 49 sites, and organic-tempered ones are on 18 sites. On six sites, there is bone and organic temper within one sherd. Forty sites yielded sherds with an intentionally or not intentionally added mineral temper. On 19 sites, bone temper occurs alongside grog, whereas on 13 sites, there is a combination of mineral and grog temper.

For Begleitkeramik, the temper is known for 38 out of 43 sites (see list 1.3). The majority is mineral tempered (24 sites) mainly on a quartz basis, in seven cases combined with grog. There are nine sites with organic-tempered sherds. Bone temper is rather rarely represented. This confirms an observation already made by Brounen and Hauzeur (2010, p. 50f).

In sum, alongside the expected bone temper (see list 2.1), there exists a certain amount of organic (see list 2.2) and a considerable amount of mineral-tempered ware (see list 2.3). Grog temper is to a certain extent present in all three groups (see list 2.4).

Sites were then mapped according to prevalent temper. The mapping of Non-LBK pottery reflects the distribution of LBK settlements clusters because due to better preservation conditions offered by cut features, finds in LBK pits are overrepresented (Jeunesse, 1987, p. 14; Modderman, 1970, p. 118). However, ca. 25% of the sites of La Hoguette pottery, Limburg pottery, and Begleitkeramik are outside an LBK context.

The regional distribution of the different categories of temper is rather uneven. The distribution area of bone-tempered Non-LBK pottery has a clear boundary in the east (Figure 1a), that of the organic-tempered pottery in the west (Figure 1b). This can be interpreted as several technological pottery traditions, potentially with different origins (Kirschneck, 2020). The distribution of the mineral-tempered pottery is divided into an area with mostly quartz-based temper in the northeast and an area with also limestone-based mineral ware in the south (Figure 1c). The distribution area of grog-tempered Non-LBK pottery is mainly concentrated in the northeast (Figure 1d). A special mineral temper with fossil shells is mainly restricted to the south (Figure 1c).

Non-LBK pottery can generally only be dated by association with LBK pottery. These dates are *termini ante quos*, as they prove the existence of the pottery at that time, but do not rule out an earlier beginning. Based on their associations with LBK assemblages, one can conclude that all three technologically different Non-LBK wares existed already at the time of the Earliest LBK in western Central Europe (Figure 2). The two more easterly wares, the organic- and the mineral-tempered Non-LBK wares, share their temper choices with the Earliest and Early LBK. In contrast, the bone-tempered pottery shows no similarity with the LBK of the early periods at all.

The **coiling technique** of the vessel wall was used as the second parameter for categorizing Non-LBK pottery, and, adopting Louise Gomart's definitions (2014, p. 61ff), three main categories were distinguished,

(a)

Figure 1: Distribution maps of bone-tempered (a) (red), organic-tempered (b) (green), and mineral-tempered (c) (blue) Non-LBK pottery. The light blue circles in (c) denote fossil shell-tempered Non-LBK pottery. The circles denote LBK settlement clusters. The distribution of grog-tempered Non-LBK pottery is shown in (d).

Figure 2: Distribution areas of early bone-, organic-, and mineral-tempered Non-LBK pottery. Examples from Machecoul (red, left), Goddelau (green, top right), and Anröchte (blue, bottom right). (Drawing: Author with figures from Lüning et al., 1989, p. 398, Figure 12.10, p. 414, Figure 28.1; Rousseau et al., 2015, p. 24).

namely O-configuration, S-configuration, and oblique external configuration. Information is only inconsistently reported. Detailed information is available for two La Hogue vessels from Choisey and Machecoul, both outside the LBK context. On these two vessels, an oblique external configuration was used for the coiling, the vessels were bone tempered (Pétrequin et al., 2009; Rousseau et al., 2015).

In her study on LBK pottery technology, Gomart (2014) analyzed the coiling technique of 86 Non-LBK vessels from five sites with Limburg pottery (one including Begleitkeramik) and one with La Hogue pottery (Gomart, 2014; Gomart & Burnez-Lanotte, 2012). Of these Non-LBK vessels 52 have oblique external configuration, 27 have S-configuration, otherwise characteristic of the advancing LBK, and 7 O-configuration, which came to dominate in later LBK pottery (see Table 3).

Table 3: Non-LBK pottery sherds studied in Gomart (2014) and categorized according to coiling method and temper (in brackets)

Site	Oblique external	S-conf	O-conf	
Rosmeer	12 (9b + 3 min)	17 (12 min + 5b)		29
Fexhe-le-Haut	1 (b)	1 (b + g)		2
Metz		1 (ind)		1
Rosheim			1 (fs)	1
Aubechies	8 (7b + 1 oM)			8
Cuiry-lès-Chaudardes phase 1	2 (b)			2
Phase 2	23 (b)	8 (b)	2 (b)	33
Phase 3	6 (b)		4 (b)	10
Sum	52	27	7	86

Among the Non-LBK vessels included in Gomart's study, the oblique external configuration has a share of more than 60%, compared to only 3% in the LBK studied by Gomart (2014, p. 280). The correlation of oblique external configuration and bone temper is strong (48 of the 52). This combination was also attested to the two La Hoguette vessels from Choisey and Machecoul.

In the Rubané moyen phase at Rosmeer, the Limburg vessels with S-configuration and the Begleitkeramik sherds have mainly mineral temper (Gomart & Burnez-Lanotte, 2012). This combination of temper and coiling techniques is the same as within the LBK, which was expanding westwards.

S-configuration in Non-LBK vessels with bone or with bone and grog temper was identified in Rosmeer, in the pioneering settlement of Fexhe-le-Haut-Clocher, and in Cuiiry-lès-Chaudardes. O-configuration in Non-LBK vessels with bone temper occurs only in the final occupation phases of Cuiiry-lès-Chaudardes. These combinations were not found in LBK vessels.

One La Hoguette vessel from the Rubané récent site Rosheim-St. Odile has O-configuration and fossil shell temper. This combination also occurs in LBK, but only in the final occupation phases of Cuiiry-lès-Chaudardes (see later).

Oxidizing or reducing **firing** is a further important technological parameter. It is not relevant for the internal categorization of Non-LBK wares, because all are fired with an oxidizing phase. For most LBK periods, this separates Non-LBK from LBK pottery, fired in reducing conditions. However, in the final phase of the Paris basin, LBK pottery is fired with an oxidizing phase as well (Meunier, 2013a, p. 492).

4 Technology Traditions

The technological areas cross-cut the ceramic groups defined based on decoration. In this study, we try to identify technological traditions using temper, coiling technique, and firing as parameters and attempt to add a temporal dimension.

4.1 Technology Tradition of Bone-Tempered Non-LBK Pottery

Early bone-tempered Non-LBK pottery is exclusively decorated in the La Hoguette style. Its distribution extends from the Atlantic ocean to the east of the Rhine river (Figure 2). This area is mostly outside the distribution area of both the Earliest LBK and the Cardial. The only available two radiocarbon dates from Alizay – Le Postel and Bad Cannstatt-Wilhelma, both not in LBK context, point to the third-quarter of the sixth Millennium calBC (Ghesquière & Aubry, 2013, p. 519; Kalis et al., 2001, p. 652). Outside the area of the Earliest LBK at least, this is the oldest pottery in western Central Europe. Although east of the Rhine, it comes into contact with the Earliest LBK (ca. 5400–5250 calBC) (Bofinger, 2005), in both shape and temper, it is significantly different to any early ware of either LBK or Cardial. Therefore, in western Central Europe, the first pottery emerged as a tradition outside both LBK and Cardial cultures.

Typical for the early bone-tempered La Hoguette pottery are large, thin-walled vessels coiled in oblique external configuration. According to Pétrequin and colleagues, this technique is very well suited for producing large vessels efficiently (Pétrequin et al., 2009, p. 505). A uniform double-dotted garland decoration can be seen at many sites (see examples in Figure 3). This uniformity suggests social control for the production of pottery. The vessels are locally produced but are similar over a large area (Pétrequin et al., 2009, p. 503; Rousseau et al., 2015, p. 31f). This hints at a large-scale network. In its first occurrence in western Central Europe, this pottery already shows a high level of craftsmanship (Pétrequin et al., 2009, p. 499). The origin of this pottery is uncertain. There are similarities to potteries in the Neolithique ancien de la côte atlantique (NACA), as at La Lède-du-Gurp or on the Iberian peninsula (van Berg, 1987, p. 268), but establishing a definite origin point would require a more comprehensive technological re-examination of the original material.

Figure 3: Early bone-tempered Non-LBK vessels (Drawing: Author with figures from Caillaud & Lagnet, 1972, p. 151; Lüning et al., 1989, p. 400, Figure 14, p. 412, Figure 26.3, p. 414, Figure 28.2; Pétrequin et al., 2009, p. 495; Ghesquière & Aubry, 2013, p. 518; Rousseau et al., 2015, p. 24).

This early bone-tempered La Hoguette pottery establishes a technological tradition characterized by bone temper, oxidizing firing process, pointed-based vessels, and a coiling technique using oblique external configuration. This technological tradition also dominates the bone-tempered Limburg sherds throughout the whole period of Limburg pottery use. In Rosmeer in the Maas valley in the middle LBK period (ca. 5150 calBC), nine out of 16 bone-tempered Limburg sherds belong to that tradition (Gomart & Burnez-Lanotte, 2012, p. 239). In Aubechies in Hainaut in the late LBK (ca. 5050 calBC), the “Classical” Limburg pottery is exclusively part of that tradition (Constantin et al., 2010b; Gomart, 2014, p. 229, Table 58). In Cuiry-lès-Chaudardes in the Aisne valley, this Limburg pottery occurs in all periods of occupation and is still dominant with a share of above 50% in the middle and final period (ca. 5000 calBC) (Gomart, 2014, pp. 88, 93). Therefore, in this area, the technological tradition of the bone-tempered La Hoguette pottery is present throughout the whole period of the LBK and even beyond. The technology is still in use in the Blicquy pottery in Vaux-et-Borset in the Hesbaye (ca. 4900 calBC) (van Doosselaere, Burnez-Lanotte, Gomart, & Livingstone-Smith, 2013). Maybe the influence of this technological tradition can even be felt in the bone-tempered sherds in the Scheldt lowlands (Crombé et al., 2015, p. 34). It was Claude Constantin who already in 1976 directed the attention to this bone-tempered pottery tradition (Constantin, 1986). It is remarkable how long this technological tradition existed – more than five centuries – and that it cross-cuts several decoration styles and even cultural boundaries.

4.2 Organic-Tempered Non-LBK Pottery

The distribution area of the organic-tempered Non-LBK pottery extends the furthest east. Its western boundaries are the lower Moselle and the lower Maas. This technology includes examples of La Hoguette

and Limburg pottery and Begleitkeramik (see list 2.2). East of the Rhine, organic-tempered Non-LBK pottery is mostly found in association with pottery of the Earliest LBK, with Bruchenbrücken and Goddelau the most prominent examples (Cladders, 2001; Lüning et al., 1989). But it also exists outside the area of the Earliest LBK as in Soest-Burgtheaterplatz, in association with flint artifacts (Knoche, 2010), and west of the Rhine, as in Liege-St. Lambert (Van der Sloot et al., 2003) and Ittervorth (Brounen et al., 2010a). It can be evidenced until the end of the LBK. Important examples of this technology are the Begleitkeramik sherds of Haelen-Broekweg, where this technology is associated with late Mesolithic-style lithic material (Bats et al., 2002). This ware is the dominant Non-LBK pottery in the Moselle valley, with examples from Weiler-la-Tour Holzdreisch (Jadin, 1996), and well represented in the Maas area. The pottery from Welde and Brecht (Amkreutz et al., 2010) could be included as late examples into this tradition.

Organic-tempered Non-LBK vessels have some technological features in common with the Earliest LBK, particularly temper, although there are differences, too – notably the oxidizing firing and the pointed bottoms (Cladders, 2001, p. 58). Therefore, it could be postulated that this pottery emerges in the sphere of the Earliest LBK. Maybe several other atypical Earliest LBK sherds could also be placed in the context of this technological tradition (Strien, 2018, p. 46; Kloos, 1997, Footnote 63). This tradition is also spread westwards outside the area of the Earliest LBK, where it survives even after LBK pottery undergoes a technological change from organic to mineral temper with the transition to Flomborn around 5250 calBC.

4.3 Mineral-Tempered Non-LBK Pottery along the Rhine and Maas

A third Non-LBK pottery tradition can be defined for an area between Ede-Frankeneng, the Netherlands, and Hiddenhausen-Bermbek (North Rhine Westphalia) in the north and Puttelange, Moselle, and Wallmersbach (Bavaria) in the south. This tradition can be identified by a mineral temper on quartz base, often with additions of grog. This technology includes examples of La Hoguette and Limburg pottery and Begleitkeramik (see list 2.3). This technological tradition exists from the Earliest LBK to the end of the LBK.

Early examples are the La Hoguette vessels in Steinfurth (Langenbrink & Kneipp, 1990) and Nackenheim (Lüning et al., 1989) in an Earliest LBK context and Anröchte (Lüning et al., 1989), Ede-Frankeneng (Schut, 1988), Sehndorf (Fritsch, 2000a), and Puttelange (Petitdidier et al., 2013) outside an LBK context. On some early examples, a characteristic barbed wire decoration can be seen, different from the garland decoration of bone-tempered La Hoguette vessels. In Geleen-Janskamperveld, the majority of the Limburg sherds is mineral tempered (van de Velde, 2007). Grog is added to 15% of the sherds in Geleen-Janskamperveld and to 55% in the later site Liege-St. Lambert (Rouselle, 1984). In Rosmeer, the S-configuration coiling technique is used for Begleitkeramik as well as for Limburg sherds similar in decoration to those from Geleen-Janskamperveld (Gomart & Burnez-Lanotte, 2012, p. 239).

