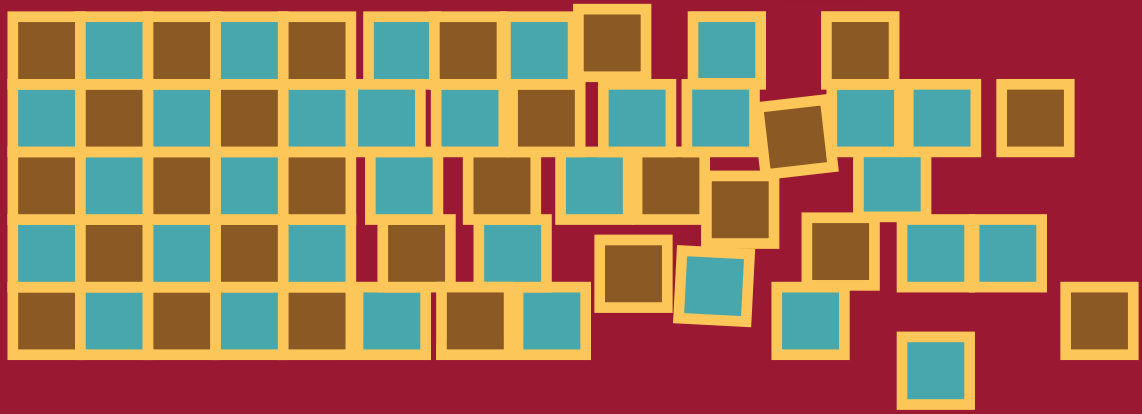




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Silviane Scharl and Birgit Gehlen (Eds.)

Mobility in
Prehistoric Sedentary Societies



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Verlag Marie Leidorf GmbH
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Silviane Scharl and Birgit Gehlen (Eds.)
Mobility in Prehistoric Sedentary Societies

Kölner Studien zur Prähistorischen Archäologie 8 (Rahden/Westf. 2017)

304 pages, 155 figures, 15 tables incl. 7 plates.
Text in English.

Hardcover: 21,0 x 29,7 cm
ISBN 978-3-86757-368-9

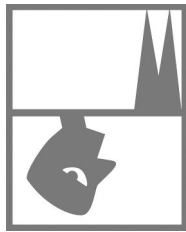
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KÖLNER STUDIEN ZUR PRÄHISTORISCHEN ARCHÄOLOGIE

Band 8



Herausgegeben von

Heinz-Werner Dämmer, Jürgen Richter und Andreas Zimmermann

für das

Institut für Ur- und Frühgeschichte der Universität zu Köln

Silviane Scharl and Birgit Gehlen (Eds.)

MOBILITY IN PREHISTORIC SEDENTARY SOCIETIES

Papers of the CRC 806 Workshop in Cologne
26–27 June 2015



A CRC 806 MONOGRAPH



Verlag Marie Leidorf GmbH • Rahden/Westf.
2017

304 Seiten mit 155 Abbildungen, 15 Tabellen inkl. 7 Tafeln

Gedruckt mit Unterstützung des SFB 806 "Our Way to Europe", Universität zu Köln



Bibliografische Information der Deutschen Nationalbibliothek

Scharl, Silviane / Gehlen, Birgit (Eds.):
Mobility in Prehistoric Sedentary Societies.
Papers of the CRC 806 Workshop in Cologne
26–27 June 2015.
Rahden/Westf. : Leidorf, 2017
(Kölner Studien zur Prähistorischen Archäologie ; Band 8)
ISBN 978-3-86757-368-9

Die Deutsche Nationalbibliothek verzeichnet diese Publikation in der Deutschen Nationalbibliografie.
Detaillierte bibliografische Daten sind im Internet über <http://dnb.ddb.de> abrufbar.

Gedruckt auf alterungsbeständigem Papier

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Verlag Marie Leidorf GmbH
Geschäftsführer: Dr. Bert Wiegel
Stellerloh 65 D-32369 Rahden/Westf.

Tel: +49/(0)5771/9510-74
Fax: +49/(0)5771/9510-75
e-mail: info@vml.de
Internet: <http://www.vml.de>

ISBN 978-3-86757-368-9
ISSN 1868-2286

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E-mail: secretary.prehistory@uni-koeln.de - Homepage: <http://www.uni-koeln.de/phil-fak/praehist>

Umschlagentwurf und -gestaltung: Hartwig H. Schluse, Köln
Satz, Layout und Bildbearbeitung: Lutz Hermsdorf-Knauth, Köln
Ganzseitige Fotos: Silviane Scharl, Köln
Redaktion: Ursula Tegtmeier, Köln

Druck und Produktion: druckhaus köthen GmbH & Co. KG, Köthen

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FORAGERS AND FARMERS DURING THE NEOLITHIC TRANSITION IN WESTERN CENTRAL EUROPE: SEARCHING FOR EVIDENCE OF MOBILITY AND INTERCULTURAL NETWORKS

Birgit Gehlen

in cooperation with

Anna-Leena Fischer, Ingrid Koch, Thomas Richter, Nele Schneid, Werner Schön, Kai Vogl and Mirijam Zickel

INTRODUCTION

This paper¹ discusses the interaction between foragers and farmers during the various phases of the neolithisation processes in south-western and north-western Central Europe. The disparate state of research on Late Mesolithic hunter-gatherer groups and Early Neolithic farmers² in terms of the certainty of the detailed chronology, the number of sites and the comprehensiveness of the find and feature analyses, does not permit a discussion on the basis of equally-weighted data. Nevertheless, examples can be found to illustrate and evaluate such interaction with regard to the questions raised in this volume on “Mobility in prehistoric sedentary societies”. Important for the following discussions are the distribution maps (**Figs. 2–4**) and the sites of special interest (**Fig. 1**; list of sites in **Appendix**, p. 73).

RESEARCH ON THE NEOLITHISATION PROCESSES IN CENTRAL EUROPE

For decades, archaeological research has addressed the neolithisation processes in Europe. The various studies have been influenced by diverse schools of thought and the continuous development of archaeological methodology (KIENLIN 2006; SCHARL 2003; 2004). After many years of stagnation in Mesolithic research in the regions associated with the Linear Pottery Culture (Linearbandkeramik – LBK), investigations have again intensified since the 1990s (TILLMANN 1993; GRONENBORN 1997; KIND 1998). Especially over the past few years, further progress has been made in investigating the Late and Final Mesolithic, which is also of significance for Neolithic research (e.g. LÖHR 1994; HEINEN 2006; MAUVILLY et al. 2008; FISCHER et al. 2009; GEHLEN 2010; KIND et al. 2012; MILLER et al. 2012; RICHTER, TH., 2017 forthcoming). Nevertheless, the number of Late Mesolithic sites in the north-western area that are conclusive from the maps are – especially for the Netherlands – only the minimum of sites already published. In the Netherlands there are most probably hundreds of surface collections and dozens of excavated sites, which have

not been published yet (see ARTS 1989; LANTING & VAN DER PLICHT 1997/1998; NIEKUS 2005/2006; VERHART 2000). The number of probably existing but not registered assemblages from private collections in Western and South-western Germany and Belgium is unknown. For North-western Germany (Rhineland and Westphalia), the already published sites and those recorded by the archaeological heritage management are shown in map **Figure 2**. In northern Central Europe, the state of research on the neolithisation processes is generally better because the investigation of the late phase of the Mesolithic – in particular the Ertebølle

1 Birgit Gehlen was the person primarily responsible for the choice of topics and the ideas for the maps in **Figures 1–4** and **18** as well as for the development of the text and other graphics. Data for the maps were compiled by Anna-Leena (find processing and literature research on the äLBK; FISCHER 2016), Ingrid Koch (find processing Trier region; KOCH 1997 and work on CRC 806, Project D4, 2013–2015), Werner Schön (find processing Bavaria and Baden-Württemberg), Nele Schneid (literature research North-Rhine Westphalia), Thomas Richter (find processing Bavaria; RICHTER 2017 forthcoming; this PhD thesis also provided important information on land use and mobility in Old Bavaria during the Late Mesolithic) and Birgit Gehlen (find processing Bavaria, Baden-Württemberg, North-Rhine Westphalia, literature and archive research). Kai Vogl and Mirijam Zickel prepared the basal maps for **Figures 1–4** and **Fig. 18**. Silvine Scharl and Werner Schön undertook a critical review of the manuscript. We thank Marjorie de Grooth, Hartwig Löhr, Sara Schiesberg, and Hans-Christoph Strien for helpful discussions.

We also would like to thank Beverley Hirschel for the English translation of the manuscript.

2 In the following text, the term “Late Mesolithic” is used for all archaeological remains of later Mesolithic communities that include trapezes – regardless of the specific dating. This cannot be conclusively determined in the case of inventories made up of surface finds. Moreover, it is often not possible for such find assemblages to be unequivocally separated from those of Early Neolithic communities. Such assemblages that are obviously contemporaneous with the Early Neolithic because their dates seem to be more or less certain, are attributed to the Final Mesolithic in the text and on the maps. Mesolithic assemblages with trapezes, regular blades and surficially retouched microliths are referred to as RMS Mesolithic B in this article, without regard to the quantity of these microliths in the inventories or the closer context.

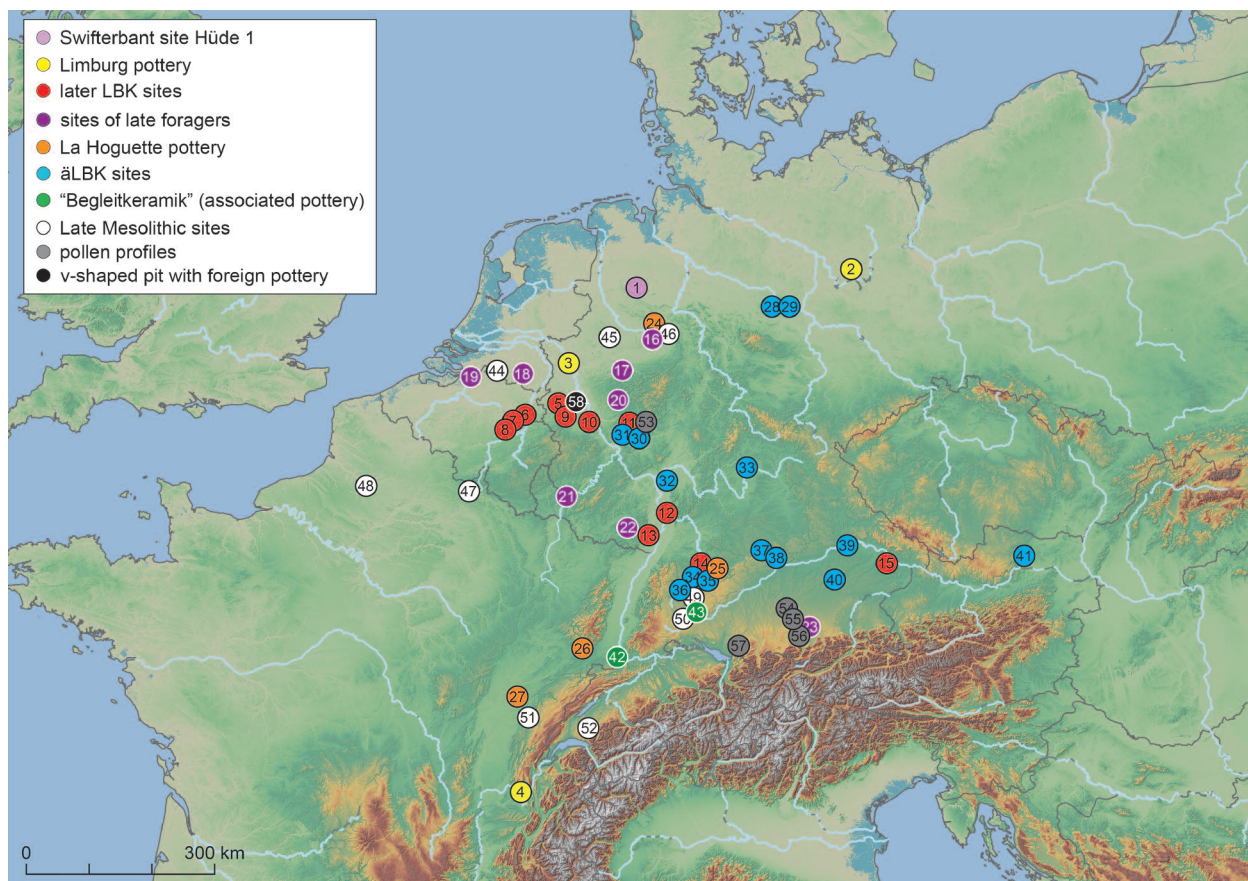


Fig. 1 Sites of special interest mentioned in the text and in **Figure 17**.

1 Swifterbant site Hüde I in Lower Saxony; 2–4 sites with Limburg pottery; 5–15 later LBK sites; 16–23 sites of late foragers; 24–27 sites with La Hoguette pottery; 28–41 älBK sites; 42, 43 sites with pottery in late or final Mesolithic context; 44–52 Late Mesolithic sites; 52–56 Pollen profiles; 57 V-shaped pit with foreign pottery. (Map by B. Gehlen, K. Vogl and M. Zickel; list of sites see **Appendix**, p. 73)

Culture in the Baltic area – has traditionally, and for many years, been at the forefront of Stone-Age research. At the same time, the Funnel Beaker Culture (Trichterbecherkultur) continues to be intensively investigated (e.g. HOIKA 1999; HARTZ & LÜBKE 2005; FURHOLT & MÜLLER 2011; HARTZ et al. 2011; KABACINSKI et al. 2015). Since the definition of the Swifterbant Culture in the 1990s, information on the Late and Final Mesolithic phases in the North Sea area has improved greatly thanks to large-scale excavations in the northern and western Netherlands, which have made a more differentiated consideration of the neolithisation of the Lower Rhine area possible (RAEMAEKERS 1999; LOUWE KOOIJMANS 2007; VANMONTFORT 2008; AMKREUTZ 2013). In northern Belgium, too, great progress has been made in recent years (CROMBÉ et al. 2009; CROMBÉ 2010; CROMBÉ et al. 2015a; 2015b). In the loess areas of the north-west, on the other hand, the assumed Mesolithic aspects of the LBK are only gradually being paid more attention in Stone-Age archaeology (e.g. DE GROOTH 2008; HEINEN 2010; VANMONTFORT et al. 2010; ROBINSON et al. 2011; 2013). Re-

search on the non-LBK pottery of the “La Hoguette” and “Limburg” groups, has also intensified in recent years (e.g. MANEN & MAZOURIÉ DE KEROUALIN 2003; HAUZEUR 2009; JEUNESSE & VAN WILLIGEN 2010; GOMART & BURNEZ-LANOTTE 2012; for a recent compilation of the sites see CZIESLA 2015) and new types of pottery from Late Mesolithic and Early Neolithic contexts, which can be subsumed under the heading of “Begleitkeramik” or “associated pottery” (see papers in VANMONTFORT et al. 2010), are gradually becoming a focal point in archaeological research. At present, archaeologists in France, Belgium and Germany are working on further detailed studies of the pottery of these groups as well as on the chronology and distribution of the connected cultural groups. The results of these studies are eagerly awaited. This inconsistent state of research makes the investigation of intercultural networks difficult since most of the information on finds and features are associated with the Neolithic. In the following discussion, conclusions regarding Mesolithic aspects will therefore often be drawn from an Early Neolithic context.

