



Universiteit
Leiden
The Netherlands

Frontier settlements of the LBK in central Belgium

Lodewijckx, M.; Bakels, C.C.; Hofmann D., Bickle P.

Citation

Lodewijckx, M., & Bakels, C. C. (2009). Frontier settlements of the LBK in central Belgium. *Creating Communities. New Advances In Central European Neolithic Research*, 32-49. Retrieved from <https://hdl.handle.net/1887/14218>

Version: Not Applicable (or Unknown)

License: [Leiden University Non-exclusive license](#)

Downloaded from: <https://hdl.handle.net/1887/14218>

Note: To cite this publication please use the final published version (if applicable).

This pdf of your paper in *Creating Communities* belongs to the publishers Oxbow Books and it is their copyright.

As author you are licenced to make up to 50 offprints from it, but beyond that you may not publish it on the World Wide Web until three years from publication (June 2012), unless the site is a limited access intranet (password protected). If you have queries about this please contact the editorial department at Oxbow Books (editorial@oxbowbooks.com).

Creating Communities
New Advances in
Central European Neolithic Research

Creating Communities

New Advances in
Central European Neolithic Research

Edited by
Daniela Hofmann and Penny Bickle



Oxbow Books
Oxford and Oakville

Published by
Oxbow Books, Oxford

© Oxbow Books and the individual authors, 2009

ISBN 978-1-84217-353-4

This book is available direct from

Oxbow Books
Phone: 01865-241249 Fax: 794449

and

The David Brown Book Company
PO Box 511, Oakville, CT 06779, USA
Phone: 860-945-9329; Fax: 860-945-9468

or from our website

www.oxbowbooks.com

Library of Congress Cataloging-in-Publication Data

Creating communities : new advances in Central European neolithic research / edited by Daniela Hofmann and Penny Bickle.

p. cm.

ISBN 978-1-84217-353-4

1. Bandkeramik culture. 2. Neolithic period--Europe, Central. 3. Neolithic peoples--Europe, Central. 4. Europe, Central--Antiquities. 5. Excavations (Archaeology)--Europe, Central. I. Hofmann, Daniela. II. Bickle, Penny.

GN776.2.B3C74 2009

943--dc22

2009018086

*Cover image: an LBK longhouse at Wang, southern Bavaria, during excavation in September 2008.
Photo: Alasdair Whittle*

Printed in Great Britain by
Hobbs the Printers Ltd, Totton, Hampshire.

Contents

Introduction: researching across borders <i>Penny Bickle and Daniela Hofmann</i>	1
Diverging trajectories? Forager-farmer interaction in the southern part of the Lower Rhine area and the applicability of contact models <i>Luc Amkreutz, Bart Vanmontfort and Leo Verhart</i>	11
Frontier settlements of the LBK in central Belgium <i>Marc Lodewijckx, with Corrie Bakels</i>	32
The extreme eastern periphery of the Linearbandkeramik: the landscape and geographical contexts <i>Olga V. Larina</i>	50
Settlement history of the Linear Band Pottery culture in Kuyavia <i>Joanna Pyzel</i>	71
The exchange of LBK adze blades in central Europe: an example for economic investigations in archaeology <i>Britta Ramminger</i>	80
Settlement history, land use and social networks of early Neolithic communities in western Germany <i>Erich Claßen</i>	95
First reflections on the exploitation of animals in Villeneuve-Saint-Germain society at the end of the early Neolithic in the Paris Basin (France) <i>Lisandre Bedault</i>	111
Scene by the brook: early Neolithic landscape perspectives in the Paris Basin <i>Penny Bickle</i>	132
Mobility in a sedentary society: insights from isotope analysis of LBK human and animal teeth <i>Corina Knipper</i>	142
New aspects and models for Bandkeramik settlement research <i>Oliver Rück</i>	159

A monumental prestige patchwork <i>Joachim Pechtl</i>	186
The LBK settlement with pit enclosure at Herxheim near Landau (Palatinate). First results <i>Andrea Zeeb-Lanz, Rose-Marie Arbogast, Fabian Haack, Miriam N. Haidle, Christian Jeunesse, Jörg Orschiedt, Dirk Schimmelpfennig and Samuel van Willigen</i>	202
Cemetery and settlement burial in the Lower Bavarian LBK <i>Daniela Hofmann</i>	220
Bone temper in early Neolithic vessels from southern Poland. Examinations using Scanning Microscopy <i>Anna Rauba-Bukowska</i>	235
The people who lived in longhouses: what's the big idea? <i>Alasdair Whittle</i>	249

Contributors

Luc Amkreutz
National Museum of Antiquities (Rijksmuseum van
Oudheden)
Papengracht 30, Postbus 11114
NL – 2301 EC Leiden

Rose-Marie Arbogast
Institut für Prähistorische und
Naturwissenschaftliche Archäologie (IPNA)
University of Basel
Spalenring 145
CH – 4055 Basel

Corrie Bakels
Faculty of Archaeology
University of Leiden
Reuvensplaats 3–4
NL – 2311 BE Leiden

Lisandre Bedault
Université de Paris 1 Panthéon-Sorbonne
CNRS UMR 7041, ArScAn, Protohistoire Européenne
Maison de l'Archéologie et de l'Ethnologie
21, allée de l'Université
FR – 92023 Nanterre Cedex

Penny Bickle
School of History and Archaeology
Cardiff University
Humanities Building, Colum Drive
UK – Cardiff CF10 3EU

Erich Claßen
Bayerisches Landesamt für Denkmalpflege
Dienststelle Ingolstadt
Unterer Graben 37
DE – 85049 Ingolstadt

Corina Knipper
Eberhard-Karls-Universität Tübingen
Institut für Ur- und Frühgeschichte und Archäologie
des Mittelalters
Naturwissenschaftliche Archäologie
Rümelinstr. 23
DE – 72070 Tübingen

Olga Larina
Institutul Patrimoniului Cultural
Str. Banulescu Bodoni 35
MD-2012 Chisinau

Marc Lodewijckx
Department of Archaeology and Art History
University of Leuven
Blijde – Inkomsstraat 21, bus 3313
B – 3000 Leuven

Fabian Haack
Generaldirektion Kulturelles Erbe Rheinland-Pfalz
Direktion Archäologie – Speyer
Kleine Pfaffengasse 10
DE – 67346 Speyer

Miriam Haidle
Intitut für Ur- und Frühgeschichte und Archäologie
des Mittelalters
Abt. Ältere Urgeschichte – Quartärökologie
Schloss, Burgsteige 11
DE – 72072 Tübingen

Daniela Hofmann
School of History and Archaeology
Cardiff University
Humanities Building, Colum Drive
UK – Cardiff CF10 3EU

Christian Jeunesse
MISHA
Université Marc Bloch – Strasbourg II
5, allée du Général Rouvillois
FR – 67083 Strasbourg Cedex

Jörg Orschiedt
Archäologisches Institut
Universität Hamburg
Edmund-Siemers-Allee 1, Flügel West
DE – 20146 Hamburg

Joachim Pechtl
Rotkehlchenweg 14c
DE – 82538 Geretsried

Joanna Pyzel
Institute of Archaeology
Gdańsk University
al. Bielańska 5
PL – 80-851 Gdańsk

Britta Ramminger
Archäologisches Institut
Universität Hamburg
Edmund-Siemers-Allee 1, Flügel West
DE – 20146 Hamburg

Anna Rauba-Bukowska
AGH University of Sciences and Technology
PL – 30-059 Krakow
al. Mickiewicza 30

Oliver Rück
Prähistorische Archäologie
Institut für Kunstgeschichte und Archäologien
Europas
Martin-Luther-Universität Halle-Wittenberg
Brandenburgweg 23c
DE – 06120 Halle (Saale)

Dirk Schimmelpfennig
Institut für Ur- und Frühgeschichte
Universität zu Köln
DE – 50923 Köln

Bart Vanmontfort
Eenheid Prehistorische Archeologie
Geo-instituut
Celestijnenlaan 200e – bus 2409
BE – 3001 Leuven

Samuel van Willigen
Swiss National Museum
Department of Archaeology
Museumstraße 2
CH – 8023 Zürich

Leo Verhart
Limburgs Museum
Keulsepoort 5
NL – 75911BX Vento

Alasdair Whittle
School of History and Archaeology
Cardiff University
Humanities Building, Colum Drive
UK – Cardiff CF10 3EU

Andrea Zeeb-Lanz
Generaldirektion Kulturelles Erbe Rheinland-Pfalz
Direktion Archäologie – Speyer
Kleine Pfaffengasse 10
DE – 67346 Speyer

Frontier settlements of the LBK in central Belgium

Marc Lodewijckx

With a contribution from Corrie Bakels

Introduction

From the north of France to the south of the Netherlands, a wide loess belt runs through central Belgium (Figure 1). This loess region, at present more fertile than it used to be (Langohr 1990), attracted early farmers of the Linearbandkeramik (LBK) culture. These are thought to have migrated into Belgium from the Rhineland (Aldenhovener Platte), passing through the south of the Netherlands. About 150 LBK settlements have hitherto been located in the southeast of the Hesbaye loess region, between the valleys of the rivers Meuse, Geer and Méhaigne. The Méhaigne, a small river that runs into the Meuse, seems to have formed the western border of this migration movement. Many LBK sites were 'excavated' in the late 19th and early 20th century when it was common practice to empty out rubbish pits to collect plenty of archaeological material but no attention was given to the barely discernible post holes that were situated near these pits. The excavations of Buttler and Haberey (1936) at Cologne-Lindenthal in the 1930s and of Modderman and Waterbolk (1958/59) in the south of the Netherlands in the 1950s and 1960s were the first to demonstrate that these settlements comprised complex dwelling structures including post-holes, scoops and enclosures. Roosens (1962) followed this up with his excavations at the Belgian site of Rosmeer.