The origin of this technology is uncertain. Quartz-based mineral temper with additions of grog and S-configuration as coiling technique are also features of Flomborn pottery, which expands westwards (Gomart, 2014, p. 197, Table 45). However, differences remain in shape, oxidizing firing, and decoration. In contrast, the bone-tempered pottery with its oblique external configuration is different from both LBK and mineral-tempered Non-LBK, but shares oxidizing firing and vessel form with the mineral-tempered Non-LBK. This mixed pattern of similarity and difference suggests that the producers of the mineral-tempered Non-LBK wares integrate technological influences of the LBK and other Non-LBK wares. One should note, however, that the mineral-tempered Non-LBK overlaps chronologically with organic-tempered Earliest LBK.

4.4 Non-LBK Pottery with Fossil Shell Temper

Beginning in the Rubané récent, a particular mineral temper of fossil shells can be found in Non-LBK potteries in Alsace. Rather often the sherds are undecorated or only very sparsely decorated. Mostly, they

are not attributed to any pottery style (see list 2.3 and Figure 1c). In Bischoffsheim (Jeunesse & Sainty, 1991) and in Rosheim-St. Odile (Jeunesse & Lefranc, 1999), the pottery is attributed to La Hoguette. The site Rosheim-St. Odile was examined by Gomart (2014, p. 237f). Here, one La Hoguette sherd is the only example with this temper, but it shares the O-configuration coiling technique with the majority of LBK sherds (Gomart, 2014, p. 245, Table 61, p. 248, Table 64).

Later, similar pottery with fossil temper was found west of Alsace in Ay-sur-Moselle and Vitry-sur-Orne in Lorraine (Petitdidier et al., 2013), in Orconte-Les Noues and Juvigny along the Marne (Meunier, 2013b; Tappret & Villes, 1996) and Presles-et-Boves in the Paris basin (Ilett & Allard, 2008), mostly attributed to Limburg pottery. Fossil shell temper is also found south of the LBK distribution in the Doubs valley in Bavans and Bart (Aimé, Jaccotey, & Thévenin, 1995, p. 84; Jeunesse, 1987), and in the Saône valley in layer 58 of the Grotte du Gardon (Manen & Convertini, 2009). The sherds from the Grotte du Gardon probably date to ca. 5200 calBC (Perrin, 2013, p. 369) and therefore earlier than those from Alsace, suggesting a southern influence. However, this temper is used very rarely in Cardial and Epicardial (Binder, Clop, Convertini, Manen, & Sénépart, 2010; van Willigen, 2004). In LBK, it is also rare: only in the Aisne valley in Cuiry-lès-Chaudardes, it is one of the two tempers used (Gomart, 2014). The origin of fossil shell temper technology is currently unknown.

The O-configuration of the Rosheim Non-LBK sherd is otherwise rare in Non-LBK pottery but dominates in the Rubané récent (see Section 3.1). It is also used for Epicardial pottery at Grotte de Camprafaud and Roucadour (Niederlender, Lacam, & Arnal, 1966; van Willigen, 2004) with different mineral tempers. Much more detailed technological study is needed to ascertain whether this shows a mutual influence between LBK and Epicardial and how the transfer could have taken place.

5 Who Made Non-LBK Pottery?

The identity of the makers of Non-LBK pottery is hotly debated. In what follows, I will present a brief history of this debate, paying particular attention to new developments that once again make a hunter-gatherer origin of these wares possible.

5.1 Research History of Hunter-Gatherer Potteries

In the 1980s, the general opinion was that pottery entered Western and Central Europe in two independent expansions as part of the so-called Neolithic package. Bearers of the Impressa and later the Cardial culture progressed west along the Mediterranean coast, whereas the LBK advanced along the Danube river (Guilaine, 2001; Lüning, 1988). It was at least implicitly assumed that the transfer of pottery production into hunting and gathering economies would be possible – if at all – only through neighboring Neolithic cultures. One influential explanation for the origin of La Hoguette and Limburg pottery was that it developed under the influence of Cardial among hunter-gatherers (Jeunesse, 1987, p. 16; Manen, 1997).

Since the 1990s, it has been acknowledged that hunter-gatherers could also play a vital role in the development of pottery. It has also become generally accepted that on a global scale, pottery was first invented in hunter-gatherer societies (Jordan & Zvelebil, 2009; Rice, 1999; van Berg, 1997). For Eastern Europe, it is firmly established that pottery existed in hunter-gatherer societies over a long period without them adopting a productive economy (Mazurkevich & Dolbunova, 2015; Piezonka, 2015).

According to Mazurkevich and Dolbunova (2015), pottery became established in hunter-gatherer societies of the steppe and forest zones of Eastern and Northern Europe in one of two ways. One is the distribution of the knowledge of pottery purely within hunter-gatherer communities over great distances and within short time spans. The reason for this could be the importance of pottery as a prestige or cult object. The other way is that pottery expanded from Neolithic centers into hunter-gatherer communities (Mazurkevich & Dolbunova, 2015, p. 31). One can hence begin from the premise that similar mechanisms could also have

existed in the case of Western and Central Europe (Constantin, 1985; van Berg, 1990) and that these could be recognized archaeologically.

For France, there are two different opinions about the existence of hunter-gatherers during the Neolithic period. One states that there is a gap of some centuries between the last hunter-gatherers and the expansion of Neolithic cultures across France. Only in the Grotte du Gardon could hunter-gatherers and Neolithic people have met (Perrin, 2013; Perrin, Manen, Valdeyron, & Guilaine, 2018). Therefore, hunter-gatherer pottery cannot exist in France, because hunter-gatherers had left the area before the innovation was introduced. In contrast, the other research tradition states that hunter-gatherer pottery also exists in France and survives in some areas until well after the establishment of Neolithic cultures (Jeunesse, Arbogast, Mauvilly, & Denaire, 2019). In this context, Epicardial is seen as a pottery tradition that possibly develops through contacts of Cardial culture communities with hunter-gatherers (van Willigen, 2018).

Similarly, different opinions exist concerning the makers of La Hoguette and Limburg pottery. One group of scholars consider the producers as hunter-gatherers with Mesolithic economies (among others Czesla, 2015, p. 273ff; van Berg, 1997). Others accept that the producers are hunter-gatherers but imply that they have already adopted some elements of the Neolithic economic package (Gronenborn, 2009, p. 534; Jeunesse & van Willigen, 2010; Pétrequin et al., 2009, p. 512; Strien, 2018, p. 37). Some researchers attribute this pottery to hunter-gatherers who live in a close, nearly symbiotic relationship with LBK people (Crombé, 2009, p. 484f). Finally, there is also the position that this pottery is produced by LBK people for a particular reason or purpose (Blouet et al., 2013, p. 165; Gomart, 2014, p. 320f; Verhart, 2000, p. 229).

There is hence a broad spectrum of opinions regarding the relationship of different pottery styles to different economic regimes and/or identity groups. It is also possible that different scenarios could be applied depending on the area and period.

5.2 Who are the Producers of the Different Technology Traditions?

We are now going to discuss the question of who the people behind the different postulated technology traditions may have been. Could they have been LBK people or is production by other social groups, for example, hunter-gatherers, also possible?

A high-quality Non-LBK pottery with unknown origin exists in a wide area from the Atlantic ocean to the Rhine already in the period of the Earliest LBK. The available two radiocarbon dates point to the third-quarter of the 6th-millennium calBC. Technologically, this pottery is significantly different from any early ware of either LBK or Cardial. Because some examples are locally produced far outside the distribution area of the Earliest LBK (Pétrequin et al., 2009; Rousseau et al., 2015), it is unlikely that LBK settlers made them. For the same reasons, the Cardial people can be ruled out. In Bad Cannstatt – Wilhelma, the pollen profile shows an undisturbed environment with no signs of agriculture (Meurers-Balke & Kalis, 2001, p. 645). This is consistent with the first scenario of Mazurkevich and Dolbunova (2015), i.e. these pots could have been produced by hunter-gatherers communicating over long distances. While direct proof, e.g., an association with Mesolithic artifacts, is still lacking, we must seriously entertain the possibility that this pottery emerged in a hunter-gatherer context.

A second technological tradition with organic temper is attested, comprising La Hoguette and Limburg pottery alongside Begleitkeramik. Some technological features are shared with the Earliest LBK. It existed already during the Earliest LBK and overlaps its area of distribution. Cladders interprets the finds in Bruchenbrücken and Goddelau as the product of hunter-gatherer descendants integrated into LBK society for example by marriage, or as produced by LBK women trying to copy Non-LBK decoration patterns in a clumsy way (Cladders, 2001, p. 59). However, organic-tempered Non-LBK ware can also be found far outside the area of the Earliest LBK and at later dates. These facts, as well as the comparatively small number of Non-LBK sherds and their internal technological variety, speak against production by LBK people. Sites with this tradition are also found outside the distribution area of bone-tempered Non-LBK pottery. Therefore, it is probable that these two Non-LBK pottery traditions were made by different societies. At Haelen-Broekweg, this pottery was found together with Mesolithic lithic artifacts. This is consistent with

the second scenario of Mazurkevich and Dolbunova (2015), in that the producers could be hunter-gatherers who are influenced by the Earliest LBK. Again, collecting further direct proof is now a priority. An alternative suggestion, specific to the Central European situation, is that the westward movement of the Earliest LBK was accompanied by ceramic hunter-gatherers.

A third technical pottery tradition with a mineral temper on a quartz base, often with the addition of grog could be identified in the lower Rhine area. The distribution area of this pottery extends far north of the LBK distribution area, and north of the distribution area of the bone-tempered Non-LBK ware. The producers of this pottery could hence be different from both LBK settlers and the producers of bone-tempered Non-LBK pottery. One central site is Geleen-Janskamperveld with its different kinds of mineral temper. The variety of decoration here can be interpreted as acculturation between LBK people and a group with different traditions, for example by marriage (van de Velde, 2007, p. 110). Given the technological similarities with the LBK, one could, following the second scenario of Mazurkevich and Dolbunova (2015), consider the producers as hunter-gatherers who learned pottery making from neighboring LBK people. But again there is no direct evidence for the economic system of the producers, and the situation is complex, as further south that pottery already exists in parallel the Earliest LBK and its organic temper.

Finally, a pottery tradition with fossil shell temper exists in Alsace and adjacent areas. Such sherds occur in small quantities on LBK sites from Alsace to the Aisne valley and are also found outside the LBK area in the Doubs and Saône valley to the south. The sherds are variously attributed to La Hoguette, to Limburg or to neither. In Alsace, they can be distinguished from LBK sherds by their temper and the firing process and could therefore have been produced by a group of potters who did not share LBK traditions. While there is a gap between the distribution areas of LBK and the Cardial and Epicardial, it is well known that there were contacts between both spheres, whether direct or indirect (van Willigen, 2018). Possibly, the producers of this Non-LBK pottery technology were neither LBK nor Cardial people and could have acted as conduits, who transferred technological know-how between these spheres.

In sum, a second tradition of pottery production seems to exist outside the LBK culture in western Central Europe. It is present during the whole period of the LBK within and outside the LBK area, and so is at least partly independent of LBK pottery production, as also shown by the divergent technological choices. We do not know very much about the economic system of its producers, but for those groups living outside already Neolithic zones, a hunter-gatherer lifestyle seems likely. Taphonomic factors are probably skewing the distribution area of Non-LBK pottery toward areas with cut features, i.e. LBK pits. Yet, the already documented sherds from outside LBK contexts suggest that more sites are yet to be found in such areas. The Non-LBK pottery in LBK pits shows that there was continuous interaction between these societies and the LBK, which we are going to discuss next.

5.3 Contacts and Acculturation

People producing LBK and Non-LBK wares existed side by side during the whole period of the LBK. The westward expansion of the LBK leads to recurrent contacts between these diverse groups. Their interaction is mirrored in the development of pottery.

The first contact of producers of a bone-tempered pottery with the Earliest LBK communities occurs east of the Rhine river (Lüning et al., 1989). Both pottery traditions are subject to a strict social control at this time, and therefore, both sides are not in a position to adopt foreign influences. As adaption is impossible, bone-tempered La Hoguette pots quickly disappear east of the Rhine (Hofmann, 2016). Bone temper is accepted into LBK tradition only much later and in geographically restricted areas as in Hainaut (Constantin et al., 2010b) or Southern Poland (Rauba-Bukowska, 2009).

In contrast, in the early settlement (Modderman period Ib/c) in Geleen-Janskamperveld in the Maas valley, Flomborn LBK pottery and mainly mineral-tempered Non-LBK pottery coexist. The multiplying of decorations in the Non-LBK pottery is interpreted as the assimilation of Non-LBK pottery producers into LBK society, maybe by marriage (van de Velde, 2007).

In Rosmeer, in the middle period of the LBK (Modderman period Id/Ila), a mutual technological exchange between mineral- and bone-tempered Non-LBK pottery is visible in the coiling technique (Gomart & Burnez-Lanotte, 2012, p. 239). Adopting grog as an additional temper could be seen as LBK influence. Here, the technological exchange only affects Non-LBK pottery, while the LBK does not yet adopt any other technology (Gomart, 2014, p. 197, Table 45).

In the Hainaut, LBK settlements are established in the Rubané récent and final (Modderman period IIb/d). LBK people now enter an area where the tradition of bone-tempered Non-LBK pottery is extremely strong. Here, this bone-tempered Non-LBK pottery is little influenced by foreign LBK pottery traditions. Its makers do not change their fashioning method (Gomart, 2014, p. 228) and the share of grog temper is only 5%, significantly smaller than in the LBK on that site or in the Non-LBK pottery further east (e.g. at Rosmeer).

In Aubechies, the producers of Non-LBK pottery are present during the whole LBK occupation from Modderman IIb to IIId. But were the producers of Non-LBK pottery already present before the arrival of LBK? There are a few indications, such as – one LBK sherd of period Modderman I in pit 128 in association with Non-LBK sherds (Constantin et al., 2010b, p. 21), indicating a contact between Non-LBK and LBK people already prior to the latter's occupation of the site, the stratigraphy of pit 7 with Non-LBK sherds below LBK sherds (Constantin, 1985, p. 106), and – the cluster of nearly complete Non-LBK vessels with almost no LBK sherds in pit 10 (Constantin, 1985, p. 106; Constantin et al., 2010b, p. 20).