INTERCULTURAL CONTACTS

There is no doubt that local foragers were in contact with the earliest farmers. It can even be assumed that the migration of members of the earliest LBK (äLBK) from their supposed region of origin in Transdanubia could not have occurred so rapidly and successfully without the help of local hunter-gatherer groups in the regions they passed through (STRIEN, this volume). On closer examination, it can be concluded that in various fields of activity there were contacts between the individual groups and that these could serve as a basis for proof of mobility. Indeed, the facts we can observe in the archaeological find material represent – it is presumed – elements of wide-ranging networks. Mobility of the groups, sections of groups or individuals involved was indispensable for the creation and maintenance of these networks. The search mentioned in the title of this paper is based on the archaeological sources in two geographical areas: southern and north-western Central Europe. These regions were chosen because they are, at present, the only areas affording sufficient data on flint material, pottery, burial rites, and land use for an investigation of the key issues.

An attempt to describe the mobility of, and interaction between, different social and cultural groups in the early phase of the Neolithic transition in the two areas³ is only possible if the characteristic cultural attributes and the settlements can be addressed chronologically. In this regard, the LBK can be considered as well-researched: numerous studies have allowed a relative chronology to be established for many regions, most of which have also been confirmed by absolute ¹⁴C dates. From studies of the pottery, the radiocarbon dates, and with the help of dendrochronological measurements from the wooden lining of wells, various models have been generated for the origin of the LBK, its ‘takeover’ of land and the subsequent waves of colonisation (e.g. HOFMANN 2016; Strien, this volume; STRIEN 2017 in

print; regional studies in BICKLE & WHITTLE 2013; PECHTL 2009; KALICZ 2010; ZVELEBIL et al. 2010). It is important to point out here that a recent evaluation of the ¹⁴C dates for the oldest phase of the LBK indicates that the earliest large-scale settlement of southern Germany probably took place only around 5300 BC. Consequently, the äLBK settlements there would have been mostly concurrent with the Flomborn phase of the early LBK and even, partially, with the middle phase (JAKUCS et al. 2016). In view of the fact that the pottery is similar to that found in a dendrochronologically dated well in Mohenice, Bohemia, Hans-Christoph Strien prefers a different scenario, in which the LBK first appeared in Germany already around 5500 calBC (STRIEN 2017 in print, Tab. 1).

Researchers are not yet in agreement on the extent to which the people of the La Hoguette and Limburg pottery groups in western Central Europe should be considered hunter-gatherers, pastoralists or farmers (e.g. LÜNING 2000, 5; 7; 110f.; KALIS et al. 2001; JEUNESSE 2002; MANEN & MAZOURIÉ DE KEROUALIN 2003; CONSTANTIN et al. 2010; see CZIESLA 2015 for a detailed discussion), because the pottery in question is mainly known from LBK contexts.

Such a favourable state of research is not the case for the Late Mesolithic. This can clearly be seen on the maps (Figs. 2–4), which reflect the disparities in the state of research very clearly.⁴ As far as the Late Mesolithic is concerned, only a few regions can be considered at all: in many regions there are no, or only vague, indications of any Late Mesolithic presence. This is above all due to problems of preservation, unsatisfactory publication of private collections and less intensive research on this period. An extreme example is Austria: while the äLBK is well documented and

³ The maps are based in part on data recorded for Project D4 of CRC 806 “Our Way to Europe” undertaken by Cologne University (www.sfb806.uni-koeln.de/index.php/projects/cluster-d/d4). In large part, the data came from research in publications and finds recorded in sources other than CRC 806. Most important information come from: GOB 1981; LÖHR 1994; SPIER 1997; SPIER & RINGENBACH 1997; DUCROCQ 2001; BILLIN 2009; NIELSEN 2009; GEHLEN 2010; CZIESLA 2015.

Although it would be of fundamental interest for our research to present a complete map of all known Late and Final Mesolithic sites of Western and Eastern France, we were not able to do this enormous work. Only the RMS B-sites and sites with asymmetrical retouched trapezes are shown on the map. The list of all mapped sites with coordinates and references will be published online by the CRC 806.

Sites of the äLBK were only mapped for the study areas. The sites from eastern and northern Germany and the Czech Republic are not shown here, but are presented in the publication of A.-L. FISCHER (2016).

⁴ The maps were generated using the programmes Q-GIS and ArcGIS. – Source: Zickel, M., 2017, Z2 Project, CRC 806 “Our Way to Europe”, Department of Geography, University of Cologne, m.zickel@uni-koeln.de.

Data:

– SRTM: The Shuttle Radar Topography Mission. 2000, USGS. <https://lta.cr.usgs.gov/SRTMVF> (accessed: 2017-01-17).

– Natural Earth Data, 2016. 50m-countries, 10m-lakes. <http://www.naturalearthdata.com/downloads/> (accessed: 2017-01-17).

– Digitales Landschaftsmodell 1:250 000. 2013, Bundesamt für Kartographie und Geodäsie – Außenstelle Leipzig – Dienstleistungszentrum.

http://www.geodatenzentrum.de/geodaten/gdz_rahmen.gdz_div?gdz_spr=deu&gdz_akt_zeile=5&gdz_anz_zeile=1&gdz_unt_zeile=1&gdz_user_id=0 (accessed: 2017-01-20).

– CORINE Land Cover. 2012, Bundesamt für Kartographie und Geodäsie – Außenstelle Leipzig – Dienstleistungszentrum.

http://www.geodatenzentrum.de/geodaten/gdz_rahmen.gdz_div?gdz_spr=deu&gdz_akt_zeile=5&gdz_anz_zeile=1&gdz_unt_zeile=22&gdz_user_id=0 (accessed: 2017-01-20).

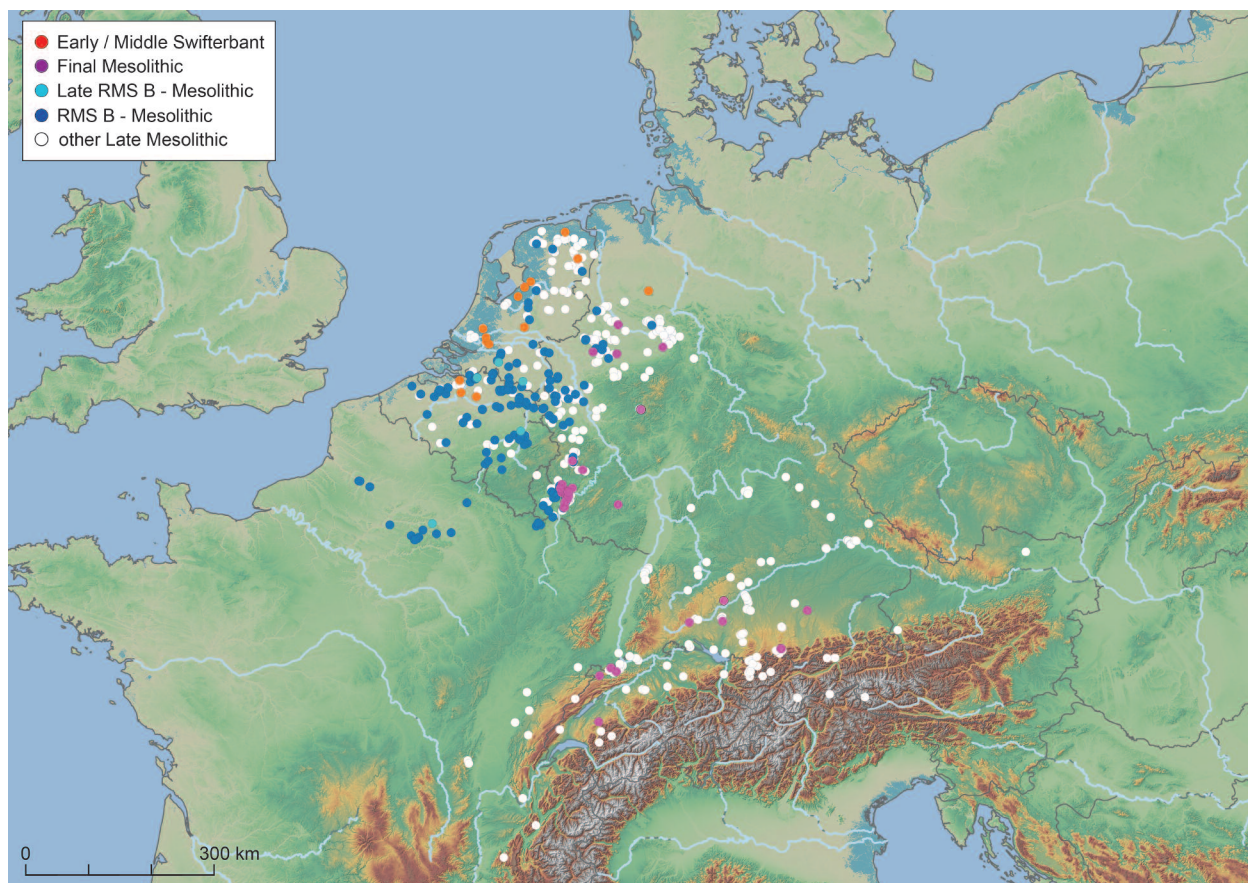


Fig. 2 Sites of the Late Mesolithic, the early and middle Swifterbant Culture, and Final Mesolithic in the area studied. Since Final Mesolithic assemblages can usually only be identified by means of absolute dates or comprehensive research for the southern part of the study area, very few such sites are therefore shown on the map. For the northern part, only sites with Danubian arrowheads are shown as Final Mesolithic. Late Mesolithic sites in the northern region include sites of the Rhine-Meuse-Scheldt (RMS) Mesolithic, Phase B, and other sites with trapeze-shaped microliths. Late Mesolithic sites are not mapped for Northern France (except the RMS B Mesolithic sites). (Map by K. Vogl and M. Zickel)

published, Late Mesolithic sites are only found in the Alpine region where archaeologists from the University of Innsbruck have been focusing specifically on the Mesolithic for many years (e.g. LEITNER 1998/99; 1999; 2004; SCHÄFFER 2006; 2011).

Since obvious similarities between Mesolithic and Early Neolithic find assemblages in the study area are mainly related to stone artefacts, the discussion of arrowheads is distinctly more detailed than that of other categories of finds.

Arrowheads as an instrument for the identification of social groups and traditional societies

To what extent the sites and types of arrowheads mapped in **Figures 2–4** represent the remains of “cultural groups” or traditions is generally still an open question. There are insufficient accurately dated find assemblages for this purpose. It is also usually difficult to differentiate between Late and Final Mesolithic assemblages. Concerning the lithic

artefacts the latter reveals mostly the same technological and similar typological characteristics as the Late Mesolithic assemblages and are thought to be contemporaneous with the local Early Neolithic. This is only true of ^{14}C dated inventories and perhaps the sites with asymmetric arrowheads and trapezes in some regions in the northern part of the study area (e.g. the area around Trier – see below). The remains of later foragers who lived in the northern part of the study area after 4500 calBC, such as “Bokel Fenn II” (GEHLEN et al. 2015) or the human remains from the “Blätterhöhle” cave that have been absolutely dated to the 4th millennium and genetically identified (BOLLONGINO et al. 2013), are deliberately not addressed here and are therefore not shown on the distribution maps (**Figs. 2–4**). Here are the suggested dates for the following Late and Final Mesolithic cultural phenomena in the study area:

Rhine-Meuse-Scheldt, phase B (Late + Final Mesolithic)
between approx. 6600 and 5200 calBC
(e.g. CZIESLA 2015, 109ff.; HEINEN 2012b).

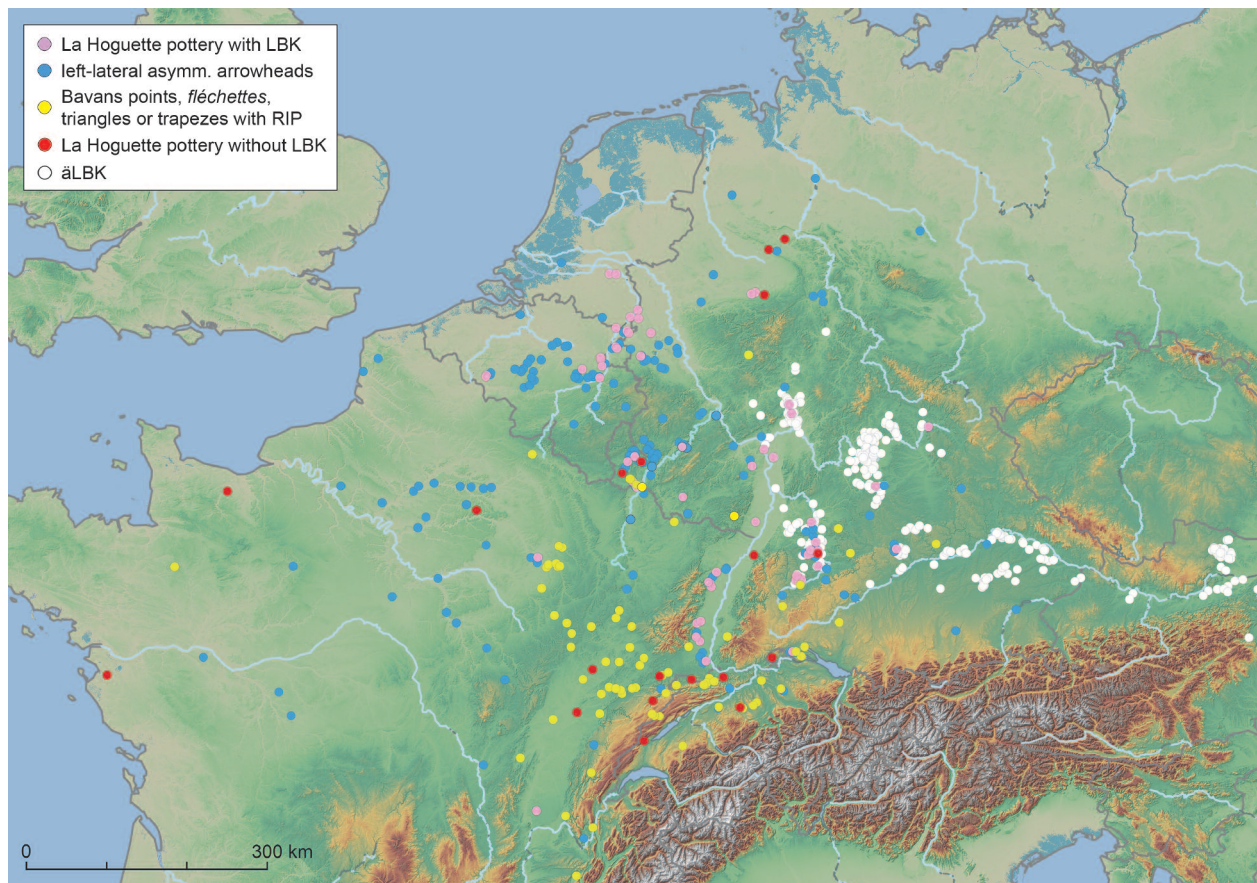


Fig. 3 Sites with pottery of the “La Hoguette” type or sites with “Begleitkeramik” (associated pottery) and sites with facially retouched points in the study areas, combined with the distribution of ãLBK settlements and the presence of asymmetric arrowheads with left-lateral retouch. (Map by K. Vogl and M. Zickel)

Late Mesolithic in southern Germany, Austria and Switzerland
between approx. 7000 and 5500 calBC
(e.g. GEHLEN 2010, 723; NIELSEN 2009, 684).