This contribution reviews the evidence from a cluster of sites in Belgium's Hesbaye loess region. Analyses of pollen, seeds, house architecture and various kinds of artefacts reveals the presence of certain characteristics which are not found in other LBK areas and can be interpreted as influences from local Mesolithic populations. This contributes to debates about the nature of Neolithisation in this area, especially on

whether or not contacts between indigenous peoples and incomers were of a violent nature.

A cluster of settlements along the Kleine Gete river

A detailed survey carried out by the author in the north part of the Hesbaye loess region led to the discovery of three new sites of the LBK culture along the Kleine Gete river. The first one was identified in 1977 and is situated to the north of the village of Wange (Wange-Neerhespenveld, Figure 2.1) on the right bank of the Kleine Gete. The second site is located on the left bank of the Kleine Gete and lies beneath the present village of Overhespen (Overhespen-Sint-Annaveld, Figure 2.2). The third site was discovered in 1989 and is situated at the northern edge of the village of Wange (Wange-Damekot, Figure 2.3), 700 m upstream from the first site at Wange.

With a diameter of c. 120 m, these three settlements along the Kleine Gete are rather small (c. 1.5 ha) and we may assume that they contained only a few individual dwellings. All three are located on a soft hill, flanked by natural gullies, as close as possible to the edge of the alluvial plain. These three sites seem to have formed a regional cluster. Because of their small size and the damage inflicted by erosion, no other sites could be located but we assume some must have existed. The nearest settlement of the southern Hesbaye group is Waremme in the valley of the Geer, about 17 km to the south-east of Wange.

A few kilometres to the north, there is a rapid transition between the Hesbaye loess zone to the south and the Hageland area to the north. The Hageland has a varied relief with areas of sandy loam, clay and



Figure 1. Map of Belgium showing the loess belt (grey), the areas with LBK settlements (stippled) and the sites mentioned in the text: 1. Rosmeer, 2. Darion, 3. Waremmé, 4. Oleye, 5. Vaux-et-Borset, 6. Remicourt, 7. Blicquy. The LBK sites at Wange and Overhespen are shown in the inset (Figure 2).

sand. The Steenberg at Wommersom (Figure 2.4) is a long protrusion into this transitional area between the Hesbaye and the Hageland. It forms the only known outcrop of Wommersom quartzite, a source of stone that was very popular amongst Mesolithic hunter-gatherer groups.

Pollen analysis (by Corrie Bakels)

An old oxbow of the Kleine Gete offered the opportunity to reconstruct the vegetation cover during the LBK occupation (Bakels 1992). The narrow channel lies 50 m from Wange-Neerhespenveld and 400 m from Overhespen-Sint-Annaveld and is filled with mainly telmatic peat (Figure 2, black dot). C-14 dating showed

that part of the peat formation was contemporaneous with the settlements.

The results of the pollen analysis are pictured in Figure 3. Before 6450 ± 100 BP [(GrN-10720) 5613–5222 cal BC] the main components of the tree cover were lime, elm and hazel. Oak and ash were less important. Other trees, even alder, were nearly absent, as were herbs from dry habitats. The environment in which the LBK people settled was a deciduous forest. Elm forest is thought to have covered the valley floor and the lower slopes. The higher parts of the landscape were covered by lime forest, which is in agreement with the general ideas on the nature of the forest growing on loess plateaux in western Europe (Bakels 1978; Greig 1982; Kalis 1988). Oak and ash were minor constituents

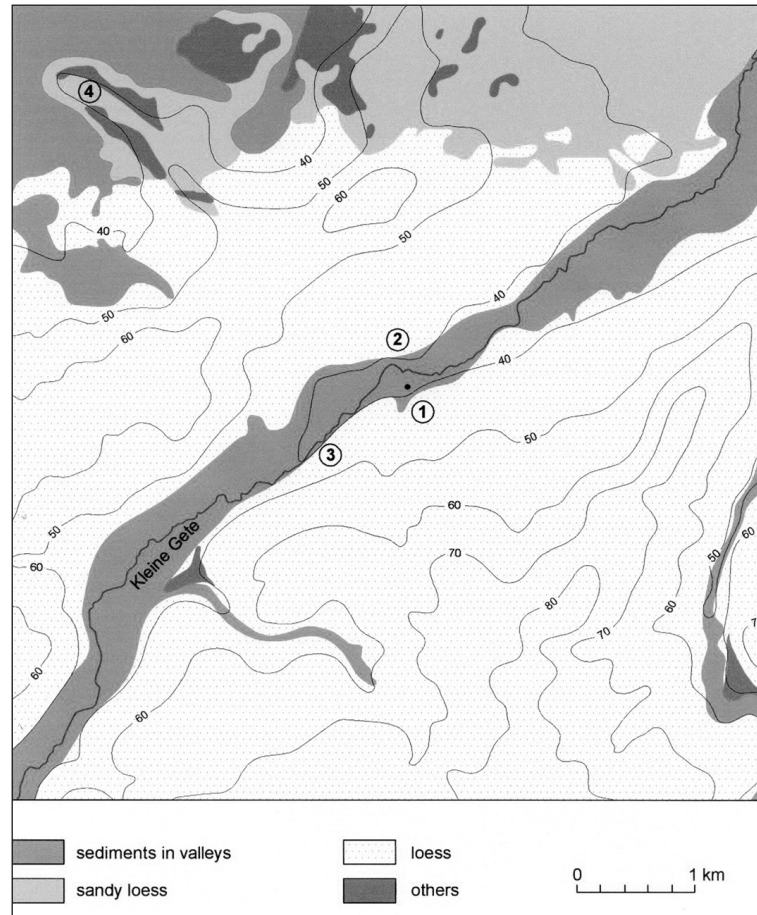


Figure 2. Map of the Kleine Gete area with the sites of Wange-Neerhespenveld (1), Overhespen-Sint-Annaveld (2), Wange-Damekot and the outcrop of Wommersom quartzite (4). The dot indicates the spot where the pollen samples were taken.

in those forests, while hazel grew at the forest edges. Because pollen from herbs growing in open spaces is scarce, these spaces must have been rather restricted in surface area. Herb pollen could obviously not escape into the air above the surrounding vegetation to be transported to the channel in which peat formation took place. On the other hand, the amount of hazel pollen is such that the open spaces must have been rather numerous. Whether these openings were natural or man-made is unclear, but Mesolithic people may have played a role.

From 6450 BP onwards, the composition of the forests changes. Elm declines first, followed by lime. The curves of the pollen percentages of oak and ash rise. The peat shows particles of charcoal. The changes took place between 6450 ± 100 BP [(GrN-10720) 5613–5222 cal BC] and 6150 ± 140 BP [(GrN-10013) 5463–4729 cal BC], which corresponds well with the dates obtained for the

LBK settlements, which fall between 6400 and 6130 BP. It is reasonable to attribute them to LBK occupation.

If these were truly contemporary, the elm forest in the valley might have been cut down to allow better passage between the Wange and Overhespen sites. They might also have been damaged by the browsing of cattle or the collection of animal feed. Moreover, part of the terrain on which the settlements were founded might have been covered by elm forest and the trees might have been cut down to make space for dwellings. The deforestation was not important enough to have created larger stretches of open ground as the curve of herb pollen did not rise. Only a few goosefoot pollen and a single grain of great plantain are witnesses of possible human impact. Both are considered as ‘anthropogenic indicators’ (Behre 1986).

The lime forest may have been partly cut down to make room for fields. No cereal pollen was encountered,