Later, close contacts between LBK settlers and the producers of bone-tempered Non-LBK pottery can be identified. In pit 150, large Non-LBK vessels were found packed together with coarse LBK ware (Constantin et al., 2010b, p. 20).

In the late LBK in the Hainaut and the western Hesbaye, a bone-tempered thin-walled Non-LBK pottery with vessel forms atypical for Limburg pottery exists. This pottery shows a characteristic dotted decoration. It has among others been identified in Aubechies, Darion, Waremmé, and Overhespen and combines technological elements of bone-tempered Non-LBK pottery and LBK ware. In the Kleine Gete, the plant spectrum and lithic artifacts were described as influenced by Non-LBK societies (Lodewijckx, 2010, p. 80). This could be interpreted as an acculturation process between LBK people and the producers of bone-tempered Non-LBK pottery. This could be the reason why LBK coarse ware at several Hainaut sites has 10% or more bone temper (Constantin et al., 2010b, p. 17).

The Aisne valley is settled by LBK people in the final period of the LBK. Here, they again enter an area where the tradition of bone-tempered Non-LBK pottery is strong. This technology is present throughout the whole period of occupation. Outside an LBK context, it exists at Berry-au-Bac-La Renardière (Ilett & Plateaux, 1995, p. 96) and Pontavert (Constantin et al., 1981), demonstrating the partial independence of its producers. In addition, the influence of the producers of fossil shell-tempered Non-LBK pottery can be seen in Presles-et-Boves (Ilett & Allard, 2008). The Aisne valley becomes a melting pot of different Non-LBK pottery traditions, with consecutive waves of LBK migrants (as envisaged by Gomart et al., 2015). Their mutual acculturation can be traced in the consecutive occupation phases of Cuiry-lès-Chaudardes. The know-how of technological features such as temper, fashioning methods, and firing are exchanged between the producers of LBK and Non-LBK pottery (see as an example the two vessels in Gomart, 2014, p. 156, Figure 51).

In sum, in the early periods, the producers of Non-LBK pottery seem to have no technological influence on the LBK. Over time, technological changes appear in LBK pottery which could have originated in the contact with Non-LBK pottery groups. In the final LBK phases of the Hainaut and the Aisne valley, acculturation processes between the different pottery groups unfold, providing the basis for the bone-tempered Blicquy pottery of the Hainaut and Hesbaye and the bone- and mineral-tempered VSG pottery of the Aisne valley.

5.4 The Information Contained in Decoration Patterns

La Hoguette and Limburg pottery are usually defined based on decoration, but decorative styles do not correlate with the technological traditions of Non-LBK pottery. In any case, there was always a broad spectrum of decorations subsumed by these two terms, leading some authors to define Begleitkeramik

(Jeunesse & Sainty, 1991, p. 20), to split up Limburg pottery into many subgroups (van Berg, 1990) or to instead define a Limburg “classique” (Constantin et al., 2010b, p. 17). The question arises whether the different origins of Non-LBK pottery and the dynamic relationship between its producers and the LBK, traced above based on technology, are also reflected in the decoration patterns.

The earliest La Hoguette vessels are characterized by different dotted decoration patterns (Figure 2). The bone-tempered ware has a double dotted garland decoration (see examples in Figure 3), the mineral-tempered ware a barbed wire-like dotted decoration, as in Anröchte and Steinfurth (Knoche, 2010; Langenbrink & Kneipp, 1990; Lüning et al., 1989), and the organic-tempered ware often a stab-and-drag decoration, as in Goddelau, Bruchenbrücken, and Ittervoorth (Brounen et al., 2010a; Lüning et al., 1989).

In the first Flomborn settlements in the Maas valley, as in Elsloo, we see the emergence of a unified stroke decoration in mineral-tempered Non-LBK pottery (Modderman, 1981). This then expands across all Non-LBK pottery traditions, even across technological borders, and is distributed from Hainaut to the Rhine, for example in Rosmeer, Aubechies, Weiler-la-Tour Holzdreisch, and Ay-sur-Moselle (Figure 4). In the literature, it is called the “Christmas tree decoration” and constitutes up to 40% of Limburg pottery (Constantin et al., 2010b, p. 18). It perhaps expresses an identity explicitly opposed to the LBK.

Figure 4: Distribution area of different technology groups showing stroke decoration pattern. Bone-tempered examples (red) from Aubechies (left) and Rosmeer (top center), organic-tempered ones (green) from Weiler-la-Tour Holzdreisch (bottom right), and mineral-tempered ones (blue) from Elsloo (top right), and Ay-sur-Moselle (bottom center). (Drawing: Author with figures from Blouet et al., 2013, p. 164, Figure 67.1; Constantin & Demarez, 1981, p. 213, Figure 2.1; Gomart, 2014, p. 188, Figure 63c; Hauzeur, 2006, p. 646, pl. 192b2; Jadin, 1996, p. 108, Figure 5.2; Modderman, 1981, p. 142, Figure 1.8).

At a regional scale, other decoration patterns exist (Figure 5). In the Maas and Moselle valley, a dotted angled band decoration occurs mainly on mineral and organic-tempered pottery (Brounen & Hauzeur, 2010). Its distribution extends north to Ede-Frankeneng and Gassel, west to Thines, and Aubechies, and south to Sehndorf, and it is relatively often found outside LBK contexts. In Haelen-Broekweg (Bats et al., 2002) and in Brüggen-Bracht (Loewe, 1971), this pottery is connected with late Mesolithic-style artifacts.

Figure 5: Distribution areas of regional decoration patterns. Examples from Gassel and Sehndorf (right) with organic and mineral temper (blue and green), Auchechies (top left) with bone temper (red), and Cuiry-lès-Chaudardes (bottom left) with mineral and bone temper (blue and red). (Drawing: Author with figures from Brounen & de Jong, 1988, p. 185, Figure 3a; Constantin & Demarez, 1981, p. 219, Figure 7; Constantin, 1985, pl. 76 378.1,2; Fritsch, 2000b, p. 232, pl. 1.1).

This Begleitkeramik decoration could represent a Non-LBK society that considers itself explicitly outside the LBK culture.

In the Hainaut and in the western Hesbaye, a specific dotted decoration appears on thin-walled bone-tempered Limburg pottery which also shares technological features with LBK ceramics (Constantin et al., 2010b, p. 17). Van Berg (1990) considered them as group 6 of Rheno-Mosan Limburg pottery. Probably, the La Hoguette sherds of Blicquy Couture du Couvent (Deramaix & Demarez, 1989) should also be included in this category. It seems to be the expression of a community with very intense relationships with the LBK.

In the late LBK of the Paris basin, particularly in Cuiry-lès-Chaudardes and in Juvigny, there is a characteristic perpendicular stroke decoration on mineral- and bone-tempered Non-LBK pottery. van Berg (1990) called it the Sequano-Scaldic branch of Limburg pottery. Its share of Limburg pottery is 15% (Constantin et al., 2010b, p. 18). This decoration pattern may be connected with southern influences (Lichardus-Itten, 1986, p. 156).

Overall, the decoration patterns of Non-LBK potteries are responsive to the social interaction of their producers with each other and the LBK, reflecting the dynamics and diversity of these communities. Although we need a better dating framework, on current evidence the technological parameters reflect the slower exchange of know-how based on shared learning. The two aspects of pottery production, clay preparation, and surface decoration, thus inform us of different dynamics.

5.5 La Hoguette and Limburg

The results of this investigation cast doubt on some long-held and widespread opinions about La Hoguette and Limburg. They fundamentally question the uniformity of La Hoguette over a wide area and a long

period of time. Early La Hoguette pottery consists of a bone-tempered variety with unknown origin and two organic- and mineral-tempered wares which could have developed partly due to contact with the LBK. For the early La Hoguette, there is no evident connection to Cardial, as already stated by Constantin and colleagues (Constantin et al., 2010a). Limburg pottery along the Maas and Moselle and in the Hainaut stands in the direct technological tradition of the various early La Hoguette pottery traditions and is not uniform either. In particular, the Begleitkeramik in the Maas and the Moselle valley with its mineral or organic temper (Brounen & Hauzeur, 2010) is part of the eastern technological traditions and therefore may originate in the sphere of early LBK pottery and not in the bone-tempered Non-LBK of the west.

The mineral-tempered late La Hoguette pottery and Begleitkeramik in Alsace have no technological connection with early bone-tempered La Hoguette pots, either. These wares could be traced back to Epicardial influences. The Limburg pottery of the Paris basin also shows inspirations of Cardial and Epicardial.

6 Conclusion

The integrated approach with its categorization according to technological parameters is a useful tool to identify technological traditions. Applied to the Non-LBK pottery of western Central Europe, one can suggest that this pottery comprises several traditions with different origins, although more work is necessary to pinpoint them precisely. The early eastern wares may have connections with LBK pottery. The southern traditions could transfer influences from the Cardial and Epicardial. Only the bone-tempered western tradition has no relationship with any Neolithic pottery. The technological traditions are not correlated with decoration patterns in a straightforward manner and do not coincide with “La Hoguette” and “Limburg” pottery as traditionally defined.

It is suggested that the producers of these pottery traditions could have been various hunter-gatherer groups, although direct evidence is lacking. Yet, it is clear that for a long time, Non-LBK pottery was produced outside LBK contexts and thus not (or not exclusively) by LBK people. Instead, different groups of producers coexisted, potentially sometimes on the same settlement. The details of these social dynamics are a fascinating field for further inquiry.

The development of pottery production in Central Europe is the result of a complex interaction of Neolithic wares and a second stream comprising various other pottery traditions. This process lasts for several centuries. The producers of Non-LBK pottery with their diversity and dynamics play a vital role throughout. In western Central Europe, pottery is not exclusively linked to the expansion of a few large-scale Neolithic cultures but is to a great extent influenced by other groups.

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Appendix

1.1. Sites with La Hoguette Pottery

The first column is the site name, the second column is the association with LBK or VSG, the third column gives the number of the site used in the distribution maps, and the last column specifies the temper (b = bone, min = mineral, q = quartz, sa = sand, ca = calcite, o = organic, g = grog, fs = fossil shell, sil = silex, hem = hematite, ch = charcoal, oM = without intentional temper, nv = not visible).

Fontenay-Le-Marmion, La Hoguette, Calvados, F (8)	—	1	b + sa
Fontenay-Le-Marmion, Le Grande Champ, Calvados, F	—	2	No info
Alizay, Le Postel, Eure, F	—	3	b
Machecoul-Guibrelou I, Loire-Atlantique, F	—	4	b + q
Mésanger, Loire-Atlantique, F	—	5	No info
Orconte-Les Noues, Marne, F	LBK	194	fs
Ede, Frankeneng, Gueldre, NL (3)	—	72	sa + g, o + g
Ittervoort, Damszand, Limburg, NL	—	57	o
Wickrath, Fundplatz 105, Mönchen-Gladbach (NW)	LBK	75	No info
Geleen-Nijssenstraat, Limburg, NL (4)	LBK	46	b + g
Sweikhuizen, De Hei, Limburg, NL (5)	—	52	b, sa + g
Langweiler 8, Düren (NW) (6)	LBK	79	q + sa + g
Liege-Saint-Lambert, B	LBK	37	o
Mons-Crotteux, Liège, B	?	36	No info
Blicquy, Couture du Couvent, Hainaut, B (7)	LBK	18	b
Hiddenhausen-Bermbek, Herford (NW) (1)	—	84	sa
Bad Sassendorf, Auf der Breite, Soest (NW)	LBK	86	No info
Soest-Burgtheaterparkplatz, Soest (NW)	—	85	o + sa
Anröchte, Soest (NW) (2)	—	87	q
Gambach, Altstädter Rossfeld (HE)	LBK	90	b + sa, o
Steinfurth-Auf der Mauer, Bad Nauheim (HE)(9)	LBK	91	q + g
Bruchenbrücken, Friedberg (HE)(10)	LBK	93	b + sa(g), b + o + sa(g), o + sa(g)
Nackenheim-Lehrbrünnchen, Mainz-Bingen (RP)(13)	LBK	96	sa, ca + sa + g, sa + o?
Goddelau, Riedstadt, Groß-Gerau (HE) (12)	LBK	95	o + sa
Dautenheim-Unterm Leckmantel, Alzey (RP) (14)	—	97	b + o + q, b + q + o + g
Speyer, Brunckstraße (RP)	?	99	No info
Herxheim, Südliche Weinstraße (RP) (17)	LBK	100	b
Banz-Zilgendorf, Lichtenfels (BY) (11)	LBK	101	o + sa
Nördlingen-Steinerner Mann, Donau-Ries (BY) (25)	LBK	102	o + sa
Wallmersbach, Uffenheim, Neustadt, a.d. Aisch (BY)	LBK	104	sa + sil
Estenfeld-Mühlhausen, Würzburg (BY)	LBK	103	o
Schwarzenbach, St. Wendel (SL)	?	204	No info
Mamer-Juckelsboesch, L	—	163	No info
Weiler-la-Tour, Mechel, L (15)	—	165	b + q
Altewies, Op dem Boesch, L	LBK	169	b + o + q