Final Mesolithic in southern Germany and Switzerland
from approx. 5500 calBC
(e.g. GEHLEN 2010, 723; RICHTER, TH., 2011;
NIELSEN 2009, 690).

Final Mesolithic sites in Westphalia
from approx. 5000 calBC onwards. Only ^{14}C -dated
Mesolithic artefacts (antler mattocks) or flint-assemblages
with trapezes and regular blades are mapped (see **Fig. 2**).

“La Hoguette” in the French Jura
from approx. 5500 calBC
(e.g. GEHLEN 2010, Fig. 36).

Early and middle Swifterbant Culture
from approx. 5600 calBC to 4500 calBC
(e.g. AMKREUTZ 2013, 127ff.)

Late Mesolithic

For most of the sites and finds that we have attributed to the Late Mesolithic in southern Germany, the question of whether they date to the 7th or to the 6th millennium remains unanswered because there are almost no trapezes with *retouche inverse* plate (RIP) – flat ventral retouch at the base – or facially retouched arrowheads that are typical of Southwestern and Western Central Europe (see compilation in CZIESLA 2015). These arrowheads do not appear east of Lake Constance in Bavaria. Here only asymmetric and symmetric shaped trapezes without *retouche inverse* plate are common. On surface sites, such as in the Main area (SPIES 2016, 251; Abb. 13) or in Southern Bavaria (FISCHER et al. 2009), a risk of confusion with settlements of the earliest LBK (ãLBK) cannot be excluded as, there, symmetrical trapezes predominate, that are characteristic for the ãLBK. Closer examination of the artefact assemblages could provide further information as seen, for example, in the study of Germering-Nebel by Thomas RICHTER (2011, 95f.), where specific triangular microlith types have been found

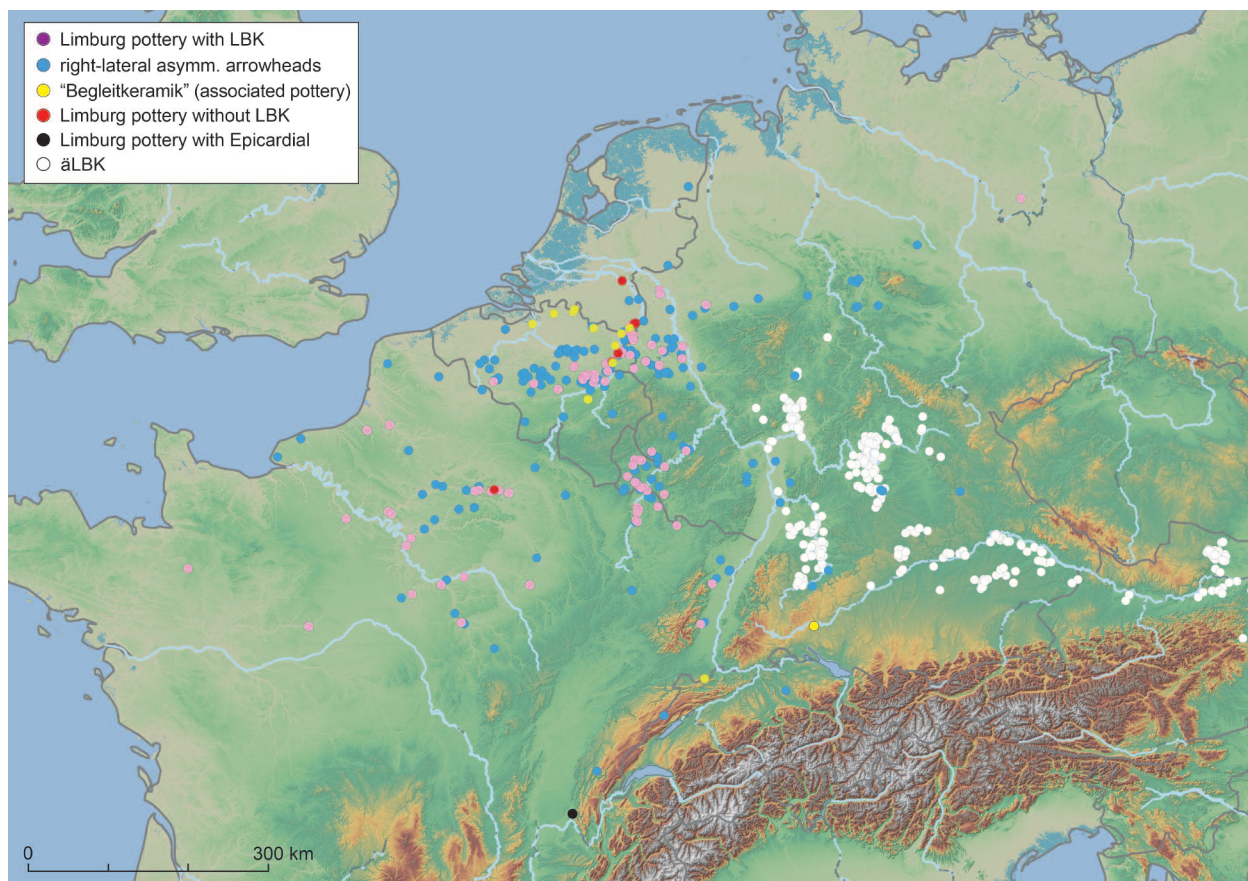


Fig. 4 Sites with pottery of the “Limburg” type or with “Begleitkeramik” (associated pottery) in the study areas, combined with the distribution of ãLBK settlements and the presence of asymmetric arrowheads with right-lateral retouch. (Map by K. Vogl and M. Zickel)

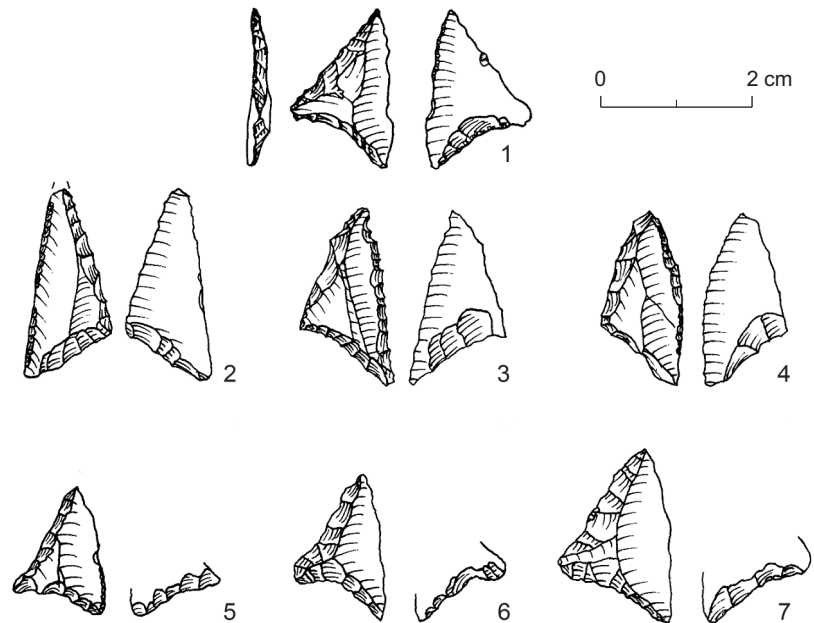
that are also known from the Rottenburg “Fröbelweg” settlement site dating to the ãLBK (KIND 2005, 289).

Asymmetric arrowheads, Bavans arrowheads, etc.

In north-western Central Europe, the presence of asymmetric arrowheads, rectangular or triangular points with one longer retouched edge and a concave retouched base with RIP⁵ (Fig. 5) – elsewhere than on LBK settlement sites – can be interpreted at least partly as evidence for Final Mesolithic settlements (KOCH 2006). The sites with such points in the Trier area outside the Moselle valley are therefore shown as probably Final Mesolithic sites on the map (cf. Fig. 2). However, pieces from Weelde-Paardsdrank 5 in Flanders (HUYGE & VERMEERSCH 1982, Fig. 23), Boves “Le Marais” southeast of Amiens (DUCROCQ 2001, 104) and “la Culotte” at Rémilly-les-Pothées (Dep. Ardennes) (SOUFFY et al. 2015) show that such types can already date to around 5800 calBC or 5400 calBC, i.e. much earlier than any LBK settlement west of the Rhine. Similarly, for example, such points have been found at Castel in the Somme valley in a

5 Sometimes these asymmetrical points are still called Danubian arrowheads, LBK-arrowheads or Omalien-points in the elder literature for the Low Countries. The first description of “Danubian arrowheads” was given by A. Bohmers & A. de Bruijn, who characterized these points as follows: “Die Spitzen von dreieckiger Gestalt haben meistens eine nicht oder weniger intensiv retuschierte Kante und einen scharfen (spitzen) Winkel. Dieser Winkel weist in den Zeichnungen nach oben, die kürzeste Kante nach unten. Letztere ist des öfteren mehr oder weniger hohl ausretuschiert. Wenn sie dabei mit der obengenannten am wenigsten retuschierten Kante einen stumpfen Winkel bildet, dann liegt eine ‘klassische’ bandkeramische Spitze vor. Sie (d.h. die kürzeste Kante) kann aber auch einen scharfen (spitzen) Winkel bilden; dann ergibt sich ein Dreieck, das oberflächlich eine gewisse Ähnlichkeit mit mesolithischen Dreiecken zeigt. Die Kanten der Spitzen können von beiden Seiten aus retuschiert sein und diese Retusche kann sich mehr oder weniger weit über die Oberfläche ausbreiten” (BOHMERS & DE BRUIJN 1958–1959, 184). Later on J.G. Rozoy described the various triangular and trapeze-shaped microliths with *retouche inverse* plate in his articles on the typology of the Franco-Belgian Mesolithic and Neolithic as “armatures de type danubien” (ROZOY 1968, 362f.; 1971, Fig. 1,1–20). At the time, he assumed that the Mesolithic inhabitants had adopted this type of retouch from the contemporaneous LBK population. The variability in the forms depicted by BOHMERS & DE BRUIJN (1958–1959, Abb. 113) and ROZOY (1968, Fig. 1) corresponds to the variety of types shown in LÖHR (1994, Abb. 10–12).

Fig. 5 Asymmetric retouched arrow-heads with RIP (so-called Danubian points) from various cultural contexts: 1 Friedberg-Bruchenbrücken, ãLBK c. 5300 calBC; 2–4 Weelde-Paardsdrank 5, Late Mesolithic c. 5800 calBC; 5–7 Himelting, with La Hoguette pottery, not dated. Scale 1:1. (From GRONENBORN 1990, Fig. 1)



purely Mesolithic stone-tool context together with asymmetric trapezes and triangles with RIP dating to 5031 ± 139 calBC (DUCROCQ 2009, 359). At the same time, numerous finds in LBK contexts prove that these types were also still in use until around 5000 calBC. They are not only evidence of continuity from the later phase of

the Late Mesolithic to the end of the Early Neolithic but also suggest that such points are originally a Mesolithic element in the LBK context. A “typological series” to illustrate the origin of various forms of Early Neolithic arrowheads in the Late Mesolithic was presented in ROBINSON et al. 2013 (Fig. 6).

