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BETWEEN FORAGING AND FARMING

AN EXTENDED BROAD SPECTRUM OF PAPERS
PRESENTED TO LEENDERT LOUWE KOOIJMANS

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9 The foam that flies ahead of a wave of advance: thoughts on the early neolithisation of the Lower Rhine uplands

Pieter van de Velde

9.1 Introduction

In the summer of 1976 Leendert Louwe Kooijmans was in his second season on the Hazendonk digs, and he asked me to act as site assistant that season. Born and raised in Arnhem on the sand hills, Leendert was wondering how prehistoric people could have endured living in such a wet area as had been the marshes in between the several Rhine branches around the Hazendonk. When I explained from first-hand experience that people living in those low-lying areas were accustomed to regular flooding of the streets, and sometimes of their houses, too, (up to ten or fifteen times for a few hours at a time every winter) and had their houses prepared for that event, either with removable boards and sand bags, or by living on the first floor, Leendert was fascinated.[1]

For the most part, Louwe Kooijmans' research interests have been with the transition to agriculture of the hunters-and-gatherers of the Dutch River Area, living in the swamps fed by the Rhine, Meuse and Scheldt rivers. Off and on, though, he has written on the other two neolithisations in the Low Countries, too: that in the northern provinces (catch-words: Swifterbant, Funnel Beaker or Trichterbecher Culture), and that in the southern loess zone, the earliest one (catch-words: Bandkeramik Culture or LBK, Limburg Group). It is this latter transition that will be addressed in my contribution where I will attempt to find an answer to the first sentence of this quote of Leendert's:

"…how this culture spread across the whole of Europe is still poorly understood. The Bandkeramik farmers who lived in the Netherlands definitely came from elsewhere … There seems to have been no acculturation of the Mesolithic occupants of the Netherlands in this first phase" (Louwe Kooijmans *et al*. 2005, 205).

In an archaeological 'How' question, 'When' and 'Why' are almost necessarily implicated.

In the present article, I shall use two or three periodization schemes, which correspond to one another more or less as follows: '*älteste LBK*' refers to the Bruchenbrücken Phase (*c*. 5325-5150 cal BC) of what formerly was known as LBK-I in the Meier-Arendt scheme; '*Flomborn*' (*mittlere* LBK, 5300-5125 cal BC) was originally defined by Meier-Arendt as LBK-II (Lüning 2005). In the Dutch chronological system LBK-1b was thought parallel with the beginnings of the Flomborn phase in Germany (Modderman 1970). This on chronological grounds seems no longer tenable (Van de Velde 2008b; present text). The hypothetical LBK-1a is equivalent to the *älteste* LBK (Modderman 1970). Starting with Stehli 1994 the LBK chronology is often expressed in 'House Generations', the average length of which is still under discussion, but for the present text LBK-1b equates with House Generations I-III, and the Flomborn phase with the Generations I-IX (Lüning 2005).

9.2 The problem

Although probably a primitive idea, it is a nice feeling to be working with something which is 'oldest ever', or 'first to be found' and the like. Thus, while preparing the publication of the excavations in the LBK village on the Janskamperveld near Geleen (a village belonging to the Graetheide cluster of Dutch Limburg, the Netherlands; see map) it was quite gratifying to have the oldest ^{14}C AMS date of the LBK in the Netherlands from that site (Van de Velde 2008a; 2008b).[2] The arrival of the LBK on that spot could be established at within a decade of 5220 cal BC.[3] Comparing the ceramic inventories of the oldest phases of several neighbouring villages in the Graetheide cluster in the Netherlands, in nearby German Rhineland to the east, and in the Belgian-Dutch Heeserwater area to the southwest, it appeared that all were of similar if not the same age. Consequently I postulated a single colonization wave for the loess belt between the Lower Rhine and the Heeserwater, with several localised target zones (Van de Velde 2008b).