Puttelange-lès-Thionville, Himeling, Moselle, F (16)	—	168	q, q + g
Sehndorf-Vor dem Büsch, Merzig-Wadern (SL)	—	172	b + q + sa, b + o + sa, q + sa + g
Mannheim-Vogelsang, -Wallstadt und -Seckenheim (BW)	LBK	106	No info
Leingarten-Großgartach-Kappmannsgrund (BW)(18)	LBK	105	q + (b or ca)
Bad Friedrichshall-Kochendorf- Butzäcker (BW)	LBK	107	q
Freiberg-Heutingsheim-Incher (BW) (19)	LBK	108	ca
Enzweihingen, Vaihingen a.d.Enz (BW)	—	111	b + sil + g
Korntal-Münchingen-Heupfad (BW) (20)	LBK	113	q + g, b + q
Ditzingen-Zechlesmühle- und Stütze, Leonberg (BW)	LBK	114	b, b + g
Gerlingen-Rossbaum, Ludwigsburg (BW) (21)	LBK	115	b
Stuttgart-Weilimdorf-Grubenäcker (BW) (24)	LBK	116	b + ca, b + q + g
Stuttgart-Mühlhausen-Viesenhäuser Hof (BW) 23)	LBK	117	b
Bad Cannstatt-Wilhelma (BW) (22)	—	118	b
Baden-Baden-Oos (BW)	—	109	No info
Filderstadt-Bernhausen-Stegäcker (BW)(26)	LBK	119	b
Rottenburg-Fröbelweg, Tübingen (BW) (27)	LBK	120	b(57%), b + q(27%), q(13%), b + g(1%), q + g(1%), hem(1%)
Hailfingen-Tübinger Weg (BW) (28)	LBK	121	b, b + q, ca, b + ca, b + g, q, q + g, g
Herrenberg-Gültstein-Kampfhans, Tübingen (BW)	LBK	112	No info
Ammerbuch-Pfäffingen-Lüsse, Tübingen (BW) (29)	LBK	122	b, b + q
Ammerbuch-Reusten-Stützbrunnen (BW) (30)	LBK	123	b, b + q, q
Griesen-Mauäcker, Klettgau (BW)	LBK	110	No info
Goldacker, Gächlingen, CH (32)	LBK	143	sa, q
Singen, Torkelweg (BW) (33)	LBK	144	b
Liestal-Hurlistraße, CH	—	145	No info
Ittenheim, Kocherberg, Bas-Rhin, F	LBK	124	q, b + q
Niedernai, Foegel, Bas-Rhin, F (34)	LBK	128	q, q + g + ca
Bischoffsheim, Le Village, Bas-Rhin, F (35)	LBK	129	b, b + ca + g, q, fs
Rosheim, Gachot, Bas-Rhin, F (36)	LBK	131	q, nv
Rosheim, Mittelfeld, Bas-Rhin, F (37)	LBK	132	q
Rosheim-St. Odile, Bas-Rhin, F (38)	LBK	133	fs
Colmar, Rufacher Huben, Haut-Rhin, F (39)	LBK	137	q
Wettolsheim, Ricoh, Haut-Rhin, F (40)	LBK	138	No info
Merxheim, Zapfenloch, Haut-Rhin, F (41)	LBK	139	min
Ensisheim, Ratfeld, Haut-Rhin, F (42)	LBK	140	q, sa
Ensisheim, Les Octrois, Haut-Rhin, F (43)	LBK	141	No info
Sierentz, Sandgrube, Haut-Rhin, F (44)	LBK	142	No info
Oberlarg, Mannlefelsen I, Haut-Rhin, F (45)	—	146	b
Bavans, abri sud/sud-ouest, Doubs, F (46)	—	147	q, ca, fs
Quitteur, Quitteur, Haute-Saone, F (47)	?	148	No info
Choisey, les Champins, Jura, F	—	149	b + q

Bretonvilliers, Abri de Gigot I, Doubs, F (48)	—	150	No info
Le Locle, Col des Roches, Neuchatel, CH (49)	—	151	No info
Baulmes, Abri de la Cure, Vaud, CH (50)	—	152	No info
Neuville, Abri du Roseau, Ain, F (51)	—	154	b or ca

The number in brackets behind the site name is the number assigned in the map of Manen and Mazurié de Keroualin (2003, p. 118). The site Inzigkofen-Vilsingen-Burghöhle Dietfurt (BW)(31) was omitted because of doubts about its existence (Cziesla, 2015, p. 188).

1.2. Sites with Limburg Pottery

The first column is the site name, the second column is the association with LBK or VSG, the third column gives the number of the site used in the distribution maps, and the last column specifies the temper (b = bone, min = mineral, q = quartz, sa = sand, ca = calcite, o = organic, g = grog, fs = fossil shell, sil = silex, hem = hematite, ch = charcoal, oM = without intentional temper, nv = not visible).

Gassel Over de Voort, NL (2)	—	71	g + sa
Veen-Kaninenberg, NL (3)	LBK	74	No info
Xanten, NW (4)	—	73	b + q + g, o + q + g, o + b + q + g
Kesseleyk-Keuperheide, NL (6)	—	68	o, b + sa
Neer-Boshei, NL (7)	—	58	g
Haelen-Helenberg, NL (8)	?	67	No info
Horn-Lateraalkanaal, NL (9)	—	59	g
Melick-Herkenbosch-Vogelkooi, NL (10)	—	62	b + g
Sint Odilienberg-Zwarteberg, NL (11)	—	60	b + g
Echt-Annendaal, NL (17)	—	63	b + g + o, sa + g
Bochum-Hiltrop, NW (1)	LBK	76	b
Köln-Lindenthal, NW (12)	LBK	83	b, o
Köln-Worringen, NW (13)	LBK	82	b
Langweiler 2, NW	LBK	77	No info
Langweiler 5–10,12, NW (14)	LBK	80	b
Langweiler 8, NW (15)	LBK	79	ca
Königshoven 1, NW	LBK	81	b
Kückhofen, NW	LBK	94	No info
Wölfersheim-Geisenheim, HE	LBK	89	b
Ober-Widdersheim, HE	LBK	88	b
Geleen-de Kluis, NL (25)	LBK	49	sa
Geleen- Janskampveld, NL	LBK	50	b(5%), o(10%), oM(17,5%), sa(40%), g(15%), clay(10%), indet (2,5%)
Geleen-Urmonderbaan, NL	LBK	39	o + b
Geleen-Haesselderveld, NL (26)	LBK	47	b + g, g, sa + g
Geleen-Station oder-Bergstraat, NL (27)	LBK	48	b + g, b + g + ch
Beek-Kerkeveld, NL (28)	LBK	51	sa
Elsloo-Koolweg, NL (29)	LBK	43	b, b + g, g
Stein-Heideveldweg, NL(30)	LBK	44	b, b + g

Stein-Keerenderkerkweg, NL (31)	LBK	45	b, b + g, b + g + sa
Maastricht-Klinkers, NL	LBK	42	b + sa + g, b + o + sa + g, b + o + sa, o + sa + g, o + g, ch + sa + g, oM, sa + g, g
Rosmeer-Staberg, B (18)	LBK	38	b(3%), b + g(20%), b + hem(18%), g(18%), g + hem(15%), hem(3%), b + g + hem(9%), oM(6%), indet(9%)
Vlijtingen-Kayberg, B (19)	LBK	41	b + q + g, b + g
Bassenge, B (20)	LBK	31	No info
Caberg-Belvédère, NL (24)	LBK	40	b + g, g + q
Liege-Saint Lambert, B (37)	LBK	37	g(55%), b(14%), b + g, fs(9%), q(22%)
Fexhe-le-Haut-Clocher, B	LBK	32	b, b + g, ch + g + q
Oleye-Al Zèpe, B (32)	LBK	28	b
Darion-Colia, B (33)	LBK	27	b + g + sa, b + sa, q
Omal-Vicinal-Les Tombes, B (34)	LBK	30	No info
Waremmes-Longchamps, B (35)	LBK	26	b, b + g
Berloz, B (36)	LBK	25	g(b + o) ¹
Horion-Hozémont-Noir Fontaine, B (38)	LBK	29	q
Overhespen-Sint Annaveeld, B (22)	LBK	24	b + o + g
Wange-Damekot, B (23)	LBK	23	b
Thines-Vieille Cour, B (39)	—	21	min
Saint-Denis, B (40)	?	20	No info
Ath-Les Haleurs, B	LBK	220	No info
Ormeignies-le Pilori, B	LBK	19	b
Ormeignies-Bois de la Bonne Fortune, B	LBK	221	b
Ormeignies-la Petite Rosière, B	LBK	222	b
Aubéchies-Coron Maton, B (41)	LBK	17	b(85%), b + g(5%), oM(10%)
Maring-Noviant Siebenborn, RP (65)	LBK	155	o + q, b(1)
Bitburg-Prüm-Peffingen, RP (63)	—	157	o
Trier-Euren Schloss Monaise, RP	LBK	156	o
Homburg-Kirberg, SL	—	183	No info
Diekirch-Dechensgaart, L (62)	LBK	159	o
Hesperange-Teschebuchels, L (67)	—	164	o + b
Medernach Reineschaff, L	—	161	o
Weiler-la-Tour Holzdréisch, L	LBK	166	o
Altewies Op dem Boesch, L	LBK	169	o
Remerschen Schengerwies, L	LBK	170	o
Remerschen Raederbiert, L	—	171	q
Sehndorf-Hinter'm Dellchen, SL	—	172	q + sa + o
Malling-derrière le Village, Moselle	LBK	175	Indet

¹ In Constantin and Haec (1979) the temper is grog, in the Leiden workshop (2007) the temper is described as bone and organic plant. So that might be the property of the grog.

Malling-Schlammlengt, Moselle	LBK	176	ca
Koenigsmacker-Le Village, Moselle	LBK	177	Indet
Oudrenne Breistroff, Moselle	LBK	178	q
Cattenom-Acheren, Moselle	LBK	179	Indet
Florange-Daspiche, Moselle	LBK	180	ca?
Rurange-lès-Thionville-sur Bruche, Guénange, Moselle	LBK	181	No info
Vitry-sur-Orne-ZAC de la Plaine, Moselle	LBK	182	q + ca, fs, ca
Trémery-Zones 3–4–36, Moselle	LBK	185	ca
Ay-sur-Moselle-La Tournaille, Moselle	LBK	186	q, fs, q + fs, ca, b + q
Ay-sur-Moselle-Les Velers Jacques, Moselle	LBK	187	oM
Ennery RD52C, Moselle	LBK	188	No info
La Maxe-Station d'épuration, Moselle	LBK	189	ca?
Metz-Nord Ban-de-Devant les Ponts, Moselle (69)	LBK	190	Indet
Farébersville, Moselle	—	192	Indet
Filstroff-Avensberg, Moselle (68)	LBK	191	ca + q
Rosheim, Gachot Bas-Rhin (70)	LBK	131	q
Rosheim, Mittelfeld, Bas-Rhin	LBK	132	q + (ca or b)
Rosheim, Lotissement, Saint-Odile, Bas-Rhin	LBK	133	q + g
Schwindratzheim-Les Terrasses de la Zorn, Bas-Rhin	LBK	125	No info
Bischoffsheim-Afua du Stade, Bas-Rhin	LBK	130	No info
Rosheim-Rittergass, Bas-Rhin	LBK	134	q
Entzheim-Les Terres de la Chapelle, Bas-Rhin	LBK	135	No info
Mittelhausen-Kellen, Bas-Rhin	LBK	136	No info
Wettolsheim, Ricoh, Haut- Rhin (71)	LBK	138	No info
Colombelles-le-Lazzaro, Calvados	LBK	210	o + g
Démouville, Calvados	LBK	211	No info
Moult-Le Relais de Poste, Calvados	LBK	212	min
Longpre-les-Corps-Saints, Somme (42)	?	7	b
Bucy-le-Long-la Fosselle, Aisne	LBK	8	No info
Bucy-le-Long-la Fosse Tounise/ la Héronnière, Aisne	LBK	9	No info
Presles-et-Boves-les Bois Plantés, Aisne	LBK	10	b, fs
Chassemy-les Grand Horles, Aisne (55)	LBK	6	No info

Cuiry-lès-Chaudardes-les Fontinettes, Aisne (56)	LBK	14	b
Pontavert-Le Marteau, Aisne (57)	—	13	b
Berry-au-Bac-La Renardière, Aisne (58)	—	11	b
Berry-au-Bac-le Chemin de la Pecherie, Aisne (59)	LBK	201	b
Berry-au-Bac-le Vieux Tordoir, Aisne	LBK	202	b
Berry-au-Bac-la Croix Maigret, Aisne	LBK	12	b, b + q
Menneville-Derrière-le-Village, Aisne (61)	LBK	16	No info
Pont-Sainte-Maxence, Oise	LBK	219	No info
Chambly le Clos de la Riviere, Oise	LBK	218	b
Balloy, les Réaudins, Saint-et- Marne	LBK	213	q + b, q, b
Barbey, le Buisson Rond, Seine-et- Marne	LBK	214	q
Aufferville, Seine-et-Marne (49)	—	199	No info
Juigny-les Grands Traquières, Marne (60)	LBK	15	b + fs, fs + q + ca
Villeneuve-Saint-Georges, Val-de- Marne (48)	—	200	No info
Sours-les Ouches, Eure-et-Loir	VSG	217	min
Marcilly-en-Beauce, Loir-et- Cher (45)	LBK	203	fs
Gumery-les-Hauts de Trainel, Aube (51)	LBK	197	min
Saint-Léger-près-Troyes, Aube (53)	—	195	b?
Bréviandes, Aube	LBK	193	No info
Villeneuve-La-Guyard, Yonne (50)	VSG	198	q
Étigny, le Brassot Est, Yonne	LBK	215	q + b, q + b + fs, q + fs
Passy, les Graviers, Yonne	LBK	216	q
Champlay-les Carpes, Yonne (52)	LBK	196	min

The number in brackets behind the name of the site is the number assigned in the map of Manen and Mazurié de Keroualin (2003, p. 121). The sites Kessel-Sjoppennaas, NL (5), Laurenzberg, NW, D (16), Crisnée-La Mai, B (21), Medernach-Savelborn-Baachbiere, L (64), Alzingen-Grossfeld, L (66), and Grotte du Gardon, Amberieux-en-Bugey, Ain, F (72) are listed in the BK list (1.3). The sites Blangy-sur-Bresle, Seine-Maritime (43), Breuilpont, Eure (44), Corneilles-en-Parisis, Val-d'Oise (46), Champigny-sur-Marne, Val-de-Marne (47), and Cys-la-Commune-les Longues Raies, Aisne (54) are considered VSG sites.