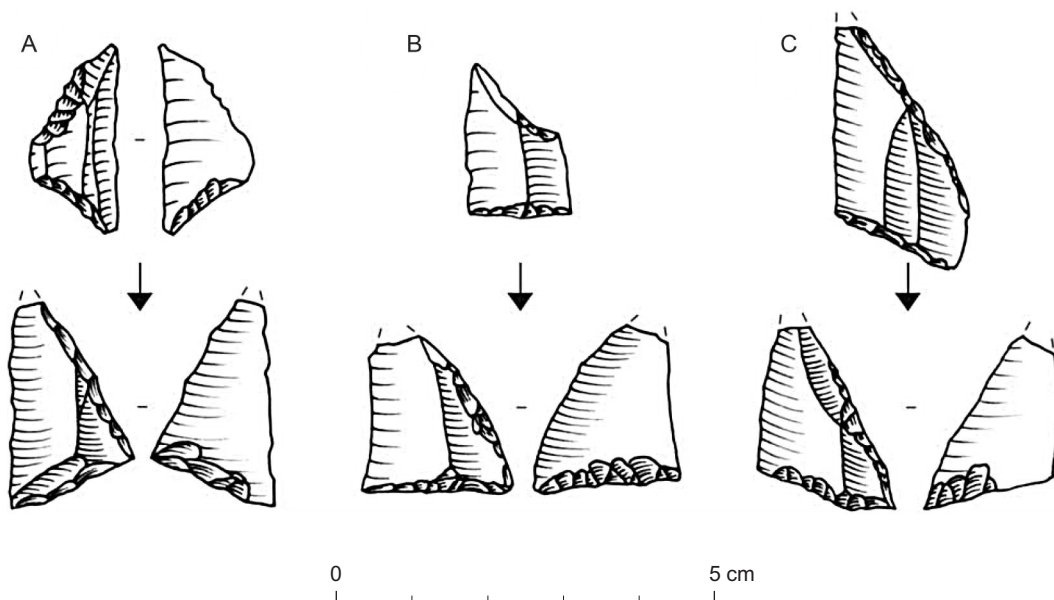


Fig. 6 The presumed development from trapeze-shaped microliths (upper row) to *pointes évoluées* (A, B) and modified trapezes (C) (lower row). Scale 1:1. (From ROBINSON et al. 2013, Fig. 1)

The asymmetric arrowheads described above also play a central role in the discussion of the origins of La Hoguette and Limburg pottery groups. This type of point and its distribution will therefore be considered in greater detail here. For both pottery groups it is generally assumed that foraging societies adopted pottery making under the influence of Mediterranean Early Neolithic cultures in southern France as of the middle of the 6th millennium (MANEN & MAZURIÉ DE KEROUALIN 2003, 131ff.; JEUNESSE & VAN WILLIGEN 2010; LÖHR & ZEEB-LANZ 2012, 69; JEUNESSE et al. 2014; CZIESLA 2015, 173ff.). On the other hand, the very small number of “pure” sites associated with these pottery groups has also been criticised. CONSTANTIN et al. (2010) believe that both pottery styles originated in an LBK context. In addition, they point out similarities in the decorative style of both groups and assume a “genetic” link (CONSTANTIN et al. 2010, 42). In connection with the question of the origins of the two pottery groups, the “lateralisation” of the asymmetric points is also of interest. The position of the retouched edges on asymmetric arrowheads has long been investigated and quantified (LÖHR 1991; 1994; HAUZEUR & LÖHR 2006). Different cultural traditions have been concluded from the lateralisation emphasis in the inventories combined with the geographical location of the sites. Most of the work on this subject has been done by Hartwig Löhr and was published in his detailed and comprehensive article in the journal *Trierer Zeitschrift* in 1994. Additional work was published by Anne Hauzeur and Löhr (2006). Thus, asymmetric arrowheads with left-lateral retouch are mainly found in south-western Europe and south-western Central Europe; those with right-lateral retouch, on the other hand, in Western Europe and north-western Central Europe (see maps in LÖHR 1994). The data on inventory characteristics presented by LÖHR (1994) and HAUZEUR & LÖHR (2006) have been used here to map the left-lateral and right-lateral retouched asymmetric arrowheads. The major part of these artefacts stem from LBK context. Following up on Löhr’s article (1994), Christian JEUNESSE (2002) and Martin HEINEN (2006) linked the distribution area of asymmetric arrowheads with right lateral retouch with the region where Limburg pottery is more common. From the geographical distribution of these elements in the inventories, which were often found almost in LBK contexts, Jürgen RICHTER (1997) also concluded that there was a cultural connection. On the other hand, he pointed out that the distribution of the various types of lateralisation could not be equated with specific cultural groups but only indicated an area with common, long-lasting traditions (RICHTER, J., 1997, 41ff.). On the map presented here (cf. **Fig. 4**), this geographical connection can also be observed. But it is still not clear how the cultural context should be interpreted. Did the asymmetric arrowheads with right-lateral retouch belong to the people who made the Limburg pottery or was

there a different cultural context? There is only little direct evidence for a combination of Limburg pottery, LBK pottery and right-lateral retouched so-called Danubien points. One example is the small assemblage from Alpen-Veen in the German Lower Rhineland outside the LBK settlement area (HINZ 1974). Without further detailed investigation of the relevant find material and features, the simultaneous appearance of Limburg pottery and asymmetric points with right-lateral retouch in LBK contexts does not permit any conclusion regarding the cultural background of the people who disposed of the rubbish in the settlement pits.

Exemplary studies on diversity within LBK settlements have been published by ROBINSON et al. (2010) and DE GROOTH (2008; 2014) based on the morphology of the arrowheads and raw material procurement linked with the locations of various houses in a settlement. Here, however, there is much potential for future research: in particular, the elaboration of a typological chronology from both the Late Mesolithic and Neolithic point of view would be a useful field of research in the future. One problem in the discussion of the cultural attribution of the asymmetric arrowheads is the wide spectrum of forms among the thus designated arrowheads. Arrowheads in western France (e.g. *armatures à éperon* – MARCHAND 1999; *flèches de Belloy* – THÉVENIN 1991; see also ROZOY 1971) are sometimes very similar to the asymmetric arrowheads discussed here, so that a cultural connection should be taken into account (see also THÉVENIN 1995; JACOTTEY et al. 2000; JEUNESSE 2002; ALLARD 2007; JEUNESSE & VAN WILLIGEN 2010). Here, without further detailed studies, there will be confusion in the terms used. Löhr’s illustrations also show the broad typological range of arrowheads (LÖHR 1994, Abb. 6; 10–12). An example from the Trier region is shown in **Figure 7**. Late Mesolithic trapezes and asymmetric points of various shapes were found together on several sites near the village of Ralingen-Wintersdorf and on other sites in the wider region. It would probably be worthwhile to differentiate further within this group of artefacts and discuss combinations within the inventories and their geographical distribution.

Since these types of arrowheads – with left or right lateral retouch – appear in both the LBK context – with and without Limburg or La Hoguette pottery – as well as far beyond the settlement area of the LBK, it is obvious that they were not only bearers of cultural information but that they also illustrate the mobility of and interaction between sections of the Mesolithic and Early Neolithic populations especially in the Paris Basin and the areas to the West (see JEUNESSE 2002; ALLARD 2007; MARCHAND 2007; CROMBÉ 2010). This can be seen over large areas on the maps presented in this article. Here, though, the great potential for the analysis of our main questions is far from exhausted. Not only the typological differentiation already mentioned above but also detailed investigations of find contexts and

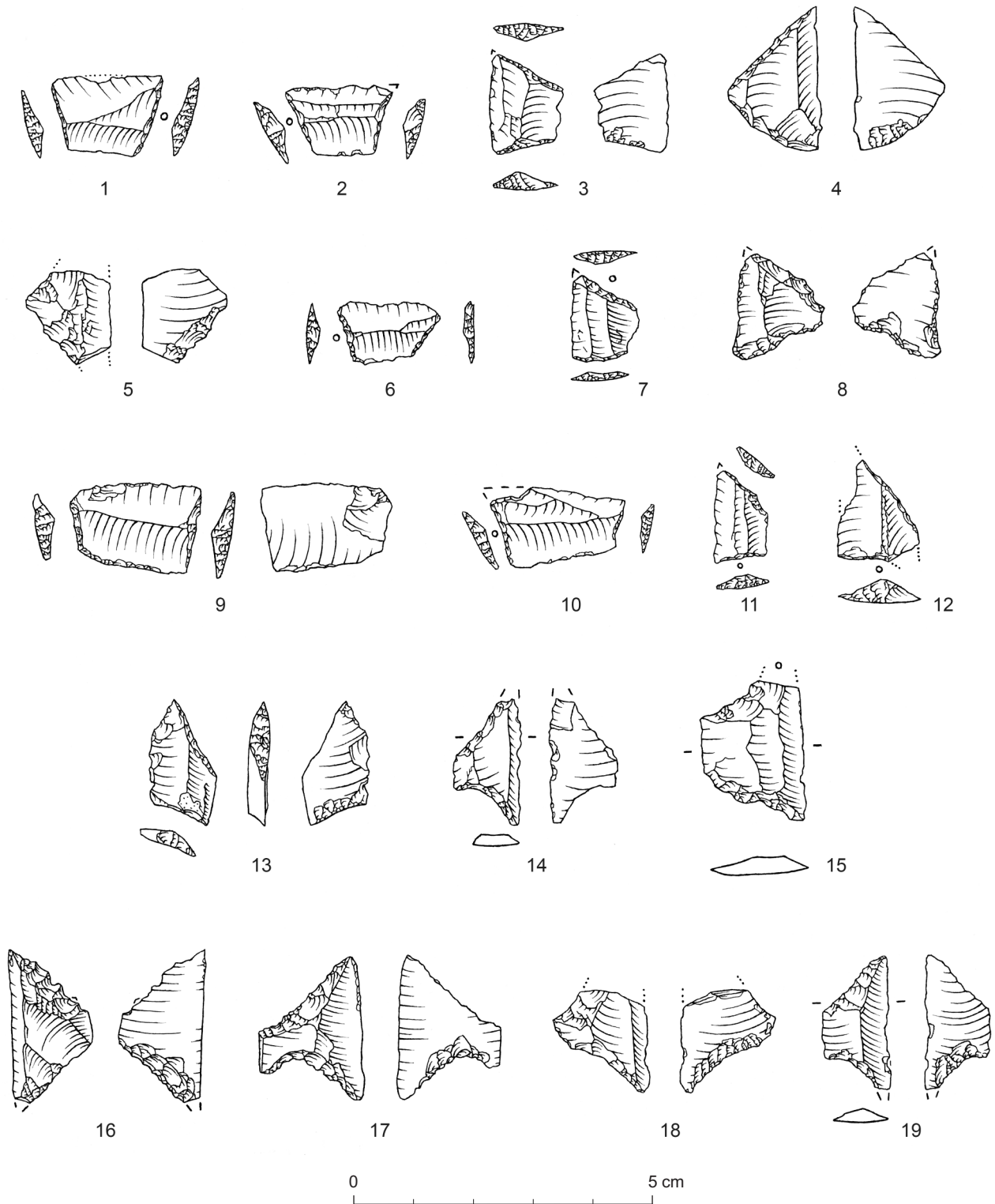


Fig. 7 Single finds of trapezes and asymmetric arrowheads from several sites close to Ralingen-Wintersdorf in the Trier region. Scale 1:1. (Drawings I. Koch; published in KOCH 2006)

of the origins of the raw materials of the stone artefacts could provide the basis for a more differentiated picture of these connections.

The situation is similar for the so-called Bavans arrowheads (**Fig. 8**), different forms of *pointes évoluées*, trapeze and

triangular microliths with RIP and related types in southwestern Central Europe (for definitions see JACOTTEY et al. 2000; HEINEN 2012a; 2012b). To the south, the distribution area of these arrowheads is adjacent to that of the asymmetric arrowheads discussed above and overlaps into the region

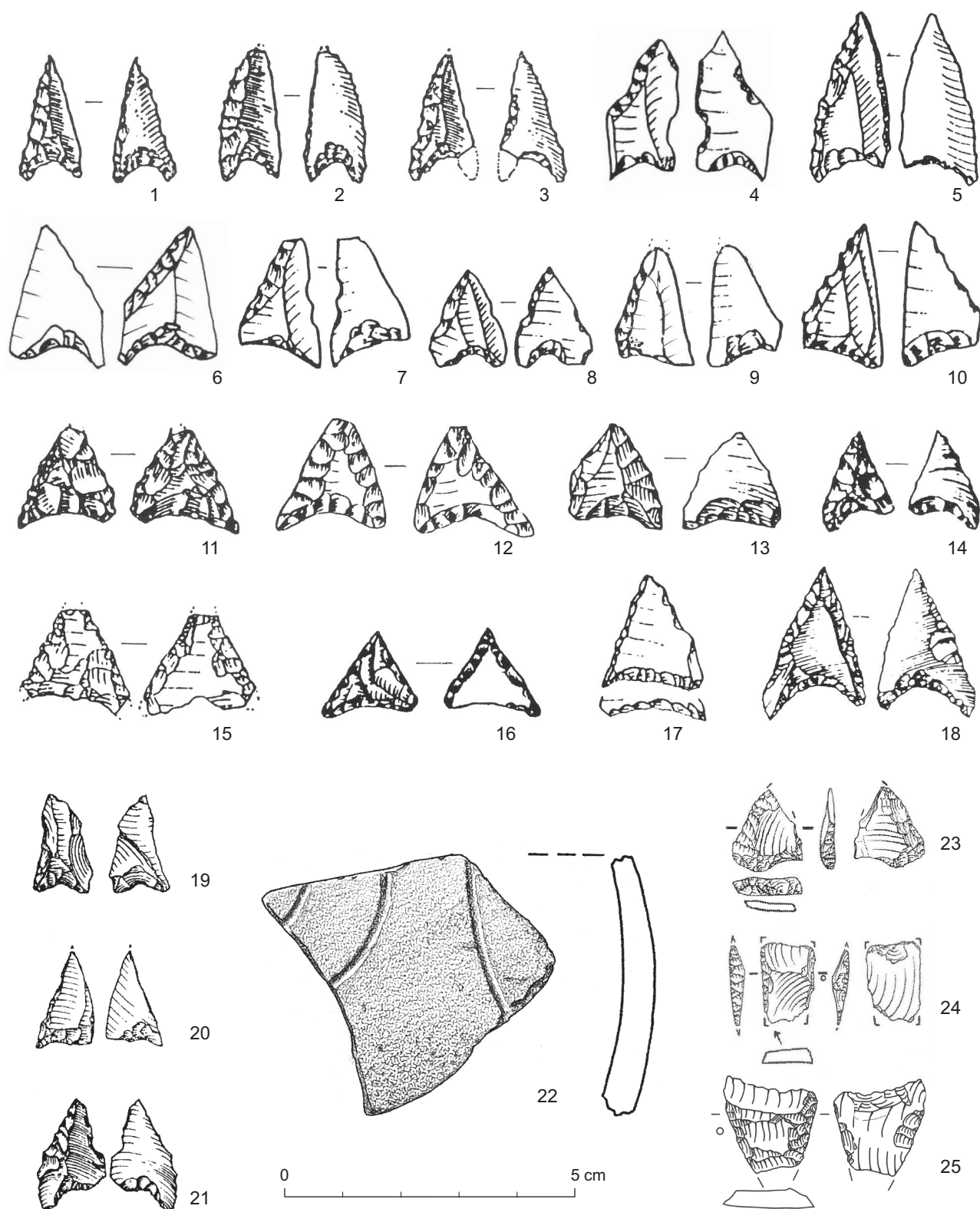


Fig. 8 Bavans points (1–10) and *flèches asymétriques à base concave* (11–18) from sites in France and Switzerland; 19–22 arrowheads and a LBK potsherd from Weidental cave in the Palatinate Forest; 23–25 arrowheads from the Final Mesolithic/Rössen site Netphen/Dreis-Tiefenbach in the Southern Westphalian uplands. – 1–5 typical Bavans points; 6–10 atypical Bavans points; 11–14 typical *flèches*; 15–18 atypical *flèches* (from JACOTTEY et al. 2000, Fig. 3-5; 7; 8). 19, 20 Bavans points or Middle Mesolithic micro-points (?), 21 *flèche asymétrique à base concave* (from CZIESLA 1992, 284); 22 probable Flomborn sherd (from CZIESLA 1991, 281); 23 atypical *flèche*?; 24 transverse arrowhead (23, 24 from BAALES & KOCH 2013, Abb. 6); 25 transverse arrowhead with facial retouch (drawing B. Gehlen).