There is one problem, however, as precisely in or near this region there are still older LBK dates: far away from the loess, in the excavations at the Hardinxveld Polderweg-site in the River District (again, by Louwe Kooijmans), LBK arrowheads have been recovered which are clearly older than the earliest LBK finds from Limburg (Louwe Kooijmans, 2001). Similarly, in the excavation at Weelde-Paardsdrank in the cover sands of the Belgian Campine, LBK arrowheads have been unearthed in the company of other lithic implements of possibly non-local origins (Huyge/Vermeersch 1982). Then too, a modest harvest of undated and unaccompanied LBK arrowheads (over one hundred) and adzes (more than

fifty) has been taken between the loess belt and the Rhine (Huyge/Vermeersch 1982; Van der Graaf 1987; Verhart 2000; Brounen, pers. comm. 2008). Even if the majority of these extra-loess LBK finds were contemporaneous with the LBK occupation on the loess, the earlier minority of the finds provides a case that the Janskamperveld LBK 'wave' was not the first to wash ashore in this comparatively outlying area.

The LBK is unquestionably the first culture to practice full farming in the region (agriculture, stock-breeding, complemented with a little hunting and a little gathering; Bakels 1978). Naturally, this accomplishment is important in the discussions regarding the later neolithisation of the wider area which includes the Dutch river district. The literature is replete with discussions of the process(es) of primary and secondary neolithisation (primary neolithisation: local and independent domestication of plants and animals; secondary neolithisation: adoption of agricultural practice after foreign stimuli) in general (*e.g.*, Dennell 1985; Rowley-Conwy 1983; Zvelebil 1986a; Whittle 1996; Scharl 2003; Barker 2007) sometimes restricted to the study of the secondary neolithisation within a region (Louwe Kooijmans 1998; Kind 1998; Gronenborn 1999; Verhart 2000; two thematic issues of the *Archäologische Informationen* – vols. 16 and 26; Amkreutz *et al*. 2007; *etc*.). With few exceptions (a.o., Dennell 1983, 175) little thought, however, has been given to the mechanisms *on the ground*, *i.e.*, the experiences and habits (to avoid the 'a-word', *agency*) of the people involved: "… many of the models are useful in constructing the grand narrative, but fail to offer an appropriate perspective for the study of interaction as it might have taken place…" (Amkreutz *et al*. 2007).

While of the natives of this general area it is said by some that they kept themselves 'available' for over a thousand years to be eventually converted to agriculture (Rowley-Conwy 1983; Zvelebil 1986a), by others the coming of agriculture has been depicted either as a gentle wave of agriculturalists steadily rolling out over Europe (Buttler 1938; Clark 1965; Ammerman/Cavalli-Sforza 1973; 1979), or framed as an incoherent set of local, small-scale colonisations, as if groups of migrants aimlessly had wandered around, and off-hand had decided to settle in the forest or on the hill they happened to find themselves (Childe 1929; Clark/Piggott 1965). 'Availability', even when used as a descriptive label substituting for the unspecific term 'acculturation' (Zvelebil 1986a), seems wide off the mark when modelling secondary neolithisation, just as much as gently rolling 'waves of advance' are (whether or not their speed is specified as 1 km/year: Ammerman/Cavalli-Sforza 1973 *vs*. 1979). And as far as colonisation is concerned, the many ethnographic and historical records of colonisation show accident and uncalculated risk to be irrelevant to any reasonable representation of what actually did happen in such endeavour: colonisation is a deliberately and carefully planned undertaking; understanding the stages of that process helps to explain some parts of the archaeological record. Below, I will outline the general process of colonisation and then attempt to fit that model to an as yet quite meagre selection of archaeological data on the LBK colonisation of the southern Netherlands.