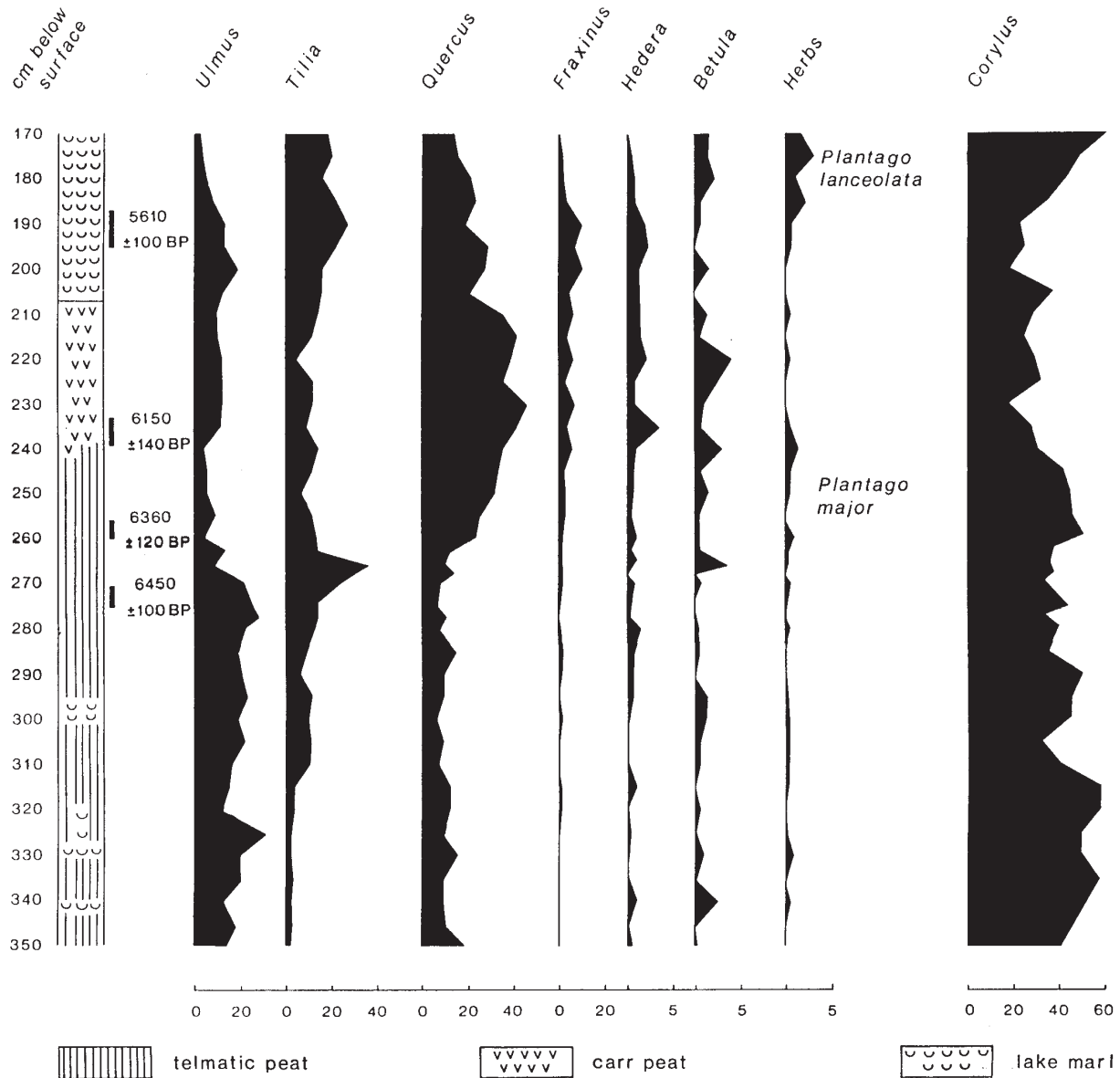


Figure 3. Results of the pollen analysis by Corrie Bakels.

but as the LBK cereals did not shed pollen freely and small fields go undetected if surrounded by trees and shrubs (Broström *et al.* 1998), this was to be expected. Ash and especially oak profited from the felling of elm and lime. After 6150 BP the forests recovered to a certain extent.

The settlement structures

Since ours was mainly a rescue dig the excavations only exposed a small part of the three LBK settlements

of the Kleine Gete cluster. More recent constructions and agricultural activities, which damaged the sites, also made it impossible to determine the true extent of the settlements. In some parts erosion had truncated features, so that only the bottom of some pits had been preserved.

The only complete plan recovered was at Overhespen (Figure 4) where a northwest-southeast oriented house measuring 26 m by 6.5 m was found. While the traditional LBK houses have a rectangular form, this house narrows slightly at its northwest end. Like

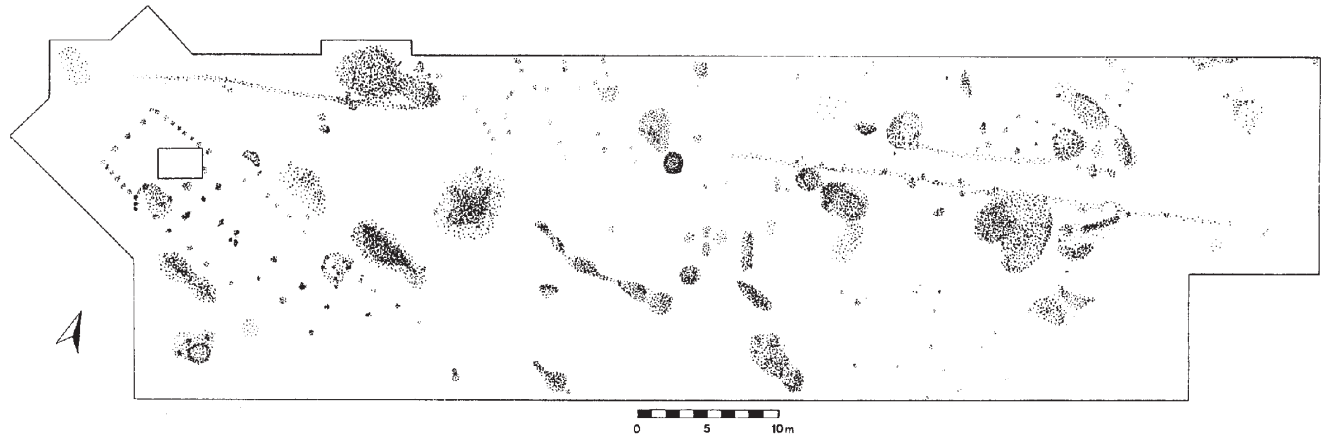


Figure 4. North part of the LBK settlement at Overhespen-Sint-Annaveeld. The house discussed here is situated to the left.

most LBK longhouses, the Overhespen house preserves more postholes to the northwest but, in contrast to the known dwellings, it has no continuous wall trench. Two other structures were located to the east, but both were barely preserved and only visible under good humidity conditions. At Wange-Neerhespenveld, a single cluster of postholes was discovered but only partly investigated. The structure has the same orientation and size as the known dwellings. At Wange-Damekot, no LBK postholes were identified because of more recent occupation. Apart from a palisade at Overhespen, no defensive structures could be identified.

The excavations did reveal a surprisingly high number of LBK pits, especially at Wange-Neerhespenveld. Most of these share a particular form which seems to suggest that they were originally made for a single purpose. Long pits along the walls of the houses are presumably loam pits. Cylindrical pits, often clustering in groups, were probably silos, whereas others may be interpreted as ovens or kilns (Figure 5). Although several other types of pits and complex structures can be observed, their functions remain enigmatic. Various types of pits were dug close to the houses, but others are situated at the edge of the settlement, perhaps in some kind of semi-industrial zone. These may be suggestive of the various activities of the inhabitants. Most pits were later used to dump household refuse. In this way, especially pottery sherds and flint tools were preserved, which help to complete the fragmentary picture provided by the soil traces. Research on animal bones carried out by Dr. Wim Van Neer of the Koninklijk Museum voor Midden-Afrika at Tervuren showed that cattle, sheep/goats and pigs were kept.

We were not able to establish any internal chronology for the sites. The settlements seem to have been conceived as a whole from the beginning. No overlap of structures or pits was recorded during the excavations. The observation that the rubbish in several pits was restricted to the bottom leads to the assumption that the settlements were deserted after a rather short period of time. C-14 analysis on charcoal from the bottom layers of the pits gave six dates for Wange-Damekot. The only determination carried out on nut shells, 5308–4848 cal BC (KIK-352/UtC-3678) for Wange-Neerhespenveld, probably is the most accurate (see also Table 1).

Pottery

Next, we will discuss the main features of the pottery recovered from the LBK sites along the Kleine Gete (Figure 6). The composition of the fabric and the addition of temper are clearly related to the size of the vessel. For larger objects, mainly grog was used as temper. Grog temper was also found in quite a few of the smaller vessels, although fine grogs can be hard to identify. In some of the small vessels sand was evidently mixed in as temper. We suspect that this sand came from sandstones, as a number of abraded sandstones with similar features were found on the site. Organic temper was also used to a limited degree; this can be deduced from the many voids in the fabric of some of the vessels. Most voids have a round shape, but elongated ones also occur. It is not clear what material was used for this temper.

Pottery can be formed in various ways. A common technique is to build the wall up using coils of clay,