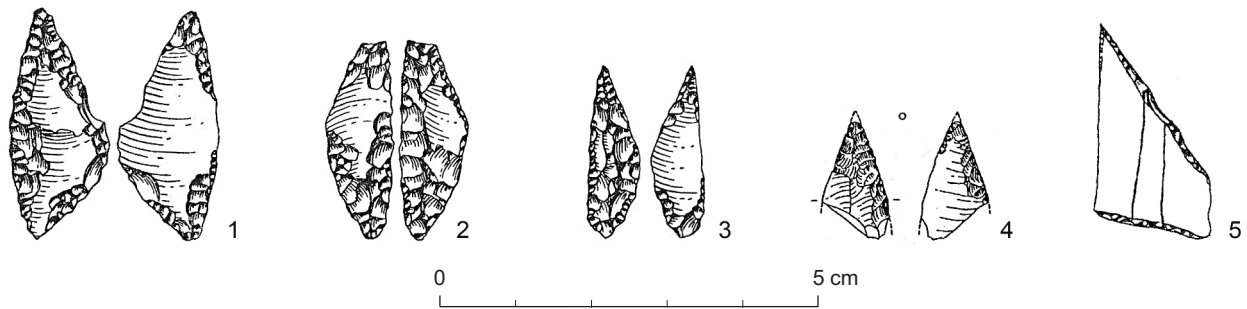


Fig. 9 Late Mesolithic arrowheads from Westphalian surface sites showing influence from the West: 1–3 facially retouched microliths from Haltern (ARORA 1976, Abb. 17,15–17); 4 fragment of a facially retouched microlith from Halle-Künsebeck (DIEDRICH 2003, Taf. 9,1); 5 rhombic arrowhead from Lage-Hörste “Rodelbahn” (ADRIAN 1956, Abb.. 70, 4185). Scale 1:1.

where most of the La Hoguette sites outside the LBK area are located (cf. **Fig. 3**). The most important site for the reconstruction of the evolution and absolute dating of these arrowheads (from 5200 calBC onwards) is Grotte Gardon (Dép. Ain) providing a complex stratigraphy (PERRIN 2003; VORUZ et al. 2004).

Two sites with important information on wide ranging contacts between Late Mesolithic and Early and/or Middle Neolithic people should be mentioned here. The first is the Weidental cave in the Palatinate Forest, where a LBK sherd (most probably from the Flomborn phase) and a *point évoluée* as well as arrowheads similar to Bavans points were excavated (CZIESLA 1992, 274ff., Fig. p. 281; Fig. p. 284, left). The second one is the surface-site Netphen/Dreis-Tiefenbach in the southern uplands of Westphalia (“Siegerland”), where an *armature évoluée* was found together with symmetrical trapezes and a transverse arrowhead. On the same site typical arrowheads of the Rössen Culture as well as a shoe-last adze made of amphibolit were found (BAALES & KOCH 2013, Abb. 6; BAALES et al. 2014, Abb. 2; 3; see also BAALES 2016). During the recent revision of new finds from the site, a facially retouched trapeze was recorded (**Fig. 8,25**). This artefact and the *armature évoluée* reveal cultural connections of the Late (or Final) Mesolithic settlers to the Early and/or Middle Neolithic people of Western and Northern France (GEHLEN in prep.).

While the sites with Limburg pottery and asymmetric points are mainly located towards the Atlantic, the facially retouched arrowheads and geometric microliths with RIP occur – like the sites with La Hoguette pottery – mainly in south-western Germany, south-eastern France and western Switzerland. This connection was already identified ten years ago by the lead author of this paper. Consequently, sites without pottery but with the relevant types of arrowheads were then considered to be La Hoguette sites (GEHLEN 2006). The distribution of sites with La Hoguette pottery shown in **Figure 3** reveals distinct groups of sites in the West and the East. The decoration of the pottery of these groups can be distinguished in style A and style B following

LEFRANC (2008). The western group is associated with the LBK of the Rhine valley and west of it (style A after LEFRANC 2008). The eastern group clearly is connected with the aLBK of the Neckar region (style B after LEFRANC 2008).

Rhine-Meuse-Scheldt B and Swifterbant

The so-called *feuilles de gui* (mistletoe-leaf arrowheads) and other facially retouched types of Late Mesolithic arrowheads represent a different tradition. They were originally Middle Mesolithic forms that first appeared in the 8th millennium in north-western Central Europe and were then apparently produced during both the Late and Final Mesolithic until around 5200 calBC. Sites with these objects in combination with trapeze microliths were called the Rhine-Meuse-Scheldt – or RMS – Culture, Phase B, by André GOB (1985). Because of the long duration of the specific microliths, Martin Heinen preferred the term “Rhine-Meuse-Scheldt Mesolithic” Phase B (HEINEN 2006), which has been adopted here. Late sites, which have been dated as already contemporaneous with the LBK pottery in the loess areas, are Maarheeze in the Netherlands (HUYGE & VERMEERSCH 1982, 198f.; GENDEL 1984) and Brecht-Moordenaarsven 2 in Belgium (VERMEERSCH et al. 1992; see **Fig. 2**: late RMS B – Mesolithic). Typical microlithic forms of the RMS B ensembles in the Rhineland, the BeNeLux-countries, and north-eastern France are – besides the facially retouched microliths – the right-lateral retouched rhombic trapezes (see THÉVENIN 1991). The hypothesis that further east there were also cultural contacts to RMS B people during the Late Mesolithic already can, so far, only be vaguely deduced from occasional sites with such types in Westphalia. Nevertheless, these single microliths show the wide ranged mobility of at least some individuals during this period. Sites in Westphalia are, for example, Haltern am See (District of Borken), Halle-Künsebeck (District of Gütersloh), and Lage-Hörste (District of Lippe) (**Fig. 9**).

Yet another area was occupied by the Swifterbant Culture. The sites are mainly in the marshy areas in the Scheldt delta near the North Sea coast (LOUWE KOOIJMANS 2007; VANMONTFORT 2008; AMKREUTZ 2013, 127ff.). Only a few finds of Swifterbant pottery are known so far from western Westphalia (STAPEL & POLLMANN 2013, 223f.). At present, the only genuine settlement site with Swifterbant pottery in Germany so far is HÜDE 1 on the Lake Dümmer in south-western Lower Saxony (RAEMAËKERS 1999, 72ff.). As a result of the research carried out in the Collaborative Research Centre 806 at Cologne University, the lead author proposes that the sites of the later phase of the Late Mesolithic in Westphalia, dating approximately to between 5000 and 4500 calBC, be linked with the Swifterbant Culture: geographically, the connection can be clearly seen on the map in **Figure 2**. The distribution of Late Mesolithic sites and those of the early Swifterbant Culture shown there indicates a continuous north-western area that is characterised by a range of trapeze microliths that are different from those in the adjacent regions to the west and south. Thus, in the north-west, there are only symmetric trapezes with no ventral retouching on the base (RIP) or facial retouching. In the later phases, short symmetric transverse arrowheads also appear (cf. NIEKUS 2009; BANGHARD & GEHLEN 2013; GEHLEN et al. 2015; GEHLEN et al. 2017 in print). It is interesting to note that La Hogue and Limburg pottery as well as asymmetric arrowheads, in both lateralisation variations, are also occasionally found in LBK contexts in northern Westphalia. This suggests wide-ranging networks of LBK farmers with various different cultural traditions.

Pottery between foragers and farmers

Pottery is not only a feature of Neolithic societies. In Europe, in addition to the long-known Ertebølle pottery, Mesolithic pottery in north-eastern Europe (eastern Baltic region and Russian Federation) has also been the subject of research for some time now (PIEZONKA 2015a). Pointed-bottom pots were produced there from the middle of the 6th millennium onwards and were often highly decorated. It is possible that this pottery was adopted by the Ertebølle Culture as a result of influence from this region from about 5000 calBC onwards (PIEZONKA 2015b, 567ff.).

Although this is not the place to describe in detail all single finds of LBK sherds or finds from complex contexts with LBK artefacts in “Mesolithic” landscapes outside the loess area, e.g. the sandy lowlands in the North and the middlerange uplands in the South, some sites and references have to be mentioned. Single sherds – together with some Limburg pottery – were for example found in the excavations under the cathedral of Xanten at the Lower Rhine (BRIDGER & SIEGMUND 1985). This is not a single phenomenon as the map in VERHART 2000 (Fig. 1.14) shows.

Sites from the uplands are the already mentioned Weidental cave in the Palatinate Forest or several sites on the Swabian and Franconian Albs as Felsdach Lautereck (TAUTE 1966) and the famous burial-cave of Tiefenellern (KUNKEL 1955).

The enigmatic LBK site of Herxheim in Palatinate, where more than 1000 humans were found, impressively demonstrated the need to undertake more research in this field of interest. The murdered people most probably belonged to various kinship-groups and most of them had been inhabitants of mountain regions. To date no LBK settlement is known from the Central German Uplands in the immediate vicinity. Genetically, all 29 examined human specimen have haplogroups common to the LBK (ZEEBLANZ 2014).

Pottery found in purely Late or End Mesolithic stone-artefact contexts in our area of study has only become a focal point of research over the last few years. Besides the La Hogue pottery group, the so-called “Begleitkeramik” (associated pottery) has also been more closely investigated recently (cf. also **Fig. 3** and **Fig. 4**). This term is used today for varieties of pottery in Late Mesolithic and Neolithic inventories in north-western Central Europe that do not fit in the known classifications. It includes both undecorated and either sparingly or heavily decorated vessels of many different forms and production methods. Some have a decoration similar to La Hogue pottery, others resemble Limburg pottery, e.g. the sherds from Trou Al’Wesse (MILLER et al. 2009). A good insight is provided by articles in the publication by VANMONTFORT et al. (2010). To what extent such “Begleitkeramik” can also be expected in LBK contexts, cannot be discussed here. However, the probability is great (e.g. a foreign sherd from the LBK site Maastricht-Belvedere – BROUNEN 2014, fig. 7.1). Recently, the Late and Final Mesolithic finds from the “Abri Saint Joseph”, near Lutter in the Sundgau region of Alsace, were published in a detailed initial preliminary report (JEUNESSE et al. 2014). The “Begleitkeramik” found there is described by Christian Jeunesse as “céramique indigène” (JEUNESSE et al. 2014, 28f.). The decoration and production method of the small sherds are very similar to that of the local La Hogue pottery but they also have their own individual character. Unfortunately, the find layers had been disturbed by bioturbation and fluvial action so that it was not possible to determine an absolute date for the pottery. There were also three Großgartach sherds in this complex of layers, which probably came from the layer above, layer 4 (JEUNESSE et al. 2014, 28ff.). Charcoal and hazelnut samples from layers 7 and 5 have been dated to between around 5300 and 5020 calBC (couche 7) and between around 5700 and 4770 calBC (couches 5, 5a, 5b); the earliest date for layer 4 is around 5020 calBC (JEUNESSE et al. 2014, 42; list of ¹⁴C dates).

In the Burghöhle cave at Dietfurt at the upper Danube, few heavily rolled, ochre-coloured pottery sherds were found, together with regular blades, spread over a small area in the lower level of what was presumably the Middle Neolithic horizon, in the zone of contact with the Late Mesolithic layer. At first glance, the sherds seemed to have been tempered with quartz and bone or crushed limestone. This may also be a type of “Begleitkeramik” (GEHLEN 1993).

Whether the development of Late and Final Mesolithic “Begleitkeramik” was exclusively due to stimulus by the La Hoguette pottery group or LBK farmers, or due to later adaptations via the influence of other pottery groups such as the Swifterbant Culture, must remain an open question in the present state of research: the find context is not always clear and only a few sites have been satisfactorily radiocarbon dated (VANMONTFORT 2008; AMKREUTZ et al. 2010). Similarities in the decoration with that on the La Hoguette – or the Limburg – pottery can only rarely be identified on such sherds.

From about the middle of the 6th millennium, the foragers were obviously aware of the advantages of the use of pottery vessels and had also mastered the techniques of processing and firing clay. The scarcity of such finds in the archaeological material is thought to be partly due to unfavourable preservation conditions, but could also be connected with the means of identification available to us archaeologists. And perhaps the foragers used pottery vessels for multivarious purposes to a much lesser extent than the Neolithic farmers. Sites with “foreign” pottery from various cultural and pottery contexts are marked on the map (cf. **Fig. 4**) under the heading “Begleitkeramik”. The arrowheads with which it can be linked also have very different forms and represent a large portion of the range of types mentioned above.

The “discovery” of Swifterbant pottery, which is also often undecorated and extremely fragmented, does not make the evaluation of “Begleitkeramik” any easier. A recently published single sherd with minimal decoration found in a v-shaped pit in Pulheim, near Cologne, clearly illustrates this problem. The OSL dating of the sediments in the pit indicated 7200 ± 900 and 7800 ± 500 BP. The attribution of the sherd to one of the known Neolithic or Final Mesolithic pottery groups has not yet been conclusively determined but a connection with the Swifterbant Culture is being considered (ECKMEIER 2015; WEBER & RÜDIGER 2015).

The social relationships suggested by the associated finds of LBK, La Hoguette and Limburg pottery cannot be discussed in detail here. More competent people have already done so (BOFINGER 2005; ALLARD 2007; JEUNESSE 2009; HOFMANN 2016) and research in this field is continuing. However, there was obviously reciprocal influence with re-

gard to the decorative style, production method and vessel forms. How widespread the distribution of pottery was in the LBK period is shown by investigations of the find material from the site “Auf dem Hempler” at Bad Nauheim-Niedermörlen in Hesse (SCHADE-LINDIG & SCHADE 2010) and from the Lietzow 10 site in Brandenburg (HAHN-WEISHAUPT 2014). The former site has been interpreted as a central LBK settlement with a significant transregional ritual function. The pottery recorded there has both typical Flomborn decoration and decoration that is known from Hungary (Szatmár group, Alföld-LBK). Furthermore, there are also motifs that can be compared with the decoration on La Hoguette and Limburg pottery as well as that on the Blicquy group pottery. Moreover, on some vessels, decorations were discovered that can be linked with Cardial ware (SCHADE-LINDIG & SCHADE 2010). Comparable data comes from äLBK sites: Some sherds with decoration imitating La Hoguette motifs are known from Strögen in Austria and Eilsleben in the Harz foreland; Cardial or very early Blicquy motifs were found on a vessel from the site Hailfingen in the Neckar region (STRIEN 2017 in print). The Lietzow 10 site in Brandenburg has yielded, so far, a hearth feature which construction is difficult to interpret. The find material not only contained Late Mesolithic flint artefacts of local tradition but also sherds from LBK vessels with decorations that are found throughout the northern LBK world, i.e. the Rhineland, Thuringia, Saxony-Anhalt and Poland. In addition, there are sherds from a Limburg vessel.