1.3. Sites with Begleitkeramik

The first column is the site name, the second column is the association with LBK or VSG, the third column gives the number of the site used in the distribution maps, and the last column specifies the temper (b = bone, min = mineral, q = quartz, sa = sand, ca = calcite, o = organic, g = grog, fs = fossil shell, sil = silex, hem = hematite, ch = charcoal, oM = without intentional temper, nv = not visible, not attr = temper cannot attributed to the BK sherd).

Ede, Frankeneng, Gueldre (NL) (3)	—	72	sa
Gassel-Over de Voort, NL (2)	—	71	g + sa
Venlo-Ossenberg, NL	—	70	sa
Kessel-Sjoppenaas, NL (5)	—	69	No info
Brüggen-Bracht 8/West, Viersen (NW) D	—	65	No info
Haelen-Broekweg, NL	—	66	o + g
Sint Odilienberg-Mortelshof, NL	—	61	o + sa
Posterholt-Voorsterveld, NL	—	64	sa + b?
Ittervoort, Damszand, Limburg (NL)	—	57	g
Sweikhuizen, De Hei, Limburg (NL)	—	52	b + o + sa
Stein-Heideveldweg, NL (30)	LBK	44	b
Maastricht-Klinkers, NL	LBK	42	sa + b
Rosmeer-Staberg, B (18)	LBK	38	g, oM
Langweiler 3, Düren (NW)	LBK	78	No info
Langweiler 8, Düren (NW) (15)	LBK	79	ca
Laurenzberg, D (16)	LBK	98	No info
Köln-Lindenthal (10)	LBK	83	Not att
Liege-Saint-Lambert, B (37)	LBK	37	Not att
Crisnée-La Mai, B (21)	LBK	34	g
Oleye-al Zépe, B (32)	LBK	28	Not att
Verlaine-Jointy, B	LBK	33	oM
Thines-Vieille Cour, B (39)	—	21	min
Trou Al'Wesse, Modave, Liège (B)	LBK	35	q + fs
Aubéchies-Coron Maton, B (41)	LBK	17	oM, b + o
Bréviandes, Aube, F	LBK	193	No info
Maring-Noviant-Siebenborn (RP) (65)	LBK	155	o + q
Medernach-Savelborn-Baachbiere, L (64)	—	160	q
Hersberg-Auf den Leien, L	—	158	g + q
Mersch-Haard, L	—	162	o
Mamer-Juckelsboesch, L	—	163	o
Alzingen-Grossfeld, L (66)	LBK	167	o
Altwies, Op dem Boesch, Luxemburg	LBK	169	q
Sehndorf-Vor dem Büsch, Hinter'm Dellchen (SL)	—	172	q + sa + o, q + sa + g
Montenach-Kirschgasse, F	LBK	173	oM
Kirschnaumen-Évendorf- Dolem, F	LBK	174	oM
Thionville-Elange, F	LBK	184	b + ca
Ay-sur-Moselle-La Tournaille, F	LBK	186	q
Nieder-Mörlen-Auf dem Hempler, Bad Nauheim (HE)	LBK	92	min
Bischoffsheim, Le Village, Bas-Rhin (35)	LBK	129	q, q + g
Wettolsheim, Ricoh, Haut-Rhin (40) (71)	LBK	138	No info
Merxheim, Zapfenloch, Haut-Rhin (41)	LBK	139	min

Bavans, abri sud/sud-ouest, Doubs (46)	—	147	q, ca,
Grotte du Gardon, Amberieux-en-Bugey, Ain, F (72)	—	153	q

The number in brackets behind the name of the site is the number assigned in the map of Manen and Mazurié de Keroualin (2003, p. 121).

1.4. Sites with Not Attributed Non-LBK Potteries

The first column is the site name, the second column is the association with LBK or Swifterbant (Sw), the third column gives the number of the site used in the distribution maps, and the last column specifies the temper (b = bone, min = mineral, q = quartz, sa = sand, ca = calcite, o = organic, g = grog, fs = fossil shell, sil = silex, hem = hematite, ch = charcoal, oM = without intentional temper, nv = not visible).

1.4.1. Pottery with Fossil Shell Temper

Bavans, abri sud/sud-ouest, Doubs, F	—	147	fs
Onnens-Praz Berthoud, Jura-Nord (CH)	—	126	fs
Bart, Abri Supérieur de Châtaillon, Doubs, F	—	209	fs
Lutter, Abri-sous-roche Saint-Joseph, couche 5 (CH)	—	127	fs
Grotte du Gardon, Amberieux-en-Bugey, Rhone, F	—	153	fs
Ittenheim, Am Alten Weg, Bas-Rhin, F	LBK	205	fs
Mundolsheim, Bas-Rhin, F	LBK	208	fs
Stützheim, Bas-Rhin, F	LBK	207	fs
Romanswiller, Bas-Rhin, F	LBK	206	ca, fs, g

1.4.2. Scheldt and Maas Wetland Sites

Kerkhove, B	—	224	b, q + hem + o
Oudenaarde–Donk (meso1), B	—	228	g
Hardinxveld-Polderweg, NL	Sw	230	b
Doel Deurganckdok-sector B, B	—	229	g + o, g, o, sil, q
Schellebelle–Aard, B	—	225	sil, b
Wijmers 2, Wichelen, B	—	226	b, oM, g, q + sil, o, q + o + g
Kalken–Molenmeers, B	—	227	b
Melsele–Hof ten Damme, B	—	223	b + g + q, o + g, sil + g, sa + g
Bazel-Kruibeke, B	—	22	b, b + o, b + g, o, g, o + g, q, q + g, q + o
Dilsen Dilserheide III, B	—	53	o + q + g
Brecht Thomas Heyveld, B	—	56	o + q
Weelde Voorheide 3, B	—	55	o, ch, b + o + sa, q
Weelde Paardsdrank, B	—	54	o + q + g

2.1. Sites with Bone-Tempered Non-LBK

The first column is the site name, the second column is the attribution in literature (LH, Lim, BK, others), the third column is the association with LBK or VSG, the fourth column gives the number of the site used in the distribution maps, and the last column specifies the temper (b = bone, min = mineral, q = quartz, sa = sand, ca = calcite, o = organic, g = grog, fs = fossil shell, hem = hematite, ch = charcoal)

Fontenay-Le-Marmion, La Hoguette, Calvados, F	LH	—	1	b + sa
Alizay, Le Postel, Eure, F	LH	—	3	b
Machecoul-Guibrelou I, Loire-Atlantique, F	LH	—	4	b + q
Longpre-les-Corps-Saints, Somme, F	Lim	?	7	b
Cuiry-lès-Chaudardes-les Fontinettes, Aisne, F	Lim	LBK	14	b
Pontavert-Le Marteau, Aisne, F	Lim	—	13	b
Berry-au-Bac-La Renardière, Aisne, F	Lim	—	11	b
Berry-au-Bac-le Chemin de la Pecherie, Aisne, F	Lim	LBK	201	b
Presles-et-Boves-les Bois Plantés, Aisne, F	Lim	LBK	10	b
Berry-au-Bac-le Vieux Tordoir, Aisne, F	Lim	LBK	202	b
Berry-au-Bac-la Croix Maigret, Aisne, F	Lim	LBK	12	b, b + q
Chambly le Clos de la Riviere, Oise, F	Lim	LBK	218	b
Juvigny-les Grands Traquières, Marne, F	Lim	LBK	15	b + fs
Balloy, les Réaudins, Saint-et-Marne, F	Lim	LBK	213	q + b, b
Étigny, le Brassot Est, Yonne, F	Lim	LBK	215	q + b, q + b + fs
Ormeignies-le Pilon, B	Lim	LBK	19	b
Ormeignies-Bois de la Bonne Fortune, B	Lim	LBK	221	b
Ormeignies-la Petite Rosière, B	Lim	LBK	222	b
Aubéchies-Coron Maton, B	Lim	LBK	17	b(85%), b + g(5%),
Aubéchies-Coron Maton, B	BK	LBK	17	b + o
Blicquy, Couture du Couvent, Hainaut, B	LH	LBK	18	b
Kerkhove, B	oth	—	224	b
Hardinxveld-Polderweg, NL	oth	Sw	230	b
Schellebelle–Aard, B	oth	—	225	b
Wijmers 2, Wichelen, B	oth	—	226	b
Kalken–Molenmeers, B	oth	—	227	b
Melsele–Hof ten Damme, B	oth	—	223	b + g + q
Bazel-Kruikebeke, B	oth	—	22	b, b + o, b + g
Weelde Voorheide 3, B	oth	—	55	b + o + sa
Fexhe-le-Haut-Clocher, B	Lim	LBK	32	b, b + g
Oleye-Al Zèpe, B	Lim	LBK	28	b
Darion-Colia, B	Lim	LBK	27	b + g + sa, b + sa
Waremmes-Longchamps, B	Lim	LBK	26	b, b + g
Overhespen-Sint Annaveeld, B	Lim	LBK	24	b + o + g
Wange-Damekot, B	Lim	LBK	23	b
Rosmeer-Staberg, B	Lim	LBK	38	b(3%), b + g(20%), b + hem(18%), b + g + hem(9%)
Vlijtingen-Kayberg, B	Lim	LBK	41	b + q + g, b + q
Caberg-Belvédère, NL	Lim	LBK	40	b + g
Liege-Saint Lambert, B	Lim	LBK	37	b(14%), b + g

Maastricht-Klinkers, NL	Lim	LBK	42	b + sa + g, b + o + sa + g, b + o + a
Maastricht-Klinkers, NL	BK	LBK	42	sa + b
Sweikhuizen, De Hei, Limburg, NL	LH	—	52	b
Sweikhuizen, De Hei, Limburg, NL	BK	—	52	b + o + sa
Geleen-Nijssenstraat, Limburg, NL	LH	LBK	46	b + g
Geleen- Janskamperveld, NL	Lim	LBK	50	b(5%)
Geleen-Urmonderbaan, NL	Lim	LBK	39	o + b
Geleen-Haesselderveld, NL	Lim	LBK	47	b + g
Geleen-Station oder -Bergstraat, NL	Lim	LBK	48	b + g, b + g + ch
Elsloo-Koolweg, NL	Lim	LBK	43	b, b + g
Stein-Heideveldweg, NL	Lim	LBK	44	b, b + g
Stein-Heideveldweg, NL	BK	LBK	44	b
Stein-Keerenderkerkweg, NL	Lim	LBK	45	b, b + g, b + g + sa
Kesseleyk-Keuperheide, NL	Lim	—	68	b + sa
Melick-Herkenbosch-Vogelkooi, NL	Lim	—	62	b + g
Sint Odilienberg-Zwarteberg, NL	Lim	—	60	b + g
Echt-Annendaal, NL	Lim	—	63	b + g + o
Xanten (NW)	Lim	—	73	b + q + g, o + b + q + g
Bochum-Hiltrop (NW)	Lim	LBK	76	b
Köln-Lindenthal (NW)	Lim	LBK	83	b
Köln-Worringen (NW)	Lim	LBK	82	b
Langweiler 5-10,12 (NW)	Lim	LBK	80	b
Königshoven 1 (NW)	Lim	LBK	81	b
Wölfersheim-Geisenheim (HE)	Lim	LBK	89	b
Ober-Widdersheim (HE)	Lim	LBK	88	b
Gambach, Altstädter Rossfeld (HE)	LH	LBK	90	b + sa
Bruchenbrücken, Friedberg (HE)	LH	LBK	93	b + sa(g), b + o + sa(g)
Dautenheim-Unterm Leckmantel, Alzey (RP)	LH	—	97	b + o + q, b + q + o + g
Herxheim, Südliche Weinstraße (RP)	LH	LBK	100	b
Enzweihingen, Vaihingen a.d.Enz (BW)	LH	—	111	b + sil + g
Korntal-Münchingen-Heupfad (BW)	LH	LBK	113	b + q
Ditzingen-Zechlesmühle- und Stütze, Leonberg (BW)	LH	LBK	114	b, b + g
Gerlingen-Rossbaum, Ludwigsburg (BW)	LH	LBK	115	b
Stuttgart-Weilimdorf-Grubenäcker (BW)	LH	LBK	116	b + ca, b + q + g
Stuttgart-Mühlhausen-Viesenhäuser Hof (BW)	LH	LBK	117	b
Stuttgart-Bad Cannstatt-Wilhelma (BW)	LH	—	118	b
Filderstadt-Bernhausen-Stegäcker (BW)	LH	LBK	119	b
Rottenburg-Fröbelweg, Tübingen (BW)	LH	LBK	120	b(57%), b + q(27%), b + g(1%)
Rottenburg-Hailfingen-Tübinger Weg (BW)	LH	LBK	121	b, b + q, b + ca, b + g
Ammerbuch-Pfäffingen-Lüsse, Tübingen (BW)	LH	LBK	122	b, b + q
Ammerbuch-Reusten-Stützbrunnen (BW)	LH	LBK	123	b, b + q
Singen, Torkelweg (BW)	LH	LBK	144	b
Maring-Novianand Siebenborn (RP)	Lim	LBK	155	b
Weiler-la-Tour, Mechel, L	LH	—	165	b + q
Altwies, Op dem Boesch, L	LH	LBK	169	b + o + q
Sehndorf-Vor dem Büsch, Merzig-Wadern (SL)	LH	—	172	b + q + sa, b + o + sa

Hesperange-Teschebuchels, L	Lim	—	164	o + b
Thionville-Elange, Moselle, F	BK	LBK	184	b + ca
Ay-sur-Moselle-La Tournaille, Moselle, F	Lim	LBK	186	b + q
Ittenheim, Kocherberg, Bas-Rhin, F	LH	LBK	124	b + q
Bischoffsheim, Le Village, Bas-Rhin, F	LH	LBK	129	b, b + ca + g
Oberlarg, Mannlefelsen I, Haut-Rhin, F	LH	—	146	b
Choisey, les Champins, Jura, F	LH	—	149	b + q

2.2. Sites with Organic-Tempered Non-LBK

The first column is the site name, the second column is the attribution in literature (LH, Lim, BK, others), the third column is the association with LBK or VSG, the fourth column gives the number of the site used in the distribution maps, and the last column specifies the temper (b = bone, min = mineral, q = quartz, sa = sand, ca = calcite, o = organic, g = grog, fs = fossil shell, hem = hematite, ch = charcoal, oM = without intentional temper)