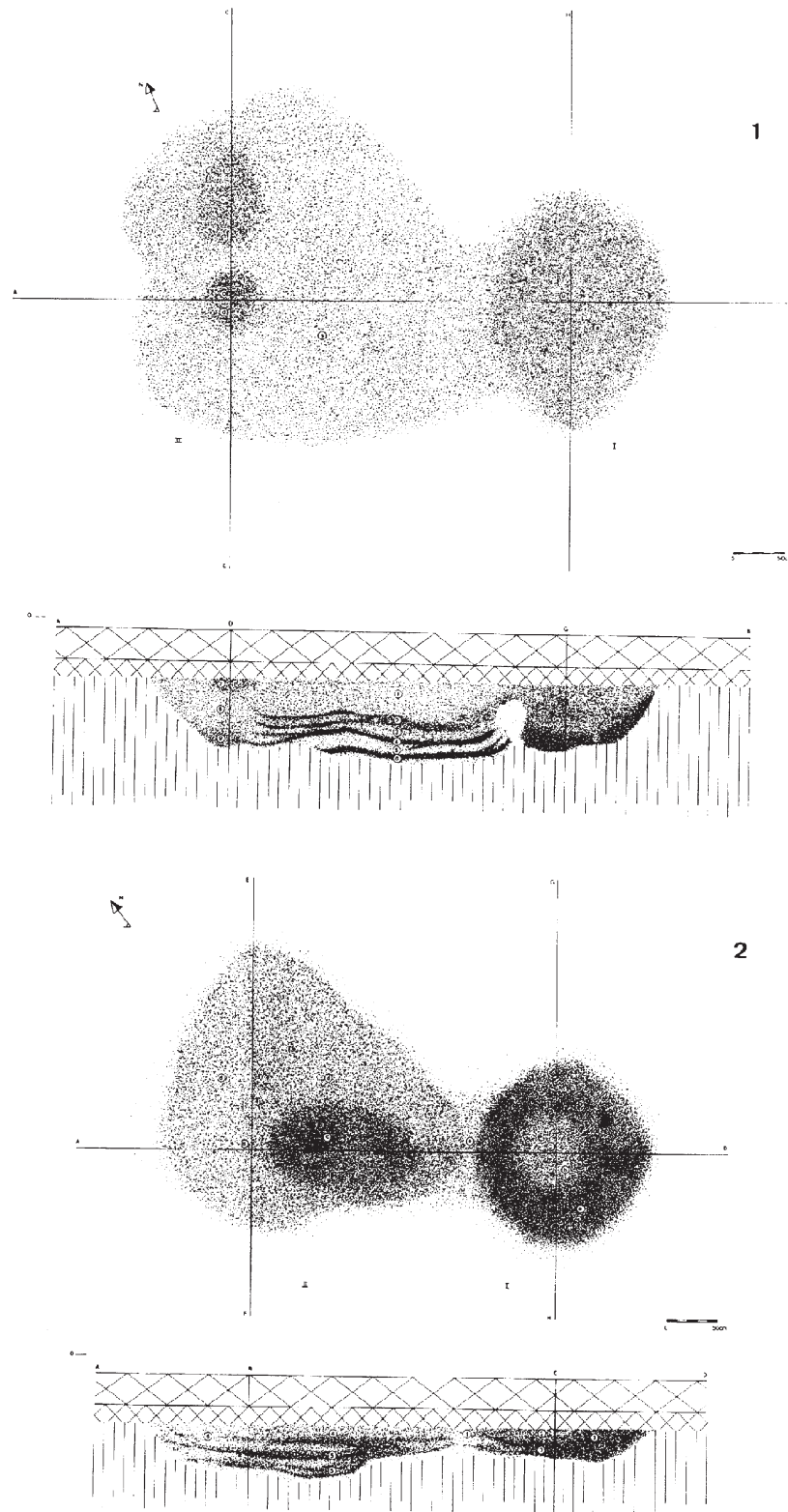


Figure 5. Plan and section of two similar pits in the LBK settlement at Overhespen-Sint-Annaveld. Their form, fill and orientation suggest that they were used as ovens or kilns.

Table 1. The radiocarbon dates for Overhespen-Sint-Annaveld, Wange-Neerhespenveld and Wange-Damekopt. Dates cal BC are given at 95.4% probability. Dates calibrated using the OxCal 3 programme.

Site	Sample code	Radiocarbon date (BP)	Calibrated date (cal BC)
Overhespen-Sint-Annaveld	GrN-12.620	6400 ± 100	5650-5050
	GrN-12.619	6190 ± 70	5310-4960
	KIK-392/UtC-3734	6130 ± 45	5220-4950
Wange-Neerhespenveld	Lv-1116	6310 ± 75	5470-5060
	KIK-352/UtC-3678	6150 ± 90	5310-4840
Wange-Damekot	KIK-366/UtC-3718	6250 ± 50	5330-5050

which are placed on top of each other to form a spiral, and then to smooth the coils together. A comparable technique is to form the vessel using slabs of clay. In both cases, the fracture lines will more often than not occur where the coils or slabs meet. However, like other researchers, we found no indications of either technique, especially not of the coiling technique, in the pottery of the LBK settlements at Wange and Overhespen. The sherds are very varied in form and size and have straight fracture surfaces. The sherds are not broken in the usual way in which ceramics built from clay coils break. Judging by the sherds, which can be very thin, potters always tried to achieve minimal thickness. The base is generally convex and so follows the profile of the vessel wall. Generally, the rims of the pots, especially the smaller ones, are no thinner or hardly any thinner than the wall of the belly of the pot. The surface of the great majority of the pots has been smoothed and sometimes even polished, but we do not know by what method. The colour of the pots varies widely, from black to grey to brown, with finely tempered pots being more often dark in colour, and the coarsely tempered pots more often of paler hue. The hardness of the fabric is determined by the composition of the temper: a fine-grained temper makes a hard pot.

The typological variation of the LBK pottery found at Wange and Overhespen is very great. In summary, one can say that the decorated pots most frequently have the pear-shaped profile which is characteristic of LBK pottery (78 %) and that the remainder consists largely of barrel-shaped pots with similar features, but without the characteristic shoulders of the pear-shaped pots. A number of bottles with decorative

patterns were also found, but most of these belong to the category of undecorated ceramics. The variation within the group of coarse ware is actually greater. Besides the pear-shaped and barrel-shaped pots, this group also includes open, semi-spherical and more closed bowls. Bottles are less well represented. Exceptional forms are the cylindrical beakers, plates and scoops. Regarding the applied attachments, too, there are many variations. The smaller pots usually do not have plastic attributes, whilst the bigger ones often have four knobs, which are evenly distributed over the widest diameter (the belly) or under the rim. Still larger pots often have perforated ears attached to the belly and plastic attachments on the rim, whilst the large containers have upwardly orientated knobs on the belly so that they can be carried on the head. The bowls usually only have plastic attachments, such as round or elongate knobs, on their rims.

The decoration patterns were usually made by drawing lines or by stabbing points or making fingernail impressions when the clay was leather-hard. Few pots demonstrate a decoration achieved by the surface being modelled by finger pinching or a combination of different decorative techniques. The final result also depended on what instrument was used, usually a lath with one or more teeth (a comb) that was used in a dragging or stabbing movement. A different tool was often used for the rim decoration than for the principal decoration. For the decoration outside the bands a different technique was usually applied (e.g. fingernail impressions), from which one can conclude that great care was taken in pottery production.

Regarding the decorative patterns, too, only a brief summary is possible here. The simple configuration,

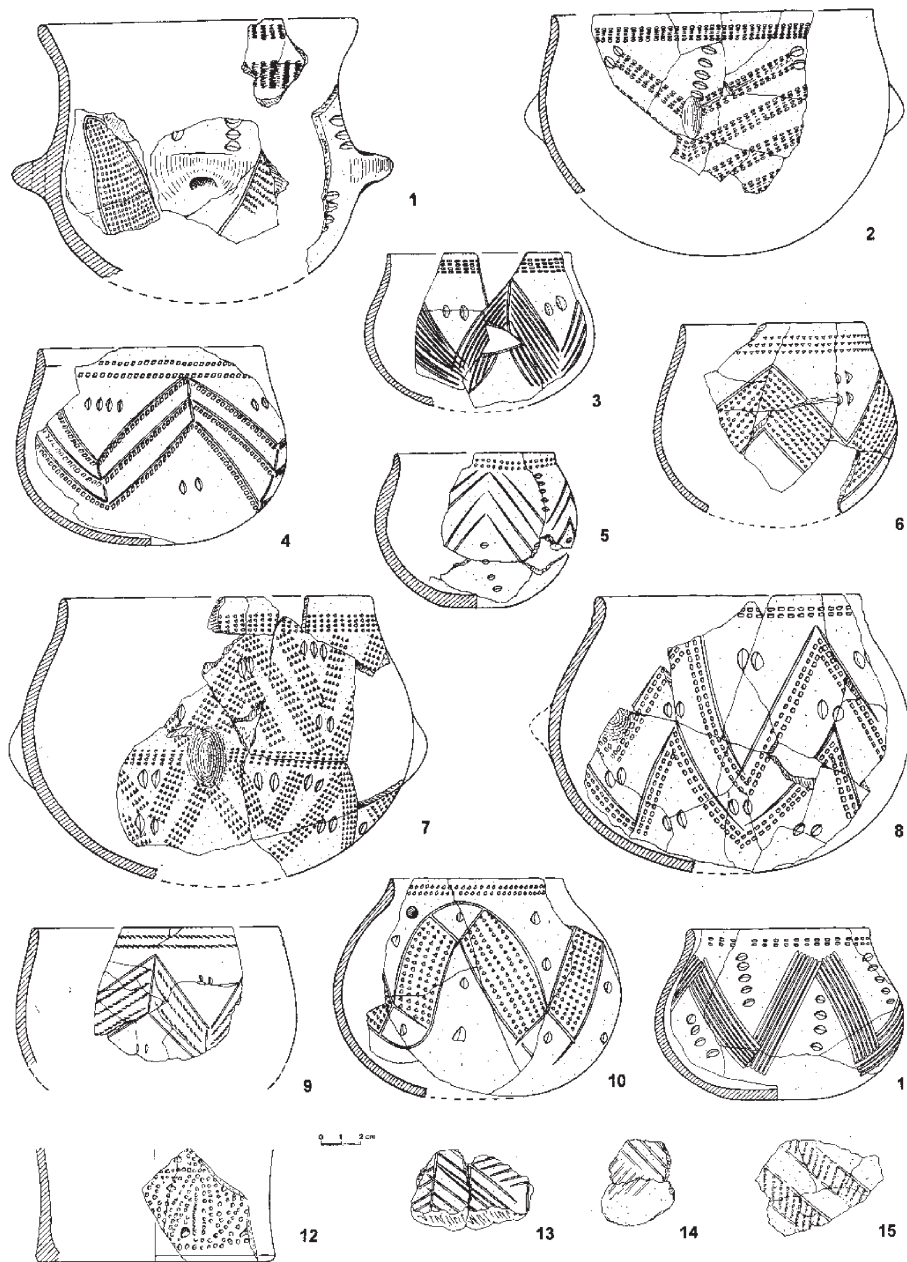


Figure 6. Some examples of the fine ware from the LBK settlements along the Kleine Gete. Numbers 12–15 are attributed to the Limburgkeramik.

where the principal decoration zigzags across the surface, dominates. Angular and undulating designs were favoured equally. On the bigger pots, these patterns are often repeated above and below the widest diameter of the vessel, usually marked by four knobs. Other motifs, such as spirals, are rare. Decorative patterns covering the whole wall, such as fingernail

impressions, are also exceptional. Predominantly, bands of two parallel lines were applied which were filled in either with lines or dots. A comb spatula was used in only one third of all cases. Still, within this framework a wide range of designs is possible, and every single pot in fact has its own particular decoration scheme (Figure 6) which consists of several elements:

the general design, the main motif, with possible secondary decoration within the bands and different ways of interrupting the bands, types of decoration between bands and finally the rim decoration. These elements, which can occur in combination with plastic attachments, were chosen in such a way that the entire wall surface was more or less evenly covered and the whole gave a harmonious outcome. Often, the potters went to a lot of trouble in their work (by using different types of spatulas, for example) and evidently did not begrudge the effort.