Further information is provided by the technical analyses carried out on La Hoguette and Limburg sherds from various sites in France and Belgium. Particularly interesting, for example, are not only the Limburg sherds but also other foreign pottery discovered in the “founder building” in the LBK settlement at Fexhe-le-Haut-Clocher in Liège Province in Belgium. The vessels were obviously not made of local clay but had been imported (BOSQUET 2010). Imported Limburg pottery has also been observed on other LBK sites and far away in the Grotte du Gardon in the French Jura (Dép. Ain; VORUZ et al. 2004). This information illustrates the cultural contacts between early Neolithic people of different origin and tradition spreading all over Western and Central Europe. Obviously local traditions in pottery decoration were appreciated even far away from the areas of origin. Late Mesolithic people living in between those geographically very distant areas must have taken part in this supra-regional network, which certainly reveals the mobility of single groups or individuals of various cultural backgrounds.

The interpretation of the results of pottery analyses and their relevance for intercultural contacts and mobility is illustrated by the two examples below.



Fig. 10 Original sherds from Choisey with replicas of the vessels. Scale 1:5. (From PÉTREQUIN et al. 2009, Fig. 13)

Example 1

From a symbol of identity to an object of daily use: the development of the production of La Hoguette pottery in the French Jura Mountains (after PÉTREQUIN et al. 2009)

The technical analysis of the La Hoguette sherds from a trial trench in a settlement near Choisey (French Jura Mountains) revealed great skill in the preparation of the clay and the decoration of the outer surface of the vessel. The clay probably came from local sources not far from the site. The temper consisted of fragments of burnt bone that were sometimes quite big. The find was dated to between about 5400 and 5300 calBC. The manufacturing steps could be determined by the experimental production of comparable pottery. The pots were built up in the coil technique on a bowl-shaped base. The coils were carefully pressed together, alternately from inside and outside; then the surface was moistened and smoothed, the decorative strips applied, and the accompanying impressed incisions added with a special bone tool (Fig. 10). The finished vessels give the impression of being standardised.

For comparison purposes, two sherds from the La Hoguette site at Bavans were examined: these had been found in association with Middle LBK sherds. It is therefore certain that they can be dated to the end of the 6th millennium. The technical characteristics and the visual impression of this pottery are completely different: the clay was tempered with quartz and fragments of black stone, which made it impossible to polish the outer surface. Bone temper could only be identified under the microscope. All in all,

the pottery gives the impression of being coarse and having an inconsistent decoration. The authors draw the following conclusions from these examinations: at the beginning of the “takeover of the land” by the makers of La Hoguette pottery, who had come from southern France via the Rhone valley to the Jura Mountains and moved on to Switzerland and southern Germany, the production of such complicated, standardised vessels would have been necessary for identification purposes. Towards the end of the “La Hoguette period”, after the expansion had been completed, such “symbols of identity” were no longer needed (PÉTREQUIN et al. 2009, 510).

If one accepts the authors’ arguments, there appears to have been a clear change in the perception of the use of pottery in the Jura Mountains. At the beginning, this would not only have been linked with migration but also with a greater appreciation of its value and as a symbol of identity that was probably indispensable for the new arrivals in alien territory. It is interesting to note the connection between this assessment and the anthropogenic changes in the landscape. These have been well-investigated in various pollen analyses, which were published some time ago (RICHARD 2004). The analyses indicate that there were phases of woodland clearance and the first cultivation of cereals well before 5400 calBC. From about 5400 calBC onwards, this use of the land intensified and, in addition to the cultivation of cereals, there is evidence that flax and poppies were planted. This development corresponds well with the concept of immigrant La Hoguette pioneers in the French Jura Mountains from this time on.

Example 2

Limburg pottery made by “indigenous”(?) and LBK methods from Rosmeer in Belgian Limburg (after GOMART & BURNEZ-LANOTTE 2012)

The authors of several studies (GOMART 2010; 2014; GOMART & BURNEZ-LANOTTE 2012; GOMART et al. 2017) describe two different traditions of pottery production based on the pottery finds from the LBK site at Rosmeer in Hainaut, Belgium – Tradition A and Tradition B:

Tradition A (**Figs. 11a,b; 12 ROS 1**)

Forming technique: coiling technique; coils blended alternately from inside and outside.

Temper: grog, haematite, bone.

Surface treatment: occasionally orange slip.

Decoration style: “classic” LBK and non-LBK motifs (but not combined on the same vessel).

Decoration tools: various.

Tradition B (**Figs. 11c,d; 12 ROS 2**)

Forming technique: coiling technique; coils blended only from the outside.

Temper: mainly bone.

Surface treatment: orange colour due to oxidising firing; occasionally orange slip.

Decoration style: exclusively non-LBK motifs (Limburg style).

Decoration tools: various.

The authors are cautious about making statements regarding wide-ranging social implications but do assume that two groups of potters were active in Rosmeer who produced different types of pottery. Group A potters followed the LBK tradition, but also attempted to produce pottery in the Group B style. Group B potters produced only non-LBK ware. There is no combination of LBK and Limburg decorative motifs on one and the same vessel.

Various scenarios can be suggested to fit the facts described above:

1. Group A was presumably of LBK origin but also wanted to provide their “customers” with Limburg pottery. Or some of the Limburg potters had married into the group and were fully integrated in the LBK Culture but, at the same time, were proud of their own roots.
2. Pottery production in Rosmeer was in the hands of Group B, men or women who upheld a tradition that did not originate in the LBK context. Apparently, there were enough people in the settlement, and possibly also outside the settlement, who could identify with and demand this type of pottery.

In brief, it can be said that both self-confident Limburg women/men who had married into the group and integrated Limburg families with a sense of tradition lived in Rosmeer alongside the inhabitants of LBK origin.

The Mesolithic legacy in Neolithic burials

If it is assumed that Late Mesolithic and Early Neolithic populations were in contact with each other, it should also be possible to identify this interconnection in the context of burials. But only very few Late Mesolithic burial sites are known in the area studied. They all date to before the start of the neolithisation phase and cannot therefore provide direct proof of intercultural contacts for our purpose. In a detailed study, the lead author has therefore attempted to discover evidence of the Mesolithic legacy in Neolithic burials (GEHLEN 2016). She has not only assembled the results of aDNA tests, the results of stable-isotope analyses and evidence revealed in burial customs but has also examined personal ornaments. The study is essentially based on the comprehensive doctoral thesis of Solange RIGAUD (2012), in which she compared the personal ornaments in Mesolithic and Neolithic burials throughout Europe at the time of the Neolithic transition. Two striking examples will be presented below. In both cases, the burials are of children. In the first case, from Eichendorf-Aufhausen in the District of Dingolfing, Lower Bavaria, a boy was buried with pharyngeal teeth of the *Perlfisch*. The burial was an isolated feature on the edge of a Middle Neolithic burial ground. The second case was a burial in the LBK burial ground at Schwetzingen in the upper Rhine valley. Here the child had a necklace made of the shells of snails that came from the Atlantic.

Case 1: The boy from Eichendorf-Aufhausen

The boy had been buried lying on his left side in a crouched position (**Fig. 13**). On his chest lay 20 pharyngeal teeth of the *Perlfisch* (*Rutilus frisii meidingeri* Heckel), a type of carp. It is presumed that the teeth had been sewn onto the boy's clothing. The burial pit also contained a small LBK sherd with an incised decoration (KREINER & PSCHIEDL 2006). Radiocarbon dating of the bones indicated a date between 5300 and 5200 calBC. Although the type of burial and the pottery sherd point to an LBK context, pharyngeal teeth of the *Perlfisch* are an exclusively Late Mesolithic element. The next Late Mesolithic surface sites to Eichendorf-Aufhausen are known from an area near the Danube southeast of Regensburg in c. 50 km distance to the north (catalogue of the finds in the collection of H.-J. Werner [deceased], by Th. Richter – cf. maps **Figs. 3; 4** and RICHTER, TH., 2017 forthcoming). So far, pharyngeal teeth of the *Perlfisch* are only

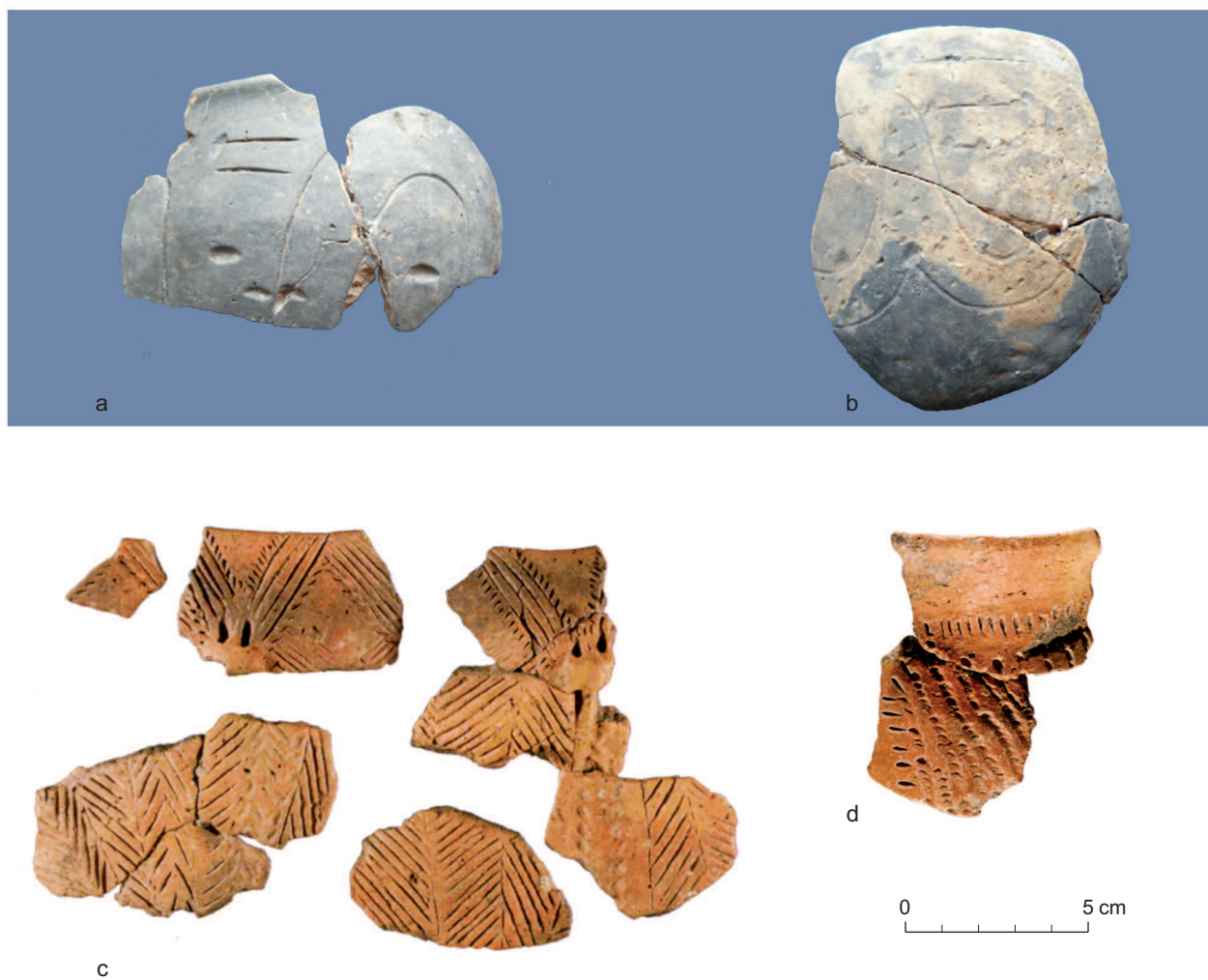


Fig. 11 a.b Group A pottery with typical LBK motifs; c.d Group B pottery with Limburg surface treatment and decoration. Scale 1:2. (From GOMART 2014, Fig. 63)

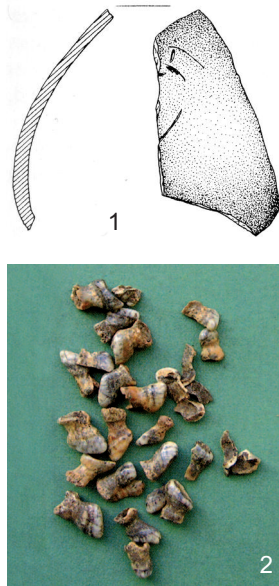
Fig. 12 a Production technique of vessels made by Group A potters (ROS 1); b production characteristics on vessels made by Group B potters (ROS 2). Scale 1:1 (From GOMART et al. 2017, Figs. 16; 17)



Fig. 13 Crouched inhumation of the boy from Eichen-dorf-Aufhausen with grave goods.

1 LBK sherd; 2 pharyngeal teeth of the Perlfish (*Rutilus frisii meidingeri* Heckel), a type of carp. 1.2 Scale 1:2. (From KREINER & PSCHIEDL 2006, Abb. 7; 8; 9,1).

0 5 cm



known from the Beuronian C period and the Late Mesolithic of the upper Danube and Swabian Jura. They are also typically found in Late Mesolithic burials at Vlasac in the Iron Gates gorge (CRISTIANI & BORIĆ 2012). Recently, it was reported from there that in some of the Late Mesolithic burials, dated to around 6600 calBC, pollen and the remains of fibres were found in the dental tartar of the deceased, which indicates a regular consumption of wheat and barley, i.e. around 400 years before the area was settled by Neolithic Starčevo groups (CRISTIANI et al. 2016). This immediately reminds one of the evidence of a “pre-Neolithic” exploitation of cereals in southern Germany and Switzerland (see below).