Banz-Zilgendorf, Lichtenfels (BY)	LH	LBK	101	o + sa
Nördlingen-Steinerner Mann, Donau-Ries (BY)	LH	LBK	102	o + sa
Estenfeld-Mühlhausen, Würzburg (BY)	LH	LBK	103	o
Gambach, Altstädter Rossfeld (HE)	LH	LBK	90	o
Bruchenbrücken, Friedberg (HE)	LH	LBK	93	b + o + sa(g), o + sa(g)
Goddelau, Riedstadt, Groß-Gerau (HE)	LH	LBK	95	o + sa
Dautenheim-Unterm Leckmantel, Alzey (RP)	LH	—	97	b + o + q, b + q + o + g
Maring-Noviant Siebenborn (RP)	Lim	LBK	155	o + q
Maring-Noviant-Siebenborn (RP)	BK	LBK	155	o + q
Bitburg-Prüm-Peffingen (RP)	Lim	—	157	o
Trier-Euren Schloss Monaise (RP)	Lim	LBK	156	o
Mersch-Haard, L	BK	—	162	o
Mamer-Juckelsboesch, L	BK	—	163	o
Diekirch-Dechengaart, L	Lim	LBK	159	o
Hesperange-Teschebuchels, L	Lim	—	164	o + b
Medernach Reineschhaff, L	Lim	—	161	o
Weiler-la-Tour Holzdréisch, L	Lim	LBK	166	o
Altwies, Op dem Boesch, L	LH	LBK	169	b + o + q
Altwies Op dem Boesch, L	Lim	LBK	169	o
Remerschen Schengerwies, L	Lim	LBK	170	o
Alzingen-Grossfeld, L	BK	LBK	167	o
Sehndorf-Vor dem Büsch, Hinter'm Dellchen (SL)	BK	—	172	q + sa + o
Sehndorf-Vor dem Büsch, Merzig-Wadern (SL)	LH	—	172	b + o + sa
Sehndorf-Hinter'm Dellchen (SL)	Lim	—	172	q + sa + o
Soest-Burgtheaterparkplatz, Soest (NW)	LH	—	85	o + sa
Köln-Lindenthal (NW)	Lim	LBK	83	o
Xanten (NW)	Lim	—	73	o + q + g, o + b + q + g
Ede-Frankeneng, Gueldre, NL	LH	—	72	o + g

Kesseleyk-Keuperheide, NL	Lim	—	68	o
Echt-Annendaal, NL	Lim	—	63	b + g + o
Haelen-Broekweg, NL	BK	—	66	o + g
Sint Odilienberg-Mortelshof, NL	BK	—	61	o + sa
Ittervoort, Damszand, Limburg, NL	LH	—	57	o
Sweikhuizen, De Hei, Limburg (NL)	BK	—	52	b + o + sa
Geleen- Janskamperveld, NL	Lim	LBK	50	o(10%)
Geleen-Urmonderbaan, NL	Lim	LBK	39	o + b
Maastricht-Klinkers, NL	Lim	LBK	42	b + o + sa + g, b + o + sa, o + sa + g, o + g
Lüttich, Saint-Lambert, B	LH	LBK	37	o
Overhespen-Sint Annenveld, B	Lim	LBK	24	b + o + g
Dilsen Dilserheide III, B	oth	—	53	o + q + s
Brecht Thomas Heyveld, B	oth	—	56	o + q
Weelde Voorheide 3, B	oth	—	55	o, b + o + sa
Weelde Paardsdrank, B	oth	—	54	o + q + g
Doel Deurganckdok-sector B, B	oth	—	229	g + o
Wijmers 2, Wichelen, B	oth	—	226	o, q + o + g
Melsele-Hof ten Damme, B	oth	—	223	o + q
Bazel-Kruikebe, B	oth	—	22	b + o, o, o + g, q + o
Kerkhove, B	oth	—	224	q + hem + o
Aubéchies-Coron Maton, B	BK	LBK	17	b + o
Colombelles-le-Lazzaro, Calvados, F	Lim	LBK	210	o + g

2.3. Sites with Mineral-Tempered Non-LBK

The first column is the site name, the second column is the attribution in literature (LH, Lim, BK, others), the third column is the association with LBK or VSG, the fourth column gives the number of the site used in the distribution maps, and the last column specifies the temper (b = bone, min = mineral, q = quartz, sa = sand, ca = calcite, o = organic, g = grog, fs = fossil shell, hem = hematite, ch = charcoal, oM = without intentional temper)

Hiddenhausen-Bermbek, Herford (NW)	LH	—	84	sa
Anröchte, Soest (NW)	LH	—	87	q
Ede-Frankeneng, Gueldre, NL	LH	—	72	sa + g
Ede-Frankeneng, Gueldre, NL	BK	—	72	sa
Gassel Over de Voort, NL	Lim	—	71	g + sa
Gassel-Over de Voort, NL	BK	—	71	g + sa
Venlo-Ossenberg, NL	BK	—	70	sa
Posterholt-Voorsterveld, NL	BK	—	64	sa + b?
Ittervoort, Damszand, Limburg, NL	BK	—	57	g
Neer-Boshei, NL	Lim	—	58	g
Horn-Lateraalkanaal, NL	Lim	—	59	g
Echt-Annendaal, NL	Lim	—	63	sa + g
Langweiler, Fundplatz 8, Düren (NW)	LH	LBK	79	q + sa + g
Langweiler 8, NW	Lim	LBK	79	ca
Geleen-de Kluis, NL	Lim	LBK	49	sa
Geleen-Janskamperveld, NL	Lim	LBK	50	oM(17,5%), sa(40%), g(15%), clay(10%)
Geleen-Haesselderveld, NL	Lim	LBK	47	g, sa + g

Beek-Kerkeveld, NL	Lim	LBK	51	sa
Elsloo-Koolweg, NL	Lim	LBK	43	g
Maastricht-Klinkers, NL	Lim	LBK	42	g, oM, sa + g, ch + sa + g
Rosmeer-Staberg, B	Lim	LBK	38	g(18%), g + hem(15%), hem(3%), oM(6%)
Rosmeer-Staberg, B	BK	LBK	38	g, oM
Caberg-Belvédère, NL	Lim	LBK	40	g + q
Liege-Saint Lambert, B	Lim	LBK	37	g(55%), fs(9%), q(22%)
Trou Al'Wesse, Modave, Liège, B	BK	LBK	35	q + fs
Fexhe-le-Haut-Clocher, B	Lim	LBK	32	ch + g + q
Darion-Colia, B	Lim	LBK	27	q
Berloz, B	Lim	LBK	25	g(b + o)
Horion-Hozémont-Noir Fontaine, B	Lim	LBK	29	q
Crisnée-La Mai, B	BK	LBK	34	g
Verlaine-Jointy, B	BK	LBK	33	oM
Thines-Vieille Cour, B	Lim	—	21	min
Thines-Vieille Cour, B	BK	—	21	min
Oudenaarde–Donk (meso1), B	oth	—	228	g
Doel Deurganckdok-sector B, B	oth	—	229	g, sil, q
Schellebelle–Aard, B	oth	—	225	sil
Wijmers 2, Wichelen, B	oth	—	226	oM, g, q + sil
Melsele–Hof ten Damme, B	oth	—	223	sil + g, sa + g
Bazel-Kruike, B	oth	—	22	g, q, q + g
Aubéchies-Coron Maton, B	BK	LBK	17	oM
Steinfurth-Auf der Mauer, Bad Nauheim (HE)	LH	LBK	91	q + g
Nieder-Mörlen-Auf dem Hempler, Bad Nauheim (HE)	BK	LBK	92	min
Nackenheim-Lehrbrünnchen, Mainz- Bingen (RP)	LH	LBK	96	sa, ca + sa + g
Wallmersbach, Uffenheim, Neustadt, a.d. Aisch (BY)	LH	LBK	104	sa + sil
Leingarten-Großgartach- Kappmannsgrund (BW)	LH	LBK	105	q + (b or ca)
Bad Friedrichshall-Kochendorf-Butzäcker (BW)	LH	LBK	107	q
Freiberg-Heutingsheim-Incher (BW)	LH	LBK	108	ca
Korntal-Münchingen-Heupfad (BW)	LH	LBK	113	q + g
Rottenburg-Fröbelweg, Tübingen (BW)	LH	LBK	120	q(13%), q + g(1%), hem(1%)
Rottenburg-Hailfingen-Tübinger Weg (BW)	LH	LBK	121	ca, q, q + g, g
Ammerbuch-Reusten-Stützbrunnen (BW)	LH	LBK	123	q
Ittenheim, Kocherberg, Bas-Rhin, F	LH	LBK	124	q
Ittenheim, Am Alten Weg, Bas-Rhin, F	oth	LBK	205	fs
Mundolsheim, Bas-Rhin, F	oth	LBK	208	fs
Stützheim, Bas-Rhin, F	oth	LBK	207	fs
Romanswiller, Bas-Rhin, F	oth	LBK	206	ca, fs, g
Niedernai, Foegel, Bas-Rhin, F	LH	LBK	128	q, q + g + ca
Bischoffsheim, Le Village, Bas-Rhin, F	LH	LBK	129	q, fs
Bischoffsheim, Le Village, Bas-Rhin, F	BK	LBK	129	q, q + g,
Rosheim, Gachot Bas-Rhin, F	Lim	LBK	131	q
Rosheim, Gachot, Bas-Rhin, F	LH	LBK	131	q
Rosheim, Mittelfeld, Bas-Rhin, F	LH	LBK	132	q
Rosheim, Mittelfeld, Bas-Rhin, F	Lim	LBK	132	q + (b od ca)

Rosheim-St. Odile, Bas-Rhin, F	Lim	LBK	133	q + g
Rosheim-St. Odile, Bas-Rhin, F	LH	LBK	133	fs
Rosheim-Rittergass, Bas-Rhin, F	Lim	LBK	134	q
Colmar, Rufacher Huben, Haut-Rhin, F	LH	LBK	137	q
Merxheim, Zapfenloch, Haut-Rhin, F	LH	LBK	139	min
Merxheim, Zapfenloch, Haut-Rhin, F	BK	LBK	139	min
Ensisheim, Ratfeld, Haut-Rhin, F	LH	LBK	140	q, sa
Goldacker, Gächlingen (CH)	LH	LBK	143	sa,q
Bavans, abri sud/sud-ouest, Doubs, F	LH	—	147	q, ca, fs
Bavans, abri sud/sud-ouest, Doubs, F	BK	—	147	q, ca,
Bavans, abri sud/sud-ouest, Doubs, F	oth	—	147	fs
Onnens-Praz Berthoud, Jura-Nord (CH)	oth	—	126	fs
Bart, Abri Supérieur de Châtaillon, Doubs, F	oth	—	209	fs
Lutter, Abri-sous-roche Saint-Joseph, couche 5 (CH)	oth	—	127	fs
Grotte du Gardon, Amberieux-en-Bugey, Rhone, F	oth	—	153	fs
Grotte du Gardon, Amberieux-en-Bugey, Ain, F	BK	—	153	q
Medernach-Savelborn-Baachbiert, L	BK	—	160	q
Hersberg-Auf den Leien, L	BK	—	158	g + q
Puttelange-lès-Thionville, Himeling, Moselle, F	LH	—	168	q, q + g
Remerschen Raederbiert, L	Lim	—	171	q
Sehndorf-Vor dem Büsch, Merzig-Wadern (SL)	LH	—	172	q + sa + g
Sehndorf-Vor dem Büsch, Hinter'm Dellchen (SL)	BK	—	172	q + sa + g
Montenach-Kirschgasse, Moselle, F	BK	LBK	173	oM
Kirschnaumen-Évendorff- Dolem, Moselle, F	BK	LBK	174	oM
Ay-sur-Moselle-La Tournaille, F	BK	LBK	186	q
Malling-Schlammlengt, Moselle, F	Lim	LBK	176	ca
Oudrenne Breistroff, Moselle, F	Lim	LBK	178	q
Florange-Daspiche, Moselle, F	Lim	LBK	180	ca?
Vitry-sur-Orne-ZAC de la Plaine, Moselle, F	Lim	LBK	182	q + ca, fs, ca
Trémery-Zones 3-4-36, Moselle, F	Lim	LBK	185	ca
Ay-sur-Moselle-La Tournaille, Moselle, F	Lim	LBK	186	q, fs, q + fs, ca
Ay-sur-Moselle-Les Velers Jacques, Moselle, F	Lim	LBK	187	oM
La Maxe-Station d'épuration, Moselle, F	Lim	LBK	189	ca?
Filstroff-Avensberg, Moselle, F	Lim	LBK	191	ca + q
Presles-et-Boves-les Bois Plantés, Aisne, F	Lim	LBK	10	fs
Orconte-Les Noues, Marne, F	LH	LBK	194	fs
Juigny-les Grands Traquières, Marne, F	Lim	LBK	15	fs + q + ca
Gumery-les-Hauts de Trainel, Aube, F	Lim	LBK	197	min
Villeneuve-La-Guyard, Yonne, F	Lim	VSG	198	q
Balloy, les Réaudins, Saint-et-Marne, F	Lim	LBK	213	q
Barbey, le Buisson Rond, Seine-et-Marne, F	Lim	LBK	214	q
Étigny, le Brassot Est, Yonne, F	Lim	LBK	215	q + fs
Passy, les Gravières, Yonne, F	Lim	LBK	216	q
Champlay-les Carpes, Yonne, F	Lim	LBK	196	min
Sours-les Ouches, Eure-et-Loir, F	Lim	LBK	217	min
Marcilly-en-Beauce, Loir-et-Cher, F	Lim	LBK	203	fs
Moult-Le Relais de Poste, Calvados, F	Lim	LBK	212	min