9.3 On the Lower Rhine Uplands neolithisation

An early text on the prehistory of the Low Countries explained the coming of the 'semi-nomadic' LBK by their primitive agriculture (slash-and-burn), which without knowledge of manuring caused relatively rapid exhaustion of the soil and so forced the people to move on to new, fresh fields. In the region between Cologne and Brussels the LBK had gradually moved from the Rhine Valley on to the plateau westward, then to the Graetheide, and finally on to the Heeserwater area; a possible autochthonous population is not considered (De Laet/Glasbergen 1959, 44-46). This gradual spread in fact was echoing ideas originally formulated by Childe and Buttler (Childe 1929, Buttler 1938). Somewhat later De Laet observed that soon after the immigration of the Bandkeramians there were contacts with the autochthonous population, as witnessed by the frequent finds of shoe-last celts and LBK arrowheads in the sandy regions to the north, west, and southwest of the LBK settlements in the Hesbaye near Liège. To him (already in 1972!), the Limburg Group represented a part of the native population which "had acquired pottery production and therefore was on the road toward neolithisation" (De Laet 1972, 195).[4]

Regarding the area to the north of the loess zone as late as 1962 Waterbolk proclaimed that it was uninhabited before and during the LBK (Waterbolk 1962), but very soon excavations in the River Area (Hazendonk, *etc*.) obviated that picture completely (Louwe Kooijmans 1974, 1976). The discussion turned rapidly toward questions of acculturation, of discontinuity and continuity *within* the north-western European Mesolithic or Neolithic in general, and the role played by the LBK in particular (De Laet, ed., 1976). Yet how the LBK had arrived in this part of the world dropped from attention: in the 1991 handbook *Pre- en Protohistorie van de Lage Landen* [Pre- and Protohistory of the Low Countries] it is simply stated that "they settled on the loess in about 5300 BC" (Bloemers/Van Dorp 1991, 215).

Divergent ideas were also voiced. Modderman, in his synthesis of LBK archaeology, cautiously tended towards an LBK resulting from acculturation of the Mesolithic population (Modderman 1988, 130). By that time acculturation had come to seem more than likely for the Hungarian Plain and the regions immediately to the north-west of it (see for example Quitta 1960; Sielmann 1972). Of course, with the rise of the New Archaeology in those days, autochthonous

developments were ever more emphasised, leaving migrations as suspect explanations (*e.g.* Dennell 1983). However, in the loess belt between Cologne and Brussels the problem was and remained that only very few Mesolithic finds were made: there were simply no prospective ('availing'?) candidates for acculturation. Some authors imputed this absence entirely to erosion (Vermeersch 1990; Gob 1990); yet the systematic field surveys and review of amateur collections and literature by Vanmontfort now seem to substantiate the empty loess proposition (Vanmontfort forthcoming). Outside or beyond the loess belt, after similar surveys of four sub-regions down the Meuse toward the River Area, Wansleeben and Verhart documented substantive Mesolithic presence, and they explored the ethnography of contact situations to elucidate their find distributions in terms of dealings between Mesolithic foragers and LBK cattle-drivers (Wansleeben/Verhart 1990, Verhart 2000).

Apart from mesolithic foragers, a few other contemporaneous groups are now known on the loess and in adjacent regions. Suspected already by Buttler (1932), from the 1970s on (ceramic) groups occurring in the same general area as the LBK but culturally distinct from them have been 'defined' or identified: firstly the Limburg Group (Modderman 1974), secondly La Hoguette (Jeunesse 1986). Elements of these groups are found sometimes in association with, sometimes independent of LBK features (Lüning *et al.* 1989; Vanmontfort *et al.*, 2007). It is supposed that these groups pertained to (epi-, proto- or para-) Neolithic societies in the region broadly around the Upper and Middle Rhine, in time partially earlier than, partially contemporaneous with the LBK, possibly with Cardium affinities or antecedents which would indicate contacts to or influences from the Mediterranean Neolithic (Van Berg 1990; Jeunesse *et al.* 1991). Regrettably, independent settlements associated with these groups have not been found as yet, so their economic and social characteristics remain largely unknown; I am not aware of any publication that has sought to derive the LBK from either or both of these groups. There will have been interaction, though, but the question of how and why LBK expansion occurred is not affected. As I wrote in 1993:

"… we believe [that regarding the Dutch LBK] there is no reason to opt for acculturation instead of migration as an explanatory model for the Flomborn phase. The entire material culture was exported as a ready-made package and relations with relatives in the home country were maintained for generations…" (De Grooth/Van de Velde 2005, 237)

Below, I will attempt to ground that belief in archaeological data.