Case 2: The Schwetzingen child

Five burials with personal ornaments made of snail shells were excavated in the LBK burial ground at Schwetzingen (Rhein-Neckar District) to the south of Mannheim in the Rhine valley (GERLING 2012). Under the neck of the child in Grave 98, buried also on the left side in a crouched position, was a “bundle” of 19 snail shells of the type *Nucella lapillus*. This snail, also known as the “northern purple-dye snail” or “dog welk”, is indigenous to the Atlantic Ocean (Fig. 14). Such snails have also been found in LBK burials in Alsace (GALLAY & MATHIEU 1988) and north-eastern France (JEUNESSE 1997; LENNEIS 2010) (Fig. 15).

Fig. 14 *Nucella lapillus* snails, which are native to the Atlantic. Such snail shells have been found as personal ornaments of the child in Grave 98 from Schwetzingen and other LBK graves in western Central Europe (image: https://commons.wikimedia.org/wiki/File:Nucella_Lapillus.jpg)



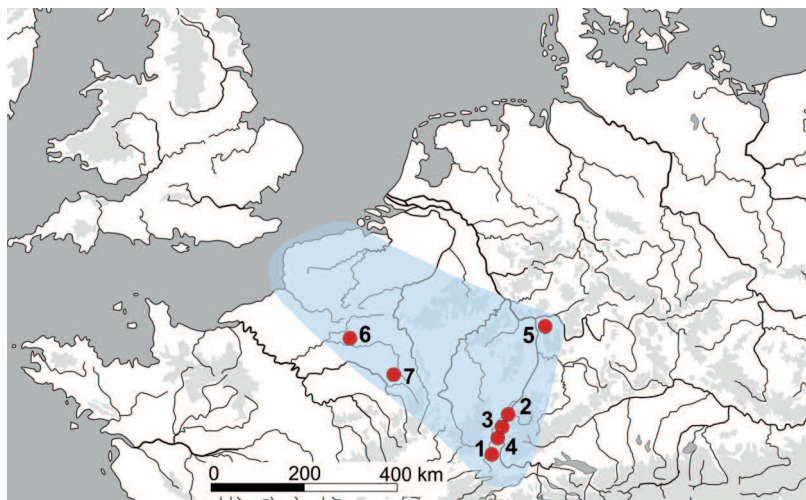


Fig. 15 Possible north-western network of the LBK, illustrated by finds of *Nuccella lapillus* in graves in France and Germany. 1 Ensisheim (F); 2 Hoenheim (F); 3 Quatzenheim (F); 4 Wettolsheim (F); 5 Schwetzingen (D); 6 Cuiry-les-Chaudardes (F); 7 Frignicourt (F). (Graphics by B. Gehlen)

The personal ornaments found in the above-mentioned children's graves demonstrate contacts with various Late Mesolithic settlement areas. It is possible that they represent small Mesolithic groups within LBK communities. It is also conceivable that Final Mesolithic children were adopted by LBK inhabitants in Lower Bavaria and the Rhine valley and, when they died, were buried with traditional Mesolithic ornaments. The two examples provide a first insight into complex and wide-ranging networks of relationships between Mesolithic and Early Neolithic groups, which must be further investigated in future.

Late Mesolithic land use and forager-farmer networks

Late Mesolithic land use and mobility

Like the investigation of raw-material procurement, the investigation of land use also yields evidence of networks between foragers and the early farmers. Valuable contributions have been made by well-dated and detailed pollen analyses and permit the reconstruction of land use during the Neolithic transition in the area under consideration. Only a few examples will be discussed here. Without wanting to restart the discussion regarding the so-called "pre-Neolithic exploitation of cereals" in the Circum-Alpine Region (cf. GEHLEN & SCHÖN 2003; 2006; 2008; REINGRUBER & RÖSCH 2005; BEHRE 2007a; 2007b – with a long list of references), more recent studies that contribute new information on the subject should nevertheless be mentioned. Over the last few years, more pollen profiles from southern Germany have been published, with evidence of cereal pollen as well as of considerable human impact on the landscape due to woodland clearance at least since the Late Mesolithic, from around 7000 or

6000 calBC. This can be seen not only in the distinctive appearance of cultural markers like *plantago lanceolata* and *artemisia*, but also in the accumulation of charcoal particles: examples are the profiles from Haspelmoor (PETERS 2015) and Pilsenmoos in Upper Bavaria (KÜSTER 1995; cf. discussion in FISCHER et al. 2009, 55f.), the Unterteller Bachtal near Augsburg-Dasing in Bavarian Swabia (GEIGER 2015), the Großer Ursee in Upper Swabia, to the north of Lake Constance (RÖSCH & HAHN 2015) as well as various profiles from the Swiss Plateau (TINNER et al. 2007). Comparable results were obtained from pollen analyses in connection with the La Hogue site "Wilhelma" in Stuttgart-Bad Cannstatt (KALIS et al. 2001). Here, detailed pollen analyses in combination with anthracological and archaeozoological investigations make a more differentiated picture of land use likely, with groups of hunters who also kept small domesticated animals and managed their environment by cultivating hedges and fruit-bearing trees. It is much more difficult to carry out differentiated pollen analyses in the usually very dry loess areas than in complex humid areas that evolved slowly. Consequently, there exists much less information from the dry areas. However, a good example is provided by the analyses undertaken in the Wetterau area by Astrid SCHWEIZER (2001). In three high-resolution pollen profiles, Schweizer could prove the existence, already around 5600 calBC, of small-scale woodland clearance, animal pens and, probably, the deliberate cultivation of plants. She tentatively links these activities with the people who used La Hogue pottery since she also found the pollen of a wild form of Mediterranean opium poppy. This study is an excellent example of the potential of pollen analysis, in combination with absolute dates, to prove human settlement in regions where there is, so far, no clear archaeological evidence for the dated period (sites are mapped in Fig. 1).

It is worth paying particular attention to the new geoarchaeological research on v-shaped pits in the loess areas, where the earliest dates place these features as early as the Late Mesolithic. This sheds a totally new light on the period of the Neolithic transition in these regions because they indicate a complex use of the land in Late Mesolithic times, which apparently – despite the LBK “takeover” of the land and their different economic system – continued unchanged (ECKMEIER 2015; GERLACH 2015; ECKMEIER et al. 2017 in print). **Figure 16** shows a feature in Düren-Merzenich, in which a v-shaped pit cuts into an earlier LBK longhouse. If one accepts the interpretation of these pits as game traps, it can be seen that the regeneration of the vegetation in former settlement areas would make them attractive hunting areas for larger game (ECKMEIER et al. 2017 in print). Although, so far, no large Mesolithic pit complexes have been identified in the loess areas of Germany, it can be assumed that in these regions, too, there was a manifold use of the land by Mesolithic people ever since the Preboreal period. Judging by the dates from pit complexes in the sandy regions of northern Germany, it would seem that there was an intensive large-scale use of the landscape from the Middle Mesolithic onwards (cf. GERKEN 2016; GEHLEN et al. 2017 in print).

So far, there have been hardly any attempts to link the “pre-Neolithic” phenomena of land use and impact on the landscape with the, usually, merely “stone remains” in the numerous collections of surface finds that represent the major portion of Late or Final Mesolithic find assemblages in the study area. A precedent in this connection for the Late Mesolithic in the Alpine foothills is the recently completed doctoral thesis of Thomas Richter in Cologne (RICHTER, TH., 2017 forthcoming). His study of land use and subsistence in the Early and Late Mesolithic in Old Bavaria is based mainly on an analysis of the structure of the flint inventories, the origin of the raw materials and their percentages in the find assemblages. Based on these data and using several statistical methods, Richter was able to determine both the function of the Mesolithic sites and the duration of settlement at each site. According to his investigations, a simple settlement and land-use system was customary in the Late Mesolithic: the sites were settled for quite long periods of time and were characterised by a diverse range of activities. Population density was probably double that in the Early Mesolithic. Pollen analyses from the area under consideration and its adjacent regions show that, already in the Boreal climatic phase, the communities of foragers had started to manage the landscape by burning down the forest and encouraging the growth of edible plants, such as hazel. This impact on natural processes obviously intensified in the Late Mesolithic. At the same time, the early cultivation of cereals or the deliberate encouragement of wild grasses, as is repeatedly observed in the Circum-Alpine Region from the



Fig. 16 V-shaped pit cuts through an LBK house at Düren-Merzenich. (From ECKMEIER et al. 2017, in print)

second half of the 7th millennium onwards, indicates an economy of “low level food production” (according to SMITH 2001) during the Late Mesolithic (see above). The findings regarding raw-material procurement and the composition of inventories during the Mesolithic offer, for the first time, clear support for the results of palaeobotanic research, which had previously been considered singular and – because they had no archaeological context – difficult to interpret. If Richter is correct in his assumption, at least a semi-sedentary lifestyle must be assumed for the people who lived in the Late and Final Mesolithic. Such a lifestyle was already suggested by Andreas Tillmann for the Late Mesolithic in southern Germany since the sites there were often concentrated near lakes or rivers. Aquatic resources probably represented an important and constant source of food. Tillmann also suggested that the increasing exploitation of plant resources, which he presumed was due to the greater diversity in the forests of the Atlantic climatic phase, would favour a seasonally sedentary lifestyle (TILLMANN 1993, 173). Several indications of fires, as seen in the more recent pollen profiles (e.g. Haspelmoor), which were most probably caused by human intervention, support the theory of land management, as the presumably desired diversity in the vegetation can only be achieved by forest clearance. Ethnographic data from northern America indicate that foraging communities whose livelihood is based mainly on fishing need much smaller territories and have a significantly higher population density than those whose protein requirements are mainly satisfied by hunting (BINFORD 2001, Tab. 5.01). Similar results were published by Kelly, who compared the size of territories of foragers with a mainly plant-based diet to those with a mainly meat-based diet. Those groups subsisting primarily on plant resources need a much smaller territory (KELLY 1983, Fig. 5).

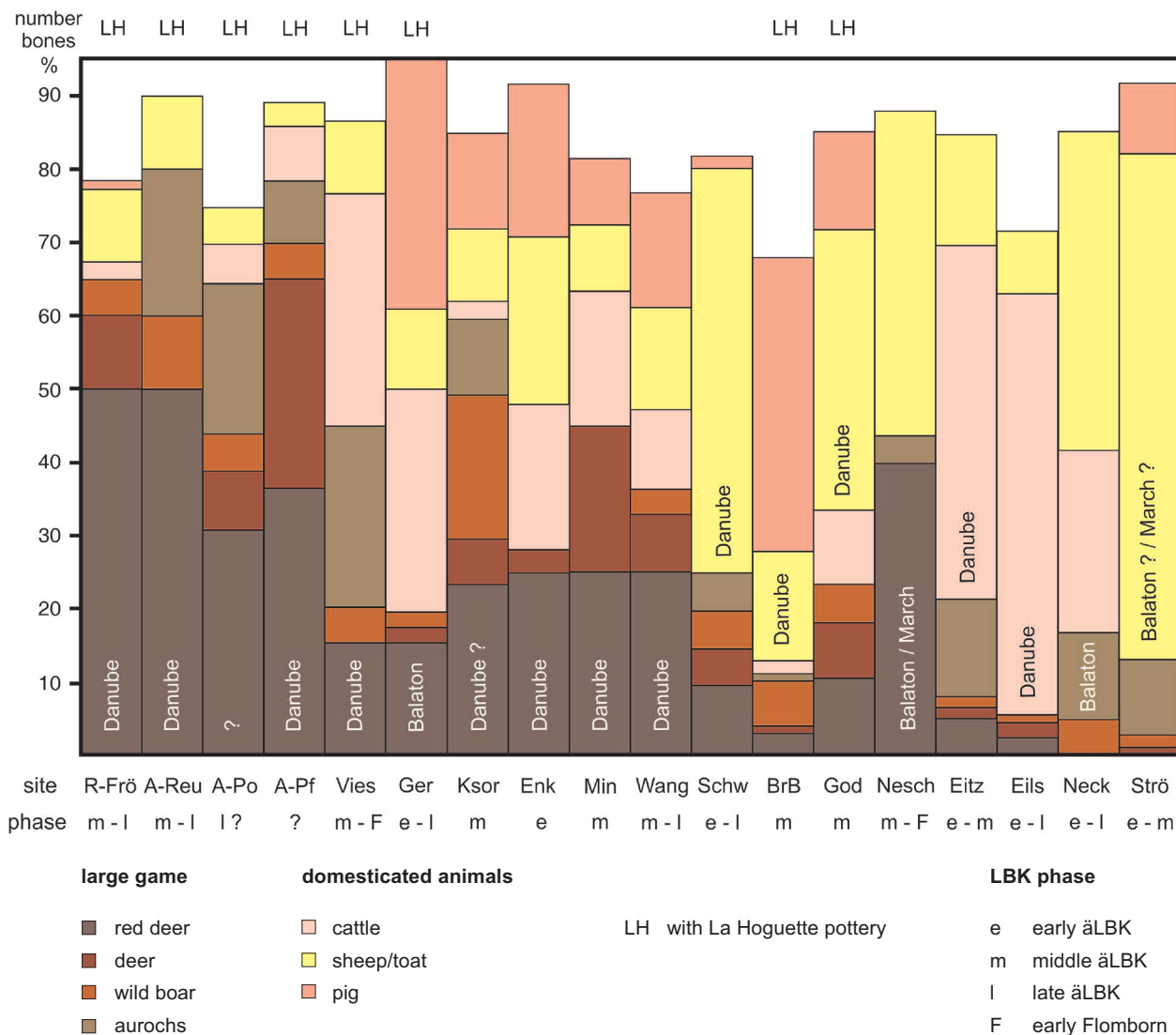


Fig. 17 La Hoguette and earliest LBK (älBK) economy: Occurrence of hunted game and domesticated animals in various settlements in Germany and Austria of different regional origin indicated by pottery decoration (Danube; Balaton; March). Sites: R-Frö = Rottenburg-Fröbelweg; A-Reu = Ammerbuch-Reusten; A-Po = Ammerbuch-Polfing; A-Pf = Ammerbuch-Pfäffigen; Vies = Stuttgart-Mühlhausen “Viesenhäuser Hof”; Ger = Gerlingen; Ksor = Kleinsorsheim; Enk = Enkingen; Min = Mintraching; Wang; Schw = Schwanfeld; BrB = Friedberg-Bruchenbrücken; God = Riedstadt-Goddellau; Nesch = Frankfurt-Niedereschbach; Eitz = Eitzum; Eils = Eilsleben; Neck = Neckenmarkt; Strö = Strögen. (Data from STEPHAN 2005, Abb. 27; 28; STRIEN 2017, in print; graphics B. Gehlen; for location of sites see **Fig. 1** and **Appendix**, p. 73)