2.4. Sites with Grog-Tempered Non-LBK Pottery

The first column is the site name, the second column is the attribution in literature (LH, Lim, BK, others), the third column is the association with LBK or VSG, the fourth column gives the number of the site used in the distribution maps, and the last column specifies the temper (b = bone, min = mineral, q = quartz, sa = sand, ca = calcite, o = organic, g = grog, fs = fossil shell, hem = hematite, ch = charcoal, oM = without intentional temper)

Ede, Frankeneng, Gueldre, NL	LH	—	72	sa + g, o + g
Gassel Over de Voort, NL	Lim	—	71	g + sa
Gassel-Over de Voort, NL	BK	—	71	g + sa
Haelen-Broekweg, NL	BK	—	66	o + g
Xanten, NW	Lim	—	73	b + q + g, o + q + g, o + b + q + g
Neer-Boshei, NL	Lim	—	58	g
Horn-Lateraalkanaal, NL	Lim	—	59	g
Melick-Herkenbosch-Vogelkooi, NL	Lim	—	62	b + g
Sint Odilienberg-Zwarteberg, NL	Lim	—	60	b + g
Echt-Annendaal, NL	Lim	—	63	b + g + o, sa + g
Ittervoort, Damszand, Limburg, NL	BK	—	57	g
Sweikhuizen, De Hei, Limburg, NL	LH	—	52	sa + g
Geleen-Nijssenstraat, Limburg, NL	LH	LBK	46	b + g
Geleen- Janskamperveld, NL	Lim	LBK	50	g(15%)
Geleen-Haesselderveld, NL	Lim	LBK	47	b + g, g, sa + g
Geleen-Station oder -Bergstraat, NL	Lim	LBK	48	b + g, b + g + ch
Elsloo-Koolweg, NL	Lim	LBK	43	b + g, g
Stein-Heideveldweg, NL	Lim	LBK	44	b + g
Stein-Keerenderkerkweg, NL	Lim	LBK	45	b + g, b + g + sa
Maastricht-Klinkers, NL	Lim	LBK	42	b + sa + g, b + o + sa + g, o + sa + g, o + g, ch + sa + g, sa + g, g
Rosmeer-Staberg, B	Lim	LBK	38	b + g(20%), g(18%), g + hem(15%), b + g + hem(9%)
Rosmeer-Staberg, B	BK	LBK	38	g
Vlijtingen-Kayberg, B	Lim	LBK	41	b + q + g, b + g
Caberg-Belvédère, NL	Lim	LBK	40	b + g, g + q
Langweiler, Fundplatz 8, Düren (NW)	LH	LBK	79	q + sa + g
Liege-Saint Lambert, B	Lim	LBK	37	g(55%), b + g
Crisnée-La Mai, B	BK	LBK	34	g
Fexhe-le-Haut-Clocher, B	Lim	LBK	32	b + g, ch + g + q
Darion-Colia, B	Lim	LBK	27	b + g + sa
Waremmme- Longchamps, B	Lim	LBK	26	b + g
Berloz, B	Lim	LBK	25	g(b + o) ²
Overhespen-Sint Annenveld, B	Lim	LBK	24	b + o + g
Aubéchies-Coron Maton, B	Lim	LBK	17	b + g(5%)
Doel Deurganckdod-sector B, B	oth	—	229	g + o, g
Wijmers 2, Wichelen, B	oth	—	226	g, q + o + g
Melsele-Hof ten Damme, B	oth	—	223	b + g + q, o + g, sil + g, sa + g

² In Constantin and Haeck (1979) the temper is grog, in the Leiden workshop (2007) the temper is described as bone and organic plant. So that might be the property of the grog.

Bazel-Kruikebe, B	oth	—	22	b + g, g, o + g, q + g
Dilsen Dilsenheide III, B	oth	—	53	o + q + g
Weelde Paardsdrank, B	oth	—	54	o + q + g
Colombelles-le-Lazzaro, Calvados	Lim	LBK	210	o + g
Steinfurth-Auf der Mauer, Bad Nauheim (HE)	LH	LBK	91	q + g
Bruchenbrücken, Friedberg (HE)	LH	LBK	93	b + sa(g), b + o + sa(g), o + sa(g)
Nackenheim-Lehrbrunnchen, Mainz-Bingen (RP)	LH	LBK	96	ca + sa + g
Dautenheim-Unterm Leckmantel, Alzey (RP)	LH	—	97	b + q + o + g
Enzweihingen, Vaihingen a.d.Enz (BW)	LH	—	111	b + sil + g
Kortal-Münchingen-Heupfad (BW)	LH	LBK	113	q + g
Ditzingen-Zechlesmühle- und Stütze, Leonberg (BW)	LH	LBK	114	b + g
Stuttgart-Weilimdorf-Grubenäcker (BW)	LH	LBK	116	b + q + g
Rottenburg-Fröbelweg, Tübingen (BW)	LH	LBK	120	b + g(1%), q + g(1%)
Rottenburg-Hailfingen-Tübinger Weg (BW)	LH	LBK	121	b + g, q + g, g
Puttelange-lès-Thionville, Himeling, Moselle, F	LH	—	168	q + g
Hersberg-Auf den Leien, L	BK	—	158	g + q
Sehndorf-Vor dem Büsch, Hinter'm Dellchen (SL)	BK	—	172	q + sa + g
Sehndorf-Vor dem Büsch, Merzig-Wadern (SL)	LH	—	172	q + sa + g
Romanswiller, Bas-Rhin, F	oth	LBK	206	g
Niedernai, Foegel, Bas-Rhin, F	LH	LBK	128	q + g + ca
Bischoffsheim, Le Village, Bas-Rhin, F	LH	LBK	129	b + ca + g
Bischoffsheim, Le Village, Bas-Rhin	BK	LBK	129	q + g
Rosheim-Saint-Odile, Bas-Rhin	Lim	LBK	133	q + g

3. List of Sites with Non-LBK Pottery

The first column shows the number assigned to every site. This number is used throughout. This numbering is also used in Kirschneck, 2020. The second column is the name of the site. The third column gives the attribution in literature of the Non-LBK pottery to La Hoguette (LH), Limburg pottery (Lim), Begleitkeramik (BK) or other attributions. This corresponds to the lists 1.1. to 1.4. The fourth column gives important citations in literature.

1	Fontenay-Le-Marmion, La Hoguette, Calvados	LH	Caillaud & Lagnet, 1972; Ghesquière & Aubry, 2013, p. 512
2	Fontenay-Le-Marmion, Le Grande Champ, Calvados	LH	Ghesquière & Aubry, 2013
3	Alizay, Le Postel, Eure	LH	Marcigny et al., 2013
4	Machecoul-Guibrelou I, Loire-Atlantique	LH	Rousseau et al., 2015
5	Mésanger, Loire-Atlantique	LH	Rousseau et al., 2015, p. 33

6	Chassemy-les Grand Horles, Aisne	Lim	Constantin, 1985
7	Longpre-les-Corps-Saints, Somme	Lim	Constantin, 1985
8	Bucy-le-Long-la Fosselle, Aisne	Lim	Ilett & Constantin, 2010, p. 247
9	Bucy-le-Long-la Fosse Tounise/la Héronnière, Aisne	Lim	Ilett & Constantin, 2010, p. 247
10	Presles-et-Boves-les Bois Plantés, Aisne	Lim	Ilett & Allard, 2008
11	Berry-au-Bac-La Renardière, Aisne	Lim	Ilett & Plateaux, 1995, p. 96
12	Berry-au-Bac-la Croix Maigret, Aisne	Lim	Constantin et al., 1981
13	Pontavert-Le Marteau, Aisne	Lim	Constantin et al., 1981
14	Cuiry-lès-Chaudardes-les Fontinettes, Aisne	Lim	Constantin et al., 1981
15	Juigny-les Grands Traquières, Marne	Lim	Meunier, 2013b
16	Menneville-Derrière-le-Village, Aisne	Lim	Constantin, 1985
17	Aubéchies-Coron Maton, B	Lim, BK	Constantin et al., 2010b, Constantin & Demarez, 1981
18	Blicquy, Couture du Couvent, Hainaut, B	LH	Deramaix & Demarez, 1989
19	Ormeignies-le Pilon, B	Lim	Constantin et al., 2010b, p. 17
20	Saint-Denis, B	Lim	Van Berg, 1990
21	Thines-Vieille Cour, B	Lim, BK	Hubert, 1981; Petitdidier et al., 2013
22	Bazel-Kruike, B	oth	Crombé et al., 2015
23	Wange-Damekot, B	Lim	Lodewijckx, 2009
24	Overhespen-Sint Annaveld, B	Lim	Lodewijckx, 2009
25	Berloz, B	Lim	Constantin & Haeck, 1979
26	Waremmes-Longchamps, B	Lim	van Berg, 1990
27	Darion-Colia, B	Lim	van Berg, 1990
28	Oleye-Al Zèpe, B	Lim, BK	van Berg, 1990
29	Horion-Hozémont-Noir Fontaine, B	Lim	Tromme & Haeck, 1974–1976
30	Omal-Vicinal-Les Tombes, B	Lim	van Berg, 1990
31	Bassenge, B	Lim	Modderman, 1981
32	Fexhe-le-Haut-Clocher, B	Lim	Bosquet et al., 1998
33	Verlaine-Jointy, B	BK	Destexhe-Jamotte, 1962
34	Crisnée-La Mai, B	BK	van Berg & Tromme, 1982
35	Trou Al'Wesse, Modave, Liège, B	BK	Miller et al., 2009
36	Mons-Crotteux, Liège, B	LH	van Berg, 1990
37	Liège-Saint-Lambert, B	Lim, BK, LH	Rouselle, 1984; Van der Sloot et al., 2003
38	Rosmeer-Staberg, B	Lim, BK	Modderman, 1981
39	Geleen-Urmonderbaan, NL	Lim	Van Wijk et al., 2014
40	Caberg-Belvédère, NL	Lim	Modderman, 1981
41	Vlijtingen-Kayberg, B	Lim	Marichal, 1987
42	Maastricht-Klinkers, NL	Lim, BK	Van Wijk et al., 2014
43	Elsloo-Koolweg, NL	Lim	Modderman, 1981
44	Stein-Heideveldweg, NL	Lim, BK	Modderman, 1981; Petitdidier et al., 2013
45	Stein-Keerderkerkweg, NL	Lim	Modderman, 1981
46	Geleen-Nijssenstraat, Limburg, NL	LH	Brounen & Vromen, 1990
47	Geleen-Haesselderveld, NL	Lim	Modderman, 1981
48	Geleen-Station oder -Bergstraat, NL	Lim	Modderman, 1981

49	Geleen-de Kluis, NL	Lim	Waterbolk, 1959, p. 159
50	Geleen- Janskamperveld, NL	Lim	van de Velde, 2007
51	Beek-Kerkeveld, NL	Lim	Modderman, 1981
52	Sweikhuizen, De Hei, Limburg, NL	LH, BK	van Berg, 1987; Brounen et al., 2010a
53	Dilsen Dilserheide III, B	oth	Amkreutz et al., 2010
54	Weelde Paardsdrank, B	oth	Amkreutz et al., 2010
55	Weelde Voorheide 3, B	oth	Amkreutz et al., 2010
56	Brecht Thomas Heyveld, B	oth	Amkreutz et al., 2010
57	Ittervoort, Damszand, Limburg, NL	LH,BK	Brounen et al., 2010a; Brounen & Hauzeur, 2010
58	Neer-Boshei, NL	Lim	Modderman, 1981
59	Horn-Lateraalkanaal, NL	Lim	Modderman, 1981
60	Sint Odilienberg-Zwarteberg, NL	Lim	Modderman, 1981
61	Sint Odilienberg-Mortelshof, NL	BK	Brounen & Hauzeur, 2010
62	Melick-Herkenbosch-Vogelkooi, NL	Lim	Modderman, 1981
63	Echt-Annendaal, NL	Lim	Brounen, 1985; Van Wijk et al., 2014
64	Posterholt-Voorsterveld, NL	BK	Brounen, 1999
65	Brüggen-Bracht 8/West, Viersen (NW)	BK	Loewe, 1971, p. 135
66	Haelen-Broekweg, NL	BK	Bats et al., 2002
67	Haelen-Helenberg, NL	Lim	Constantin, 1985
68	Kesseleyk-Keuperheide, NL	Lim	Modderman, 1974
69	Kessel-Sjoppenaas, NL	BK	Brounen & de Jong, 1988
70	Venlo-Ossenberg, NL	BK	Brounen, 1999
71	Gassel Over de Voort, NL	Lim, BK	Brounen & de Jong, 1988
72	Ede, Frankeneng, Gueldre, NL	LH, BK	Schut, 1988; Brounen et al., 2010b
73	Xanten (NW)	Lim	Bridger & Siegmund, 1985
74	Veen-Kaninenberg, NL	Lim	Modderman, 1981
75	Wickrath, Fundplatz 105 (NW)	LH	Cziesla, 2015, p. 178
76	Bochum-Hiltrop (NW)	Lim	Modderman, 1981
77	Langweiler 2 (NW)	Lim	Farruggia et al., 1973, p. 84
78	Langweiler 3, Düren (NW), D	BK	Petitdidier et al., 2013
79	Langweiler 8, Düren (NW)	LH, Lim, BK	Lüning et al., 1989; Lüning & Stehli, 1994, pp. 163–165; Brounen & Hauzeur, 2010
80	Langweiler 5-10,12 (NW)	Lim	Spatz, 1991
81	Königshoven 1 (NW)	Lim	Claßen, 2011
82	Köln-Worringen(NW)	Lim	Meier-Arendt, 1972
83	Köln-Lindenthal (NW)	Lim, BK	Buttler & Haberey, 1936; Meier-Arendt, 1969
84	Hiddenhausen-Bermbek, Herford (NW)	LH	Günther, 1991
85	Soest-Burgtheaterparkplatz, Soest (NW)	LH	Knoche, 2010
86	Bad Sassendorf, Auf der Breite, Soest (NW)	LH	Kneipp, 1998
87	Anröchte, Soest (NW)	LH	Lüning et al., 1989
88	Ober-Widdersheim (HE)	Lim	Kneipp, 1998
89	Wölfersheim-Geisenheim (HE)	Lim	Kneipp, 1998
90	Gambach, Altstädter Rossfeld (HE)	LH	Cladders, 2001
91	Steinfurth-Auf der Mauer, Bad Nauheim (HE)	LH	Langenbrink & Kneipp, 1990
92	Nieder-Mörten-Auf dem Hempler, Bad Nauheim (HE)	BK	Schade-Lindig & Schade, 2010