Different styles of decoration patterns occur on the sites of Wange and Overhespen. The simplest decorations show widely spaced bundles of broad parallel lines which, in practice, occur only in an undulating version and in combination with a simpler rim and secondary decoration. On other pots the lines are placed a little closer together or the lines or dots within the bands are still relatively far apart. There are no secondary types of decoration within the bands and the rim decoration usually consists of parallel lines and dots, whilst fingernail impressions are used between the bands. More elaborate patterns are used on other pots where the decoration is denser; the decorative elements are applied with a finer spatula and secondary band decoration and more decorative elements outside the bands are applied, often with a comb spatula. Finally there are pots the whole surface of which is covered with one single decoration type, such as fingernail impressions or pinches.

We were able to ascertain that these different styles were distributed almost homogeneously across the sites and the various pits and that no chronological significance can be attached to them, as was demonstrated by the seriations that were carried out. Apparently, the application of an angular or undulating design does not have any chronological significance either, as both occur in comparable quantities in the various pits.

A few sherds are totally different in tempering material, shape and decoration techniques (Figure 6, 12–15). Pots are usually semi-spherical and show small fragments of bone as tempering material. One bottom fragment (Figure 6, 12) clearly belongs to a cylindrical beaker. Based on these characteristics we believe that these sherds can be attributed to the Limburg pottery, which is accredited to another population (Modderman 1981; van Berg 1990). Although doubts have arisen in the meantime about the extent to which all the sherds that have been described as *Limburgkeramik* in the literature belong to the same cultural group, we believe

that, for the time being, we are justified in maintaining the attribution of our sherds.

Some of the most characteristic sherds were found in the rubbish pits of the LBK settlement at Overhespen. They have very thin walls and are made of a hard but very brittle fabric with a fine temper composed of grog and organic materials with a small admixture of fine, possibly burnt bone fragments. The surface has been smoothed in all cases, but usually exhibits an abundance of small round voids from the organic temper. The fractured surfaces are sometimes remarkably oblique (Figure 6, 13). The colour varies from beige to almost black, although most of the decorated sherds are red-brown. The decoration, which consists of lines, has been applied very superficially and usually is only visible in shadow contrast. The dots have been stabbed a little deeper but, because of their small dimensions, they are hard to distinguish from the little holes left by the organic temper. A very characteristic feature is the sharp angle at which the decoration was applied.

This group of sherds thus exhibits almost all the characteristic features of *Limburgkeramik* and provides evidence for the presence of these ceramics on the sites of Wange and Overhespen. In addition, sherds with similar technological features occur; in particular, the fine organic temper, the thinness of the walls and the carefully smoothed surface, which distinguishes them from traditional LBK pottery. A number of pits contain assemblages of these sherds which are something in between typical LBK pottery and *Limburgkeramik*. In most cases these ceramics are very fragmented, but bigger sherds too can raise doubt. Several colleagues have made similar observations in the literature. The question is whether the *Limburgkeramik* and the LBK pottery are always that distinct, and whether both groups – even if they had different origins and pottery traditions – may not have met, resulting in a mutual exchange of know-how.

Toolkit

Flint tools are abundant at the three sites but neither cores nor flakes nor other flint production waste were found. Flint is not to be found in the region but is quite abundant in the south of the Hesbaye, where it can be found as large nodules on the valley floors. Hence, one can assume that blades or finished tools were imported from sites in the Hesbaye region, where several LBK flint workshops have been identified (Jadin 1990; Vanderhoeft *et al.* 1996; Burnez-Lanotte and Allard 1997). The LBK tool kit is completely made of

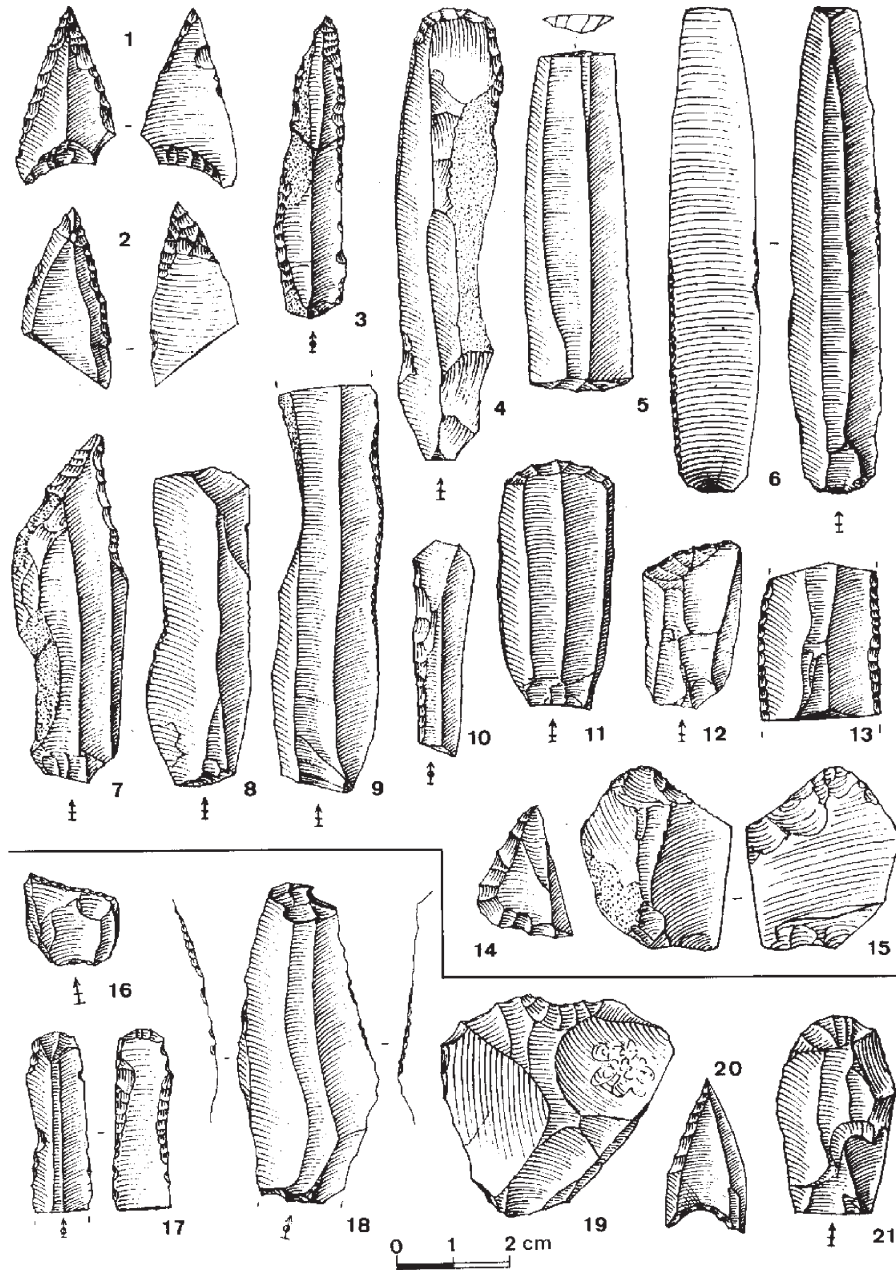


Figure 7. Flint (1–10) and Wommersom quartzite (16–21) tools from the LBK pits.

blades and consists of endscrapers, truncated blades, blades with traces of wear, sickle blades, burins and asymmetrical arrowheads (Figure 7). These are the standard tools of the western LBK. Flaking waste only consists of very small retouch or re-sharpening chips.

Besides the flint tools, many artefacts made in a fine-grained quartzite were recovered (Figure 7.16–7.21). They originate from an outcrop at Wommersom (Figure

2.4), a site only 3.5 km away from the nearest settlement. At that spot, this raw material can be found in the form of flat fractions, splintered from the original bedrock by frost. Hence, these blocks had to be knapped in a specific way, beginning at one of the small edges. Depending on the site, the total amount of artefacts in Wommersom quartzite varies from nine to ten percent of the total amount of artefacts. Since artefacts in Wommersom are

fresh and fragments can sometimes be joined, it is likely that the Wommersom quartzite was processed within the LBK settlements. No typical LBK or Mesolithic tools in Wommersom quartzite were found. One arrowhead has a concave base but no ventral retouch (Figure 7.20) and one scraper looks like an LBK endscraper but was made out of a flake (Figure 7.21). A few artefacts in Wommersom quartzite have been found at the adjacent sites in southern Hesbaye (Jadin 1990, 149).

Adzes in lydite from Ottignies-Mousty, which is 36 km to the southwest, were also produced in all three settlements. Several unfinished adzes (Figure 8.5) and hundreds of flakes were found in the LBK pits. Adzes vary from flat and large to high and long ones (Figure 8.1). Most of them were broken and left behind, obviously because there was no shortage of raw material. The techniques used to manufacture LBK adzes in lydite appear quite similar to those used on Wommersom quartzite. When shaped into a suitable form, the adzes were carefully polished. The corresponding whetstones are made out of iron-sandstone that originates from the Hageland. Adzes in lydite from Wange and Overhespen were found on many sites in Belgium, the Netherlands and even Germany (Toussaint and Toussaint 1980/82; Caspar 1984). Several artefacts in lydite appear to be small axes (Figure 8.2). In contrast to adzes, axes have a symmetrical cutting edge and their sides and heel are left unpolished. Several other atypical tools were made out of lydite (Figure 8.3 and 8.4). Millstones of different sizes were made out of a local rough quartzite.