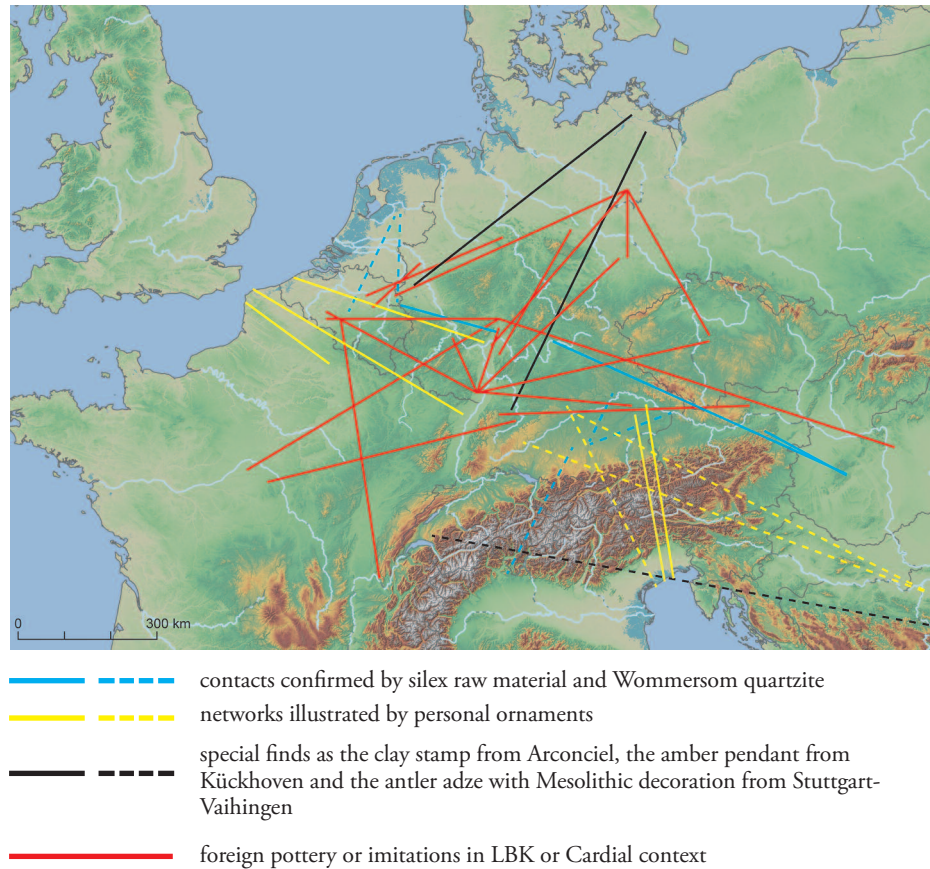
As far as Late Mesolithic social structures are concerned, the results of the investigation of the Mesolithic site at Rottenburg-Siebenlinden 3-5 are of interest, where Claus-Joachim Kind was able to prove that the Late Mesolithic community had a collective social structure. He saw this in contrast to the Middle Mesolithic situation, which he described as a loose association of family units (KIND et al. 2012, 467ff.).

From this evidence, it could be inferred that during the Late Mesolithic in southern Germany there was a decline in mobility among the groups of foragers and that a change in social structure can be expected. It remains the task of future research to find further for these assumptions.

Economy and cultural identity

The large proportion of wild animals in various fauna inventories of earliest LBK settlements, especially in the Neckar region (**Fig. 17**), shows that hunting, in addition to animal husbandry and plant cultivation, must have played an important role in the subsistence economy of the earliest farmers. In her study of the fauna from the Rottenburg “Fröbelweg” settlement, Elisabeth Stephan explained the various scenarios that could have led to these findings. As well as reasons linked with labour economics, ecological factors and, to a certain extent, protective hunting may have been important causes of this phenomenon.

Fig. 18 Examples of widespread networks during the Late Mesolithic (broken line) and the early Neolithic (continuous line). (Map by B. Gehlen, K. Vogl and M. Zickel)



A broad overview of the proportions of wild animals in the fauna inventories of the earliest LBK settlements highlights not only the concentration on large mammals, such as red deer, aurochs and wild boar but also the heterogeneous nature of these inventories. This can best be explained by the different needs of the settlements and their diverse natural environments (STEPHAN 2005, 357ff.; SCHÄFER, M., 2010). However, there may also have been cultural reasons for this pattern of findings. A particularly good example was discovered in the already mentioned settlement of Rotenburg “Fröbelweg”, where wild animals were dominant among the faunal remains (cf. **Fig. 17**). Most of the remains of hunted animals were found in the long pits of houses 1 and 2 (STEPHAN 2005, Abb. 10–13). This is also where most of the La Hoguette pottery sherds were found (BOFINGER 2005, 107). Here, the connection between hunting as part of the subsistence pattern and the South-west-European cultural tradition from a different kind of Early Neolithic context seems particularly clear.

Lithic raw materials and pieces of mobile art

The origin of the stone used as raw material on Stone-Age sites has long been used as an important tool in understand-

ing mobility, land use and social networks (cf. ZIMMERMANN 1995). Despite the many problems encountered in the precise identification of the origins, such studies are the foundation on which every deliberation on the subject is built. The relevant publications on the area under consideration number in the hundreds: just a few of the most important ones for this area will be mentioned here. In a general review, Bart VANMONTFORT (2007; 2008) described the numerous contacts of the Swifterbant Culture in north-western Central Europe. Based on the use of Wommersom quartzite from Flanders and flint from southern Limburg it was possible to demonstrate the widespread links between the inhabitants of the North Sea coast and the sand and loess areas further south. This applies to the Late Mesolithic as well as to the pottery and Neolithic phases of the Swifterbant Culture. Not only the widespread networks can thus be reconstructed but also the long duration of the relationships. Already in the Late Mesolithic, Wommersom quartzite was a very popular raw material in the area to the west of the Meuse and had a wide distribution (GENDEL 1984; COPPENS 2015) (**Fig. 18**).

For the southern part of the area under consideration, mention should be made of the studies on the wide-ranging contacts of the earliest LBK that can be discerned from the origin of the flint employed (e.g. GRONENBORN 1997;

1999, 165ff.; 2010; KERIG 2008; 2010; MATEICIUCOVÁ 2008) (cf. **Fig. 18**). The studies not only clearly show the networks between LBK communities but also possible contacts with contemporaneous Mesolithic groups living to the west of the Rhine. The few find assemblages from La Hoguette contexts in southern Germany do not, so far, allow any unambiguous description of flint networks. Nevertheless, it seems possible that comparisons can be drawn between the raw materials used by La Hoguette and LBK communities (STRIEN & TILLMANN 2001; KIND 2006; 2010).

Widespread links with Mesolithic settlement areas can be assumed not only for Friedberg-Bruchenbrücken (FISCHER 2011) and other äLBK settlements (GRONENBORN 1997) but also for the early Flomborn-period settlement at Niederkassel-Uckendorf, which, at present, belongs to the earliest LBK sites in the Rhineland (HEINEN 2010; BALKOWSKI et al. 2016). The procurement of flint from the area around Aix-La-Chapelle (Aachen) and from the Limburg area could not have functioned without effective contacts with the Mesolithic forager groups in the Rhineland. The objection by M. de Grooth, that LBK prospectors could also have discovered the sources of raw material and thus supplied domestic requirements (DE GROOTH 2008), cannot be discounted, but even that system could not have functioned “speedily” without a friendly reception and helpful information from the Mesolithic inhabitants of the Rhineland. Her objection regarding Mesolithic support, that the Late Mesolithic people used other sources of flint and that they could therefore not get in each other’s way, must be considered distinctively. A preliminary inspection by the lead author of several Late Mesolithic inventories in the Rhineland has already revealed that, in fact, they did partly use the same sources (Vetschau/Orsbach). To a certain extent, this material was already used in the Early and Middle Mesolithic of the Rhineland. It can be assumed that in the context of this procurement of raw material, which could indicate bartering, tolerated transit through clan territory or expeditions by members of both groups, other forms of social contact could also have been established and perhaps even led to marriage ties between members of the various groups (see, e.g., ZIMMERMANN 2010).

Further indications of widespread networks that stretched beyond cultural borders and over large distances can be found in the distribution of personal ornaments in Mesolithic and Neolithic contexts (see above) as well as in isolated “special” finds, such as the amber pendant in the LBK well at Erkelenz-Kückhoven in the Rhineland (WEINER 1995) or the Mesolithic-like decoration on a deer-antler axe from the LBK settlement at Stuttgart-Vaihingen (KRAUSE 2001). Both indicate contacts with the Baltic region (cf. **Fig. 18**).

A recently published investigation into the chert extraction-site of the Krumlov Forest in Moravia shows, that already from the Early Mesolithic onwards, people dug pits and shafts in order to quarry the chert from lower layers (OLIVÁ 2015). The mediocre quality of the material led the author to the assumption, that social activities were the main reason for these activities – during the Mesolithic as well as the Neolithic – rather than extracting the chert for knapping purposes. Concerning possible Mesolithic–Neolithic interactions at rawmaterial extraction-sites, Olivá stated: “Moreover, it was under way at the transition period from foraging to the agricultural mode of life. Outcrops of raw materials were one of the few places where both populations could come into direct contact, cooperate and refine their relationships.” (OLIVÁ 2015, 5).

Not only silicious rawmaterials but also the use and distribution of adzes and “Breitkeile” made of amphibolit and similar metamorphic rock found outside the regions inhabited by Early and Middle Neolithic farmers, show the wide ranging networks of Mesolithic and Neolithic people during the early phase of neolithisation (e.g. VERHART 2013). Moreover, the oldest finds of polished artefacts from Bohemian metamorphic schist date to the Late Mesolithic (FISCHER et al. 2009; OLIVÁ 2015, 32).

FUTURE PROSPECTS

The examples of contacts between Early Neolithic and Late or End Mesolithic groups presented here are only a small portion of what could be determined by an intensive analysis and evaluation of the archaeological sources. Whether one wants to describe the users of La Hoguette pottery, Limburg pottery and “Begleitkeramik” as Neolithic or Mesolithic, complex social networks between the groups studied can already be detected from these few examples. They include family/kinship relations (production method of Limburg pottery; Mesolithic legacy in LBK burials), economic contacts (flint raw material; remains of game hunting in äLBK features with La Hoguette pottery) and the transmission of traditional techniques within communities that are in communication with each other (arrowhead style; La Hoguette and Limburg pottery production). Above all, this brief insight into the world of the 6th millennium shows that far from enough data have been collected or analyzed (and, in view of the scientist’s boundless thirst for knowledge, there can never be enough!) and that many archaeological sources remain untapped. The results of the recent genetic analyses, carried out mainly on LBK skeletons but on only a few Late Mesolithic skeletons (cf. BRANDT et al. 2013), have yielded nowhere near as much information as has been obtained from archaeological sources. In all the cases presented here, the mobility of

groups or individuals must have played a part – even if this cannot be proved in specific cases. The important role played by the transfer of innovations over widespread communication networks has been described by Silvine Scharl in her article in this volume for the Neolithic and Chalcolithic periods (SCHARL, this volume). That such networks may well have stretched as far as the regions of origin of the LBK and in the western Mediterranean, is indicated by single archaeological finds such as the clay stamp from a Late Mesolithic layer at Arconciel in the Swiss canton of Fribourg (MAUVILLY et al. 2008) (cf. **Fig. 18**) as well as the flint raw material (see also MATEICIUCOVÁ 2008) and personal ornaments found in burials (see RIGAUD 2012)

(**Fig. 18**). The limited number of samples that have been analysed (see also HOFMANN 2015) are one reason why the genetic findings are far less conclusive than the archaeological results. Moreover, new genetic methods and more detailed analyses permit the assumption that the present one-sided picture of “unmixed” cultural groups will be presented in a more differentiating light in future. Since the sources for the Late and Final Mesolithic are far poorer and less numerous than those for the Early Neolithic, greater efforts must be made in the future, not only in research on the later Mesolithic itself but also on “Mesolithic elements” in Neolithic contexts.

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Appendix: Sites of special interest shown on map **Figure 1**.

Cultural Context	No. on Map Fig. 1	Site	Country
Swifterbant site	1	Hüde 1	D
Limburg pottery	2	Lietzow 10	D
	3	Alpen-Veen	F
	4	Grotte du Gardon	D
LBK sites	5	Erkelenz-Kückhoven	D
	6	Maastricht-Belvedere (with "Begleitkeramik")	NL
	7	Rosmeer	B
	8	Fexhe-le-Haut-Clocher	B
	9	Düren-Merzenich	D
	10	Niederkassel-Uckendorf	D
	11	Niedermörlen "Auf dem Hempler"	D
	12	Schwetzingen	D
	13	Herxheim	D
	14	Stuttgart-Vaihingen	D
	15	Eichendorf-Aufhausen	D
Final Mesolithic (late forager) sites	16	Bokel Fenn I	D
	17	Blätterhöhle	D
	18	Marheeze	NL
	19	Brecht-Moordenaarsven 2	B
	20	Ralingen-Wintersdorf	D
	21	Netphen/Dreis-Tiefenbach	D
	22	Weidentalhöhle	D
	23	Germering-Nebel	D
La Hoguette pottery	24	Halle-Künsebeck	D
	25	Stuttgart - Bad Cannstatt	D
	26	Bavans "Abri sudsud-ouest", couche 5	F
	27	Choisey "Les Campins"	F
äLBK sites	28	Eitzum	D
	29	Eilsleben	D
	30	Friedberg-Bruchenbrücken	D
	31	Frankfurt-Niedereschbach	D
	32	Riedstadt-Goddelau	D
	33	Schwanfeld	D
	34	Ammerbuch	D
	35	Rottenburg-Fröbelweg	D
	36	Hailfingen	D
	37	Kleinsorsheim	D
	38	Enkingen	D
	39	Mintraching	D
	40	Wang	D
	41	Strögen	A
Pottery in Mesolithic context	42	Abri Saint-Joseph / Lutter	F
	43	Burghöhle Dietfurt	D
Late Mesolithic sites	44	Weelde-Paardsdrank 5	B
	45	Haltern am See	D
	46	Lage-Hörste	D
	47	"la Culotte" at Rémyilly-les-Pothées	F
	48	Boves "Le Marais"	F
	49	Rottenburg-Siebenlinden	D
	50	Jägerhaus Höhle	D
	51	Ruffey-sur-Seille	F
52	Arconciel "La Souche"	CH	
Pollen profiles	53	Rockenberg, Wetterau	D
	54	Unterzeller Bachtal	D
	55	Haspelmoor	D
	56	Pilsenmoos	D
	57	Großer Ursee bei Isny	D
Foreign pottery	58	Pulheim (pit with foreign pottery c. 7400 BP)	D