93	Bruchenbrücken, Friedberg (HE)	LH	Lüning et al., 1989
94	Kückhofen (NW)	Lim	Lehmann, 2004, p. 61
95	Goddelau, Riedstadt, Groß-Gerau (HE)	LH	Lüning et al., 1989
96	Nackenheim-Lehrbrünnchen, Mainz-Bingen (RP)	LH	Lüning et al., 1989
97	Dautenheim-Unterm Leckmantel, Alzey (RP)	LH	Lüning et al., 1989
98	Laurenzberg (NW)	BK	Petitdidier et al., 2013
99	Speyer, Brunckstraße (RP)	LH	Sperber, 1995, p. 34
100	Herxheim, Südliche Weinstraße (RP)	LH	Stöckl, 2001
101	Banz-Zilgendorf, Lichtenfels (BY)	LH	Lüning et al., 1989
102	Nördlingen-Steinerner Mann, Donau-Ries (BY)	LH	Lüning et al., 1989
103	Estenfeld-Mühlhausen, Würzburg (BY)	LH	Strien, 2018
104	Wallmersbach, Uffenheim, Neustadt, a.d. Aisch (BY)	LH	Nadler, 2010
105	Leingarten-Großgartach-Kappmannsgrund (BW)	LH	Lüning et al., 1989
106	Mannheim-Vogelsang, -Wallstadt und -Seckenheim	LH	Kraft, 2007
107	Bad Friedrichshall-Kochendorf-Butzäcker (BW)	LH	Friederich, 2011
108	Freiberg-Heutingsheim-Incher (BW)	LH	Lüning et al., 1989
109	Baden-Baden-Oos (BW)	LH	Strien & Tillmann, 2001, p. 680
110	Griesen-Mauäcker, Klettgau (BW)	LH	Altorfer & Hartmann, 2018, p. 78
111	Enzweihingen, Vaihingen a.d.Enz (BW)	LH	Fb BaWü 26, 2002, p. 106
112	Herrenberg-Gültstein-Kampfhaus, Tübingen (BW)	LH	Bofinger, 2005
113	Korntal-Münchingen-Heupfad (BW)	LH	Lüning et al., 1989
114	Ditzingen-Zechlesmühle- und Stütze, Leonberg (BW)	LH	Strien & Tillmann, 2001, p. 678
115	Gerlingen-Rossbaum, Ludwigsburg (BW)	LH	Neth, 1999
116	Stuttgart-Weilimdorf-Grubenäcker (BW)	LH	Lüning et al., 1989
117	Stuttgart-Mühlhausen-Viesenhäuser Hof (BW)	LH	Kurz, 1992
118	Bad Cannstatt-Wilhelma (BW)	LH	Strien & Tillmann, 2001
119	Filderstadt-Bernhausen-Stegäcker (BW)	LH	Lüning et al., 1989
120	Rottenburg-Fröbelweg, Tübingen (BW)	LH	Bofinger, 2005
121	Hailfingen-Tübinger Weg (BW)	LH	Bofinger, 2005
122	Ammerbuch-Pfäffingen-Lüsse, Tübingen (BW)	LH	Bofinger, 2005

123	Ammerbuch-Reusten-Stützbrunnen (BW)	LH	Bofinger, 2005
124	Ittenheim, Kocherberg, Bas-Rhin	LH	Lefranc, 2008
125	Schwindratzheim-Les Terrasses de la Zorn, Bas-Rhin	Lim	Lefranc & Michler, 2015, p. 41
126	Onnens-Praz Berthoud, Jura-Nord, CH	oth	Jacob & Falquet, 2015
127	Lutter, Abri-sous-roche Saint-Joseph, couche 5, CH	oth	Jeunesse et al., 2019
128	Niedernai, Foegel, Bas-Rhin	LH	Jeunesse, 1987
129	Bischoffsheim, Le Village, Bas-Rhin	LH, BK	Jeunesse, 1987; Jeunesse & Sainty, 1991
130	Bischoffsheim-Afua du Stade, Bas-Rhin	Lim	Lefranc & Michler, 2015, p. 41
131	Rosheim, Gachot Bas-Rhin	Lim, LH	Jeunesse & Constantin, 1982; Jeunesse & Sainty, 1987
132	Rosheim, Mittelfeld, Bas-Rhin	LH, Lim	Jeunesse et al., 2001
133	Rosheim, Saint-Odile, Bas-Rhin	LH, Lim	Jeunesse & Lefranc, 1999; Lefranc & Michler, 2015, p. 41
134	Rosheim-Rittergass, Bas-Rhin	Lim	Lefranc & Michler, 2015
135	Entzheim-Les Terres de la Chapelle, Bas-Rhin	Lim	Lefranc & Michler, 2015, p. 41
136	Mittelhausen-Kellen, Bas-Rhin	Lim	Lefranc & Michler, 2015, p. 41
137	Colmar, Rufacher Huben, Haut-Rhin	LH	Jeunesse, 1987
138	Wettolsheim, Ricoh, Haut-Rhin	Lim, BK, LH	Jeunesse et al., 1991
139	Merxheim, Zapfenloch, Haut-Rhin	LH, BK	Jeunesse, 1987
140	Ensisheim, Ratfeld, Haut-Rhin	LH	Jeunesse & Sainty, 1992
141	Ensisheim, Les Octrois, Haut-Rhin	LH	Jeunesse, 1993
142	Sierentz, Sandgrube, Haut-Rhin	LH	Wolf et al., 1993
143	Goldacker, Gächlingen, CH	LH	Altorfer & Hartmann, 2018
144	Singen, Torkelweg (BW)	LH	Hald, 2005
145	Liestal-Hurlistraße, CH	LH	Sedlmeier, 2003
146	Oberlarg, Mannlefelsen I, Haut-Rhin	LH	Jeunesse, 1987
147	Bavans, abri sud/sud-ouest, Doubs	LH, BK, oth	Jeunesse, 1987
148	Quitteur, Quitteur, Haute-Saone	LH	Jeunesse, 1993
149	Choisey, les Champins, Jura	LH	Pétrequin et al., 2009
150	Bretonvilliers, Abri de Gigot I, Doubs	LH	Cupillard et al., 1991
151	Le Locle, Col des Roches, Neuchatel, CH	LH	Cupillard et al., 1991
152	Baulmes, Abri de la Cure, Vaud, CH	LH	Jeunesse et al., 1991
153	Grotte du Gardon, Amberieux-en-Bugey, Ain	BK, oth	Manen & Convertini, 2009
154	Neuville, Abri du Roseau, Ain	LH	Guillet, 1995
155	Maring-Novian Siebenborn, RP	Lim, BK	Schmidgen-Hager, 1993
156	Trier-Euren Schloss Monaise, RP	Lim	Schmidgen-Hager, 2003
157	Bitburg-Prüm-Peffingen, RP	Lim	Löhr, 1984
158	Hersberg-Auf den Leien, L	BK	Valotteau et al., 2009

159	Diekirch-Dechensgaart, L	Lim	Le Brun-Ricalens, 1995
160	Medernach-Savelborn-Baachbiert, L	BK	Löhr & Ewers-Bartimes, 1985
161	Medernach Reineschhaff, L	Lim	Spier et al., 2001–2002
162	Mersch-Haard, L	BK	Hauzeur & Löhr, 2008
163	Mamer-Juckelsboesch, L	BK, LH	Cziesla, 2015, p. 188; Hauzeur & Löhr, 2008
164	Hesperange-Teschbuchels, L	Lim	Löhr & Spier, 1982
165	Weiler-la-Tour, Mechel, L	LH	Le Brun-Ricalens & Grisse, 1993
166	Weiler-la-Tour Holzdréisch, L	Lim	Jadin, 1996
167	Alzingen-Grossfeld, L	BK	Hauzeur, 2006
168	Puttelange-lès-Thionville, Himeling, Moselle	LH	Belland et al., 1985; Petitdidier et al., 2013
169	Altwies, Op dem Boesch, L	LH, Lim, BK	Hauzeur, 2006
170	Remerschen Schengerwies, L	Lim	Hauzeur, 2006
171	Remerschen Raederbiert, L	Lim	Hauzeur & Löhr, 2008
172	Sehndorf-Vor dem Büsch und Hinter'm Dellchen (SL)	LH, Lim, BK	Fritsch, 2000a,b
173	Montenach-Kirschgasse, F	BK	Petitdidier et al., 2013
174	Kirschnaumen-Évendorff- Dolem, F	BK	Petitdidier et al., 2013
175	Malling-derrière le Village, Moselle	Lim	Petitdidier et al., 2013
176	Malling-Schlammlengt, Moselle	Lim	Petitdidier et al., 2013
177	Koenigsmacker-Le Village, Moselle	Lim	Petitdidier et al., 2013
178	Oudrenne Breistroff, Moselle	Lim	Petitdidier et al., 2013
179	Cattenom-Acheren, Moselle	Lim	Petitdidier et al., 2013
180	Florange-Daspiche, Moselle	Lim	Denaire & Robert, 2009
181	Rurange-lès-Thionville-sur Bruche, Guénange, Moselle	Lim	Petitdidier et al., 2013
182	Vitry-sur-Orne-ZAC de la Plaine, Moselle	Lim	Petitdidier et al., 2013
183	Homburg-Kirberg, SL	Lim	Fritsch, 2009
184	Thionville-Elange, F	BK	Petitdidier et al., 2013
185	Trémery-Zones 3-4-36, Moselle	Lim	Petitdidier et al., 2013
186	Ay-sur-Moselle-La Tournaille, Moselle	Lim, BK	Petitdidier et al., 2013
187	Ay-sur-Moselle-Les Velers Jacques, Moselle	Lim	Petitdidier et al., 2013
188	Ennery RD52C, Moselle	Lim	Hauzeur & Löhr, 2008
189	La Maxe-Station d'épuration, Moselle	Lim	Petitdidier et al., 2013
190	Metz-Nord Ban-de-Devant les Ponts, Moselle	Lim	Petitdidier et al., 2013
191	Filstroff-Avensberg, Moselle	Lim	Petitdidier et al., 2013
192	Farébersville, Moselle	Lim	Petitdidier et al., 2013
193	Bréviandes, Aube	Lim, BK	Laurelut, 2010
194	Orconte-Les Noues, Marne	LH	Tappret & Villes, 1996
195	Saint-Léger-près-Troyes, Aube	Lim	Tappret & Villes, 1996
196	Champlay-les Carpes, Yonne	Lim	Constantin, 1985
197	Gumery-les-Hauts de Trainel, Aube	Lim	Tappret & Villes, 1996
198	Villeneuve-La-Guyard, Yonne	Lim	Prestreau, 1992
199	Aufferville, Seine-et-Marne	Lim	Ilett & Plateaux, 1995, p. 98

200	Villeneuve-Saint-Georges, Val-de-Marne	Lim	Constantin, 1985
201	Berry-au-Bac-le Chemin de la Pecherie, Aisne	Lim	Ilett & Plateaux, 1995
202	Berry-au-Bac-le Vieux Tordoir, Aisne	Lim	Allard et al., 1995
203	Marcilly-en-Beauce, Loir-et-Cher	Lim	Bailloud et al., 1987
204	Schwarzenbach, St. Wendel (SL)	LH	Fritsch, 1998
205	Ittenheim, Am Alten Weg, Bas-Rhin	oth	Jeunesse, 1987, p. 9
206	Romanswiller, Bas-Rhin	oth	Jeunesse, 1987, p. 9
207	Stützheim, Bas-Rhin	oth	Jeunesse, 1987, p. 9
208	Mundolsheim, Bas-Rhin	oth	Jeunesse, 1987, p. 9
209	Bart, Abri Supérieur de Châtaillon, Doubs	oth	Aimé et al., 1995, p. 84
210	Colombelles-le-Lazzaro, Calvados	Lim	Billard et al., 2014
211	Démouville, Calvados	Lim	Billard et al., 2014
212	Moult-Le Relais de Poste, Calvados	Lim	Ghesquière et al., 2018
213	Balloy, les Réaudins, Saint-et-Marne	Lim	Meunier, 2012
214	Barbey, le Buisson Rond, Seine-et-Marne	Lim	Meunier, 2012
215	Étigny, le Brassot Est, Yonne	Lim	Meunier, 2012
216	Passy, les Graviers, Yonne	Lim	Meunier, 2012
217	Sours-les Ouches, Eure-et-Loir	Lim	Dupont et al., 2010
218	Chambly le Clos de la Rivière, Oise	Lim	Boucneau et al., 1996
219	Pont-Sainte-Maxence, Oise	Lim	Alix et al., 1997
220	Ath-Les Haleurs, B	Lim	Deramaix et al., 2018
221	Ormeignies-Bois de la Bonne Fortune, B	Lim	Constantin et al., 2010b, p. 17
222	Ormeignies-la Petite Rosière, B	Lim	Constantin et al., 2010b, p. 17
223	Melsele-Hof ten Damme, B	oth	van Berg et al., 1992
224	Kerkhove, B	oth	Crombé, 1986
225	Schellebelle-Aard, B	oth	Bats & de Reu, 2006
226	Wijmers 2, Wichelen, B	oth	Perdaen et al., 2011
227	Kalken-Molenmeers, B	oth	Crombé et al., 2015, p. 34
228	Oudenaarde-Donk (meso1), B	oth	Crombé & Vanmontfort, 2007
229	Doel Deurganckdok-sector B, B	oth	Crombé, 2010
230	Hardinxveld-Polderweg, NL	oth	Louwe Kooijmans, 2003, p. 617