Analysis of carbonised seeds (by Corrie Bakels)

The agricultural activities of the inhabitants of the Wange and Overhespen settlements are to a certain extent reflected in the carbonised plant remains they left behind (see Appendix). These were recovered by wet-sieving the fill of the pits. In total, 17 soil samples from Wange-Neerhespenveld, 28 samples from Overhespen-Sint-Annaveeld and 12 samples from Wange-Damekot have been analysed (Bakels 1992; Bakels pers. comm.). Not every sample revealed remains, but the results of those that did were rather similar. The appendix lists the species with the number of samples in which they have been encountered. Only fragments of unidentifiable cereals were not entered, but they occurred everywhere. *Pisum sativum* 2 in Wange-Damekot means, for instance, that in two of the ten samples with carbonised seeds one or more peas were found.

The table shows that at least four cultivated plants were present: naked barley, emmer wheat, einkorn wheat and pea. Hazelnuts and sloe plums were probably gathered. The ivy and lime fruits might have been brought in with branches lopped for fire-wood or animal feed. The herbs belong to the field weeds of the LBK, even if some of the species are not considered as field weeds in present times (Knörzer 1971; Bakels and Rousselle 1985). Emmer, einkorn and pea are common LBK crop plants.

The surprise is the naked barley. It is found in all three settlements. It is not found in the vast range of settlements excavated in the loess belt between the Rhine and the Méhaigne. This cereal is also absent from other classical LBK 'core' areas such as Lower Bavaria. As one of the main cereals grown, next to emmer and einkorn, the plant does turn up in LBK settlements situated in landscapes belonging to Sielmann's 'Ökologie-Kreis B' (Sielmann 1972). The regions with barley nearest to the Kleine Gete area are the Neckar area in Germany and the Aisne valley in France.

Why was barley cultivated regularly in the Kleine Gete area? The reason might be a climatological or pedological one. Barley is rather hardy. However, a climatological cause is not plausible, because there cannot have been much climatological difference with the adjacent loess belt. The soils, on the contrary, might have been less fertile. The area borders the sandy loam of the Hageland. But there is a third possibility, which is not environmental. It might be that the human population was not 'classic' LBK but influenced by other customs and tastes. I have suggested that the barley might have been introduced by non-LBK people (Bakels 1992). As a matter of fact, naked barley was a quite common cereal in early Neolithic cultures further to the south (Marnival 1988). Whether triggered by environmental or cultural causes, the occurrence of barley as a main crop in LBK societies deserves special attention.

Characteristics of the sites at Wange and Overhespen

After summarising this data, one can first of all conclude that the three LBK settlements along the Kleine Gete at Wange and at Overhespen correspond to the traditional image of the LBK; clustered settlements in a rolling landscape in the loess region, rectangular house plans with rubbish pits in the vicinity, pear-shaped vessels with the typical LBK decoration, traditional tools on flint blades, adzes made from ground stone, the cultivation of emmer, einkorn wheat and pea, the evidence of tool

use, such as blades with sickle gloss and millstones, and the keeping of cattle, sheep, goats and pigs. Also the occurrence of *Limburgkeramik* is not unique, even if its origin is not all that obvious. Most exceptional for the settlements along the Kleine Gete are the following additional characteristics: a small group of settlements beyond the traditional area of distribution of the LBK, slightly trapezoidal house plans, clusters of pits of a type which apparently has not been found elsewhere, the proximity to the outcrop of Wommersom quartzite that was processed locally, workshops where adzes were made in lydite, the presence of small axes, and especially the occurrence of barley.

We conclude that the inhabitants of the sites at Wange and Overhespen must have had strong connections with the LBK. They most probably had their roots in LBK societies. The tradition of oblong house constructions, the economy based on agriculture and cattle breeding, the typical tools and ceramics clearly belong to the characteristic western LBK as it is found in the south Hesbaye region, the Netherlands and the Rhineland. It is also typical of the LBK that each settlement had its own specialisation within its group (Cahen *et al.* 1990, 130). Our own investigations led to the conclusion that all types of flint material were imported as blades or finished tools from settlements from the south Hesbaye region, where flint can be found in the valleys and where conclusive evidence for large scale flint knapping exists (Jadin 1990).

Nevertheless, the LBK settlements along the Kleine Gete also took care of their own knapping, although it was limited to Wommersom quartzite and lydite. These two types of stone most commonly occur as fairly flat blocks, which had to be knapped in a specific way. The technique differs from the more prevailing flint knapping techniques. The exploitation, processing and distribution of these materials are most frequently associated with indigenous groups. The appearance of these stone types within the LBK settlements seems to indicate that the LBK inhabitants either took over this way of exploitation, or that they had a good contact with the local groups who kept up these traditions. The fact that the stoneworkers at Wange and Overhespen did not make typical LBK tools creates room for the interpretation that they were not of LBK origin. The observation that they specialised in making typical LBK adzes of excellent quality, tools which were more widespread in other LBK regions in the east, hints at a strong integration into the LBK economy. Moreover, we see that adzes and arrowheads of LBK type were also discovered in the more northern area

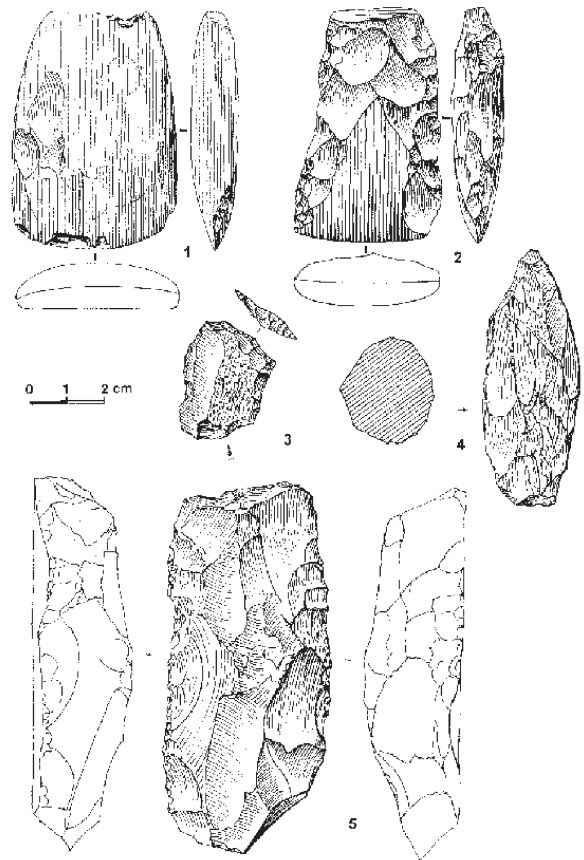


Figure 8. Unfinished adze (5), adze (1), axe (2) and other tools in lydite.

of the Hageland, a region where LBK settlements have not been discovered. In addition, the iron-sandstone which was used to polish the adzes appears to come from the Hageland. Therefore it is possible that part of the inhabitants of the LBK settlements at Wange and Overhespen did not have LBK origins.

The occurrence of Limburg pottery also points to the presence of a non-LBK population, which may or may not have been permanent. *Limburgkeramik* differs too much from LBK pottery to be considered a variant (van Berg 1990, 171). The chances for this ceramic to be preserved outside the protective environment of a LBK rubbish pit are very slim but not non-existent (Modderman 1981). In spite of this, *Limburgkeramik* appears to be widespread. It is still unclear who the producers of *Limburgkeramik* were. They nevertheless appear to constitute a significant component in the context of the early Neolithic populations. Even though it is most commonly accepted that they had their roots

in the more indigenous groups, they may have had customs comparable to those of LBK societies. However, the lack of distinct traces and archaeological material makes them archaeologically invisible and renders it difficult to estimate their influence and position in the Neolithisation process in central Belgium.

We next return to the discovery of barley within the LBK sites along the Kleine Gete. The presence of barley on the three sites suggests that this is not a coincidence. Moreover, the sampling of the LBK pits was carried out very carefully. The occurrence of barley is an important indication of the influence of non-LBK groups. At this stage, the chronological relation with other barley cultivating sites in the early Neolithic is not completely clear. However, the sites along the Kleine Gete seem to have fulfilled a pioneering function. Whether the barley at Wange and Overhespen was imported via the same population group as the *Limburgkeramik* and the lydite manufacturers is not yet clear.

The early Neolithic period in Belgium: some reflections

When placing these elements in a broader context, we notice that an isolated group of LBK settlements was found in the loess area in western Belgium (Figure 1). At present, five rather small LBK settlements (c. 1.5 ha) are known in the neighbourhood of the sources of the Dender, in the Hainaut province (Constantin *et al.* 1980; Constantin 1985; Cahen *et al.* 1993; Constantin and Demarez 1997; Gillet *et al.* 1997; Bosquet and Livingstone Smith 1997). This cluster of settlements is situated about 100 km west of the nearest LBK settlement in the Hesbaye area. Nevertheless, their archaeological features seem very similar to those of the Hesbaye settlements. Due to massive erosion processes in the loess area, few house plans were recovered. These appear to have been very similar in plan and construction and were accompanied by the typical elongated rubbish pits. A morphological, technical and decorative comparison of the ceramic production underlines the great similarities with the Hesbaye area. The LBK pottery is frequently associated with *Limburgkeramik* and the range of tools from these Hainaut settlements is identical to the Hesbaye toolkit. Alongside the imported flint from the Hesbaye region, local flint was also used. These settlements appear to have been occupied for a rather short time period. At present, it is not clear why this LBK population, which was apparently of Hesbaye origin, moved so far westward.

Detailed excavations have demonstrated that various settlements along the northwest border of the LBK cluster in the southern Hesbaye (Figure 1) appeared to have been fortified with walls and ditches: Darion (Cahen *et al.* 1985), Waremme (Trocki *et al.* 1988; Keeley and Cahen 1989), Oleye (Cahen *et al.* 1990; Figure 9), Vaux-et-Borset (Caspar *et al.* 1992) and Remicourt (Bosquet *et al.* 1997; Bosquet and Prued'Homme 1998). Within this context, it is somewhat peculiar that neither the settlements along the Kleine Gete, nor those in Hainaut, contain a defensive structure with walls and ditches. It is possible that only one of the settlements functioned as a central stronghold for the inhabitants of the neighbouring villages (Cahen *et al.* 1990, 142). In that case, we have not come across the fortified settlement(s) along the Kleine Gete. There might, however, also be a chronological explanation for the difference between fortified and non-fortified settlements. According to this hypothesis, either the settlements at Wange and Overhespen were deserted at or even before the time of the hostilities, or they may have been established only after peace had returned. Even though examples of such villages, like Darion and Waremme, were possibly immediately constructed as a fortified settlement, others, such as Oleye, seem to have added a wall and ditch at a later date (Cahen *et al.* 1990, 137; Jadin and Cahen 1997). The available data would also imply that the fortifications of some of these settlements lost their functionality in a later phase (Cahen *et al.* 1990, 138). This leads to the assumption that a security problem arose after the initial colonisation, and disappeared in a later phase. This implies that the colonisation of the region did not take place in a hostile atmosphere and that the termination of the LBK settlements in central Belgium was not triggered by fatal conflicts.

Who caused the trouble for these LBK settlements is not known. The security problem may have had its origin in internal conflicts, even though the location of these fortified settlements at the periphery of the LBK distribution suggests a conflict with outsiders. It is not clear who formed the threat; were there other local groups, or did people migrate from faraway places? Both options remain open. It is even possible that the inhabitants of the settlements along the Kleine Gete formed a threat for their southern neighbours. Even though we need to be careful with these interpretations, we may at least conclude that the LBK settlements in Hesbaye do not have a straightforward history.

The time period in which we should locate the settlements of Wange and Overhespen remains uncertain. Did they belong to the first expansion phase



Figure 9. Aerial photograph of the ditch that partly surrounded the LBK settlement of Oleye. Picture taken on the 11th of March 2007 by Rene Pelegrin (K.U. Leuven).

of the LBK in Hesbaye? Did they not succeed in keeping their position, or were they only settled in a later phase? Typological and C-14 analyses are presently inadequate to come to an unequivocal conclusion. It remains largely uncertain when these settlements were established within the framework of the Belgian LBK. It is also difficult to determine for how long they persisted. The absence of overlapping structures points rather to a short-lived settlement, possibly only lasting for one generation. The circumstances of its termination are also ambiguous: did the inhabitants leave abruptly or gradually? And what were the causes? Did the inhabitants decide to leave themselves, or were they forced by external circumstances? The questions remain unanswered, as is the enigma of what became of these inhabitants.

The successor in this region of the LBK appears to have been the *Groupe de Blicquy*. So far, eight settlements have been found in the immediate vicinity of the LBK settlements in Hainaut (Constantin and Demarez 1997; Deramaix 1997). In addition, habitation and funerary remains of this group were found near two frontier settlements of the LBK in Hesbaye, i.e. at Darion and at Vaux-et-Borset (Cahen *et al.* 1993; Caspar *et al.* 1993; Hauzeur *et al.* 1997). The longhouses here have a trapezoidal plan and the ceramic production is similar to that of the LBK, although bone temper was used. The

flint industry also follows the LBK tradition, although local material was being used. Bracelets in schist are typical of this group. The *Groupe de Blicquy*, which was originally confined to Hainaut, apparently had a greater impact than initially expected. At this point in research, however, there are too few indications to conclude that this *Groupe de Blicquy* was also present along the Kleine Gete. Further investigations are needed to shed light upon this question.

To summarise, we may conclude that the three sites at Wange and Overhespen predominantly show LBK characteristics, yet also contain elements which are related to non-LBK societies. It is not clear whether these groups are indigenous in origin or whether their roots are elsewhere. The cultural affinities with the traditional LBK people, together with the chronological relation of these sites with other LBK groups, are currently an issue for debate.

The Early Neolithic Period in Europe: some reflections

Since the sites at Wange and Overhespen were discovered and the excavation data had been analysed in detail, many new discoveries have been made regarding the origins of the LBK people in Europe and the presence of other non-LBK societies. It is becoming

more and more perceptible that western Europe was inhabited by neolithised groups of people other than the LBK, and that these groups of people maintained very close contact with LBK settlements in various different regions. These other groups are represented by Limburg ceramics, La Hoguette ceramics and other pottery assemblages (e.g. *Begleitkeramik*) which can be clearly distinguished from LBK pottery on the basis of their fabric, their shape and their decorative patterns (if present). The relationships between the various non-LBK groups are not yet clear, and we feel that we know too little about them at present to be able to draw any conclusions about their origins, distribution or chronological development. It is also far from clear how the non-LBK people lived, because only very few settlements where they occur as a distinct group have been found. The occurrence of their distinctive pottery in LBK settlements is too rare to shed light on their identity.

The results of excavations at various sites allow us to conclude that these groups were already present in certain regions before the arrival of the LBK culture. It is also clear from the excavation results on different sites that they were able to survive in a relatively independent way even after the arrival of the LBK people. At any rate, judging by pottery found in association with pottery from various LBK phases, non-LBK pottery was not recognizably influenced by LBK pottery, at least not as regards the distinctiveness of the pottery. Apparently, no integration or mutual influences regarding the fabric, shapes or decorative patterns which were used by the two groups, LBK and non-LBK, occurred throughout the whole of the LBK period.

The 'snap shot' picture of this evolution that was presented to us at the Wange and Overhespen sites is in keeping with this general perspective. Here, at the edge of the area of LBK distribution, a period of intensive contact between LBK and non-LBK groups evidently occurred which, although it was only for a short time, was peaceful and productive. There is clear evidence

of cooperation and the mutual exchange of expertise, which, more than in other places perhaps, resulted in specific features such as the trapezoidal form of the ground plans of dwellings and the specialized debitage of Wommersom quartzite and lydite.

Nevertheless, it is still difficult to determine the precise relationship between the LBK people and those of non-LBK origin. We find it hard to shake off the impression that contact between the two groups was already well-established at the time of the settlements in Wange and Overhespen and hence did not begin when the settlements were founded. It is possible that more or less intensive contact had already existed for many years or decades, in which case the type of community existing in the settlements of Wange and Overhespen would confirm earlier contact, perhaps in previous generations. We can even ask to what extent the origin of both of these populations still played a role within the communities inhabiting the settlements. It is possible that integration was already well advanced, even though distinctive characteristics of both communities still existed.

Whatever the case, the present elements seem to indicate that these settlements along the Kleine Gete river played a short yet crucial role in the history of contact between LBK and non-LBK groups. Even if we are not able to reconstruct the precise events of the period in question, we hope that further research will shed more light on the relationship between these populations in the near future.

This contribution is a reworked copy of an earlier article, published in 2000 as Marc Lodewijckx and Corrie Bakels, 'The interaction between early farmers (Linearbandkeramik) and indigenous people in central Belgium', in J. C. Henderson (ed.), *The prehistory and early history of Atlantic Europe*, 33-46. Oxford: BAR. The issue of these frontier settlements of the LBK has remained topical in the light of new discoveries made elsewhere in Europe.

Appendix

Carbonised seeds from LBK sites at Wange and Overhespen.

Site	Wange-N	Wange-D	Neerhespen	
number of samples with remains	8	10	16	
Cultivated plants				
<i>Hordeum vulgare</i> var. <i>nudum</i>	1	1	1	naked barley
<i>Triticum dicoccum</i>	1	-	3	emmer wheat
<i>Triticum monococcum</i>	1	1	-	einkorn wheat
<i>Tr. dicoccum/monococcum</i>	3	3	7	emmer or einkorn
<i>Pisum sativum</i>	1	2	1	pea
Trees and shrubs				
<i>Corylus avellana</i>	1	2	2	hazelnut
<i>Hedera helix</i>	-	-	1	ivy
<i>Prunus spinosa</i>	-	-	1	sloe plum
<i>Tilia</i> sp.	-	-	1	lime
Wild grasses				
<i>Bromus arvensis/hordeaceus/secalinus</i>	4	2	3	field, soft or rye brome
<i>Bromus sterilis/tectorum</i>	-	1	-	barren or drooping brome
<i>Chenopodium album</i>	1	6	4	fat hen
<i>Fallopia convolvulus</i>	-	3	2	black bindweed
<i>Galium aparine</i>	-	2	-	cleavers
<i>Galium</i> cf. <i>spurium</i>	-	-	1	false cleavers
<i>Lapsana communis</i>	1	3	4	nipplewort
<i>Persicaria lapathifolia</i>	1	-	-	pale persicaria
<i>Phleum</i> sp.	-	-	2	cat's tail
<i>Stachys sylvatica</i>	-	-	1	hedge woundwort
<i>Rumex</i> cf. <i>sanguineus</i>	-	-	1	red-veined dock
<i>Rumex</i> sp.	-	2	-	dock
<i>Vicia sepium</i>	-	-	1	bush vetch
<i>Indeterminatae</i>	1	3	1	unidentified

Bibliography

- Bakels, C. C. 1978. Four Linearbandkeramik settlements and their environment: a paleoecological study of Sittard, Stein, Elsoo and Hienheim. *Analecta Praehistorica Leidensia* 11.
- Bakels, C. C. 1992. The botanical shadow of two early Neolithic settlements in Belgium: carbonized seeds and disturbances in a pollen record. *Review of Palaeobotany and Palynology* 73, 1–19.
- Bakels, C. C. and Rousselle, R. 1985. Restes botaniques et agriculture du néolithique ancien en Belgique et aux Pays Bas. *Helinium* 25, 37–57.
- Behre, K.-E. 1986. *Anthropogenic indicators in pollen diagrams*. Rotterdam/Boston: A.A. Balkema.
- Bosquet, D. and Livingston Smith, A. 1997. Ath-Ormeignies. Un habitat rubané au lieu-dit 'Le Pilon'. In M.-H. Corbiau (ed.), *Le patrimoine archéologique de Wallonie*, 177–79. Namur: Commission Royale des Monuments, Sites et Fouilles.
- Bosquet, D. and Preud'Homme, D. 1998. Dernière campagne de fouille sur le village rubané de Remicourt au lieu-dit 'En Bia Flo' II (TGV oriental). *Notae Praehistoricae* 18, 119–22.
- Bosquet, D., Preud'Homme, D., Fock, H. and Goffioul, C. 1997. Découverte d'un village rubané fossoyé à Remicourt au lieu-dit 'En Bia Flo' (TGV oriental). *Notae Praehistoricae* 17, 103–10.
- Broström, A., Gaillard, M.-J., Ihse, M. and Odgaard, B. 1998. Pollen-landscape relationships in southern Sweden – a first step towards quantification of vegetation openness in the past. *Vegetation History and Archaeobotany* 7, 189–201.
- Burnez-Lanotte, L. and Allard, P. 1997. Le site rubané du 'Petit Paradis' à Harduémont (Verlaine, Lg.): résultats de la campagne 1997. *Notae Praehistoricae* 17, 117–21.
- Butler, W. and Haberey, W. 1936. *Die bandkeramische Ansiedlung bei Köln-Lindenthal*. Berlin: de Gruyter.
- Cahen, D., Langohr, R., Sanders, J., Heim, J. and Caspar, J. P. 1985. Le village rubané de Darion (prov. de Liège, Belgique). *Bulletin de la Société Royale Belge d'Anthropologie et de Préhistoire* 96, 7–86.
- Cahen, D., Keeley, H., Jadin, I. and van Berg, P.-L. 1990. Trois villages fortifiés du Rubané récent en Hesbaye liégeoise. In D. Cahen and M. Otte (eds), *Rubané et Cardial: actes du colloque de Liège, novembre 1988*, 125–46. Liège: University of Liège.
- Cahen, D., Caspar, J. P., Constantin, C., Hauzeur, A. and Jadin, I. 1993. Dix ans de progrès dans la connaissance du Néolithique ancien en Hainaut et en Hesbaye. *L'archéologie en région wallonne 1980–1990*, 21–30. Namur: Commission Royale des Monuments, Sites et Fouilles.
- Caspar, J. P. 1984. Fabrication et réaménagement d'herminettes rubanées en phtanite. *Bulletin de la Société Royale Belge d'Anthropologie et de Préhistoire* 95, 47–58.
- Caspar, J. P., Hauzeur, A., Docquier, J., Bit, R., Van Assche, M. and Tromme F. 1992. Le fossé rubané de Vaux-et-Borset 'Gibour'. *Notae Praehistoricae* 11, 77–83.
- Caspar, J. P., Constantin, C., Hauzeur, A. and Burnez-Lanotte, L. 1993. Nouveaux éléments dans le Groupe de Blicquy: le site de Vaux-et-Borset 'Gibour' et 'à la Croix Marie-Jeanne'. *Helinium* 33, 67–79.
- Constantin, C. 1985. *Fin du Rubané, céramique du Limbourg et post-Rubané. Le Néolithique le plus ancien en Bassin parisien et en Hainaut*. Oxford: BAR.
- Constantin, C. and Demarez, L. 1997. Beloel-Aubechies. Rubané, céramique du Limbourg et Groupe de Blicquy à 'Coron Maton'. In M.-H. Corbiau (ed.), *Le patrimoine archéologique de Wallonie*, 169–73. Namur: Commission Royale des Monuments, Sites et Fouilles.
- Constantin, C., Farrugia, J.-P. and Demarez, L. 1980. Aubechies: site de la céramique Linéaire en Hainaut occidentale. *Bulletin de la Société Préhistorique Française* 77, 367–84.
- Deramaix, I. 1997. Ath-Irchonwelz. Un habitat du Groupe de Blicquy. In M.-H. Corbiau (ed.), *Le patrimoine archéologique de Wallonie*, 180–81. Namur: Commission Royale des Monuments, Sites et Fouilles.
- Gillet, E., Burnez-Lanotte, L. and Demarez, L. 1997. Un nouveau site rubané en Hainaut à Blicquy 'Ville d'Anderlecht' (Leuze-en-Hainaut). *Notae Praehistoricae* 17, 93–95.
- Greig, J. 1982. Past and present lime woods of Europe. In S. Limbrey and M. Bell (eds), *Archaeological aspects of woodland ecology*, 23–55. Oxford: BAR.
- Hauzeur, A., Burnez-Lanotte, L., Delye, E., Constantin, C., and Caspar, J. P. 1997. Villers-le-Bouillet-Vaux-et-Borset. Villages mitoyens du Rubané et du Groupe de Blicquy à 'Gobour' et 'à la Croix Marie-Jeanne'. In M.-H. Corbiau (ed.), *Le patrimoine archéologique de Wallonie*, 174–76. Namur: Commission Royale des Monuments, Sites et Fouilles.
- Jadin, I. 1990. Économie de production dans le Rubané récent de Belgique. Approche comparative des industries lithiques de trois villages. In D. Cahen and M. Otte (eds), *Rubané et Cardial: actes du colloque de Liège, novembre 1988*, 147–53. Liège: University of Liège.
- Jadin, I. and Cahen, D. 1997. Des villages fortifiés le long du haut Geer. Pourquoi? Contre qui? In M.-H. Corbiau (ed.), *Le patrimoine archéologique de Wallonie*, 164–68. Namur: Commission Royale des Monuments, Sites et Fouilles.
- Kalis, J. 1988. Zur Umwelt des frühneolithischen Menschen: ein Beitrag der Pollenanalyse. In H.-J. Küster (ed.), *Der prähistorische Mensch und seine Umwelt. Festschrift für U. Körber-Grohne*, 125–37. Hannover: Leibnitz Universität.
- Keeley, L. H. and Cahen, D. 1989. Early Neolithic forts and villages in NE Belgium: a preliminary report. *Journal of Field Archaeology* 16, 157–76.
- Knörzer, K.-H. 1971. Urgeschichtliche Unkräuter im Rheinland, ein Beitrag zur Entstehungsgeschichte der Segetalgesellschaften. *Vegetation* 23, 89–111.
- Langohr, R. 1990. The dominant soil types of the Belgian loess belt in the early Neolithic. In D. Cahen and M. Otte (eds), *Rubané et Cardial: actes du colloque de Liège, novembre 1988*, 147–53. Liège: University of Liège.
- Lodewijckx, M. 1990. Les deux sites rubanés de Wange et d'Overhespen (Belgique, prov. Brabant). In D. Cahen and M. Otte (eds), *Rubané et Cardial: actes du colloque de Liège, novembre 1988*, 105–16. Liège: University of Liège.
- Lodewijckx, M. and Bakels, C. 2000. The interaction between early farmers (Linearbandkeramik) and indigenous people in central Belgium. In J. C. Henderson (ed.), *The prehistory and early history of Atlantic Europe*, 33–46. Oxford: BAR.
- Marinval, P. 1988. *Ceuillette, agriculture et alimentation végétale de l'épipaléolithique jusqu'au 2e âge du Fer en France méridionale*.

- Paris: École Hautes études de Science et de Sociologie.
- Modderman, P. J. R. 1970. Linearbandkeramik aus Elsloo und Stein. *Analecta Praehistorica Leidensia* 3.
- Modderman, P. J. R. 1981. Céramique du Limbourg: Rhénanie-Westphalie, Pays-Bas, Hesbaye. *Helinium* 21, 140–75.
- Modderman, P. J. R. and Waterbolk, H. T. 1958/59. Zur Typologie der verzierten Tonware aus den bandkeramischen Siedlungen in den Niederlanden. *Palaeohistoria* 6/7, 173–82.
- Roosens, H. 1962. Gebouwen van een bandkeramische nederzetting op de Staberg te Rosmeer. *Archaeologia Belgica* 61, 121–44.
- Sielmann, B. 1972. Die frühneolithische Besiedlung Mitteleuropas. In H. Schwabedissen (ed.), *Die Anfänge des Neolithikums vom Orient bis Nordeuropa. Fundamenta* A/3–Va, 1–65. Köln: Böhlau.
- Toussaint, M. and Toussaint, G. 1980/82. Pétrographie et paléogéographie des herminettes omaliennes de Hesbaye. *Les Chercheurs de la Wallonie* 25, 503–59.
- Trocki, P., Keeley, L. H. and Cahen, C. 1988. Waremme-Longchamps, a fortified LBK site: preliminary report. *Bulletin de la Société Royale Belge d'Anthropologie et de Préhistoire* 99, 115–28.
- van Berg, P.-L. 1990. Céramique du Limbourg et néolithisation en Europe du nord-ouest. In D. Cahen and M. Otte (eds), *Rubané et Cardial: actes du colloque de Liège, novembre 1988*, 161–208. Liège: University of Liège.
- Vanderhoeft, E., Burnez-Lanotte, L., Clarys, B. and Van Assche, M. 1996. Le 'Petit Paradis' à Harduémont (Verlaine, Lg): un atelier de débitage laminaire dans le Rubané de Hesbaye. *Notae Praehistoricae* 16, 145–49.
- Zvelebil, M. 2004. The many origins of the LBK. In A. Lukes and M. Zvelebil (eds), *LBK dialogues: studies in the formation of the Linear Pottery culture*, 183–205. Oxford: BAR.