9.4 Chronology of LBK exploration and of settlement

The present text was occasioned by the chronological lapse between the oldest secure dates of the LBK within the Graetheide *Siedlungskammer* and those in the Dutch River District and in the Belgian Campine. The Graetheide date proposed here is younger or more recent by about ¾ of a century than most recent authors would be willing to assume: the most often quoted date for the coming of the LBK to these parts is currently 5300 cal BC (*e.g.* Vanmontfort forthcoming). That date is derived from a calculation that starts with the dendrochronological date of the Kückhoven well in nearby German Rhineland (5090 BC, for the oldest wooden frame of the well) and adds estimates of a total time lapse of 11 house or settlement generations prior to the building of the well, based on Petar Stehli's original reflections on their average duration (*c.* 20 years; Stehli 1989); that is, 5090 + 225 ≈ 5320 cal BC as the date of arrival of the LBK in these regions. Thus even Whittle, notwithstanding his valiant attempts to establish the time range of the LBK in his account of the coming of the New Age, in the end had to use Stehli's calculations, simply because no reliable direct determinations were available (Whittle 1990; 1996, 158). In other words, the generally accepted date for the coming of the LBK is substantially based on assumption.

Other views, however, are possible. Starting from the same baseline, the Kückhoven well and the few available AMS readings on charred grain (16 from the LBK-1a phase, 6 from LBK-2b/c), by means of wiggle matching Lanting and Van der Plicht posit the beginning of the German LBK-1a (*i.e.*, *älteste* LBK) in about 5325 cal BC. The arrival of the LBK on the Graetheide is then estimated at 5230 cal BC, and its demise at about 5000 cal BC (Lanting/Van der Plicht 2002).[5] Similarly Jadin and Cahen, in an extended discussion of the available chronological data and the associated methodical issues, do not arrive at an unequivocal date of entry, although one of their diagrams is suggestive of about the same moment in time as the date proposed here, 5220 cal BC (Jadin *et al.* 2003, 547-553, and fig. 6.1-4, taken from an earlier article by J. Lanting). There are some problems with these datings, though: it is tacitly assumed by the authors quoted that LBK-1b (or Flomborn) *succeeds* to LBK-1a (or *älteste* LBK). This is quite unlikely though, as there is a considerable overlap in time of the two phases, at least east of the Rhine (Lüning 2005) where the origins of the Flomborn floruit are sought. Also, the entry of the LBK into the area between Rhine and Scheldt at the beginning of LBK-Ib of the Dutch periodization is generally equated with the beginning of the Flomborn phase (Lüning 2005, following Modderman 1970).

Not based on assumption, four AMS readings have been taken on carbonised grain from the Janskamperveld LBK village by the Groningen and Oxford laboratories. The grain comes from side pits of two houses from the earliest settlement phase. The AMS results fall easily within each other's standard deviations (Van de Velde 2008b) which thus could be pooled to 6204 ± 22 BP, calibrating to 5214 - 5203 cal BC.

Considering their find context half way the pits' fillings the seeds were deposited perhaps 10 to 15 years later than the erection of the associated houses. That way, the event of first settlement can be set to a date of 5220 cal BC (with a ± of about one decade; Van de Velde 2008b). If Lüning's proposed chronology of the German LBK holds good some three or four generations had still to elapse until the expansion from the Main area into the Northwest, ample time for a careful exploration.

As regards the Hardinxveld Polderweg arrowheads, the layer they were found in has a *t.a.q.* of 6320 ± 50 BP together with six AMS readings to the three preceding centuries (Louwe Kooijmans 2001, 68, 135-137, and 466-468). The latter can be pooled to 5430 ± 90 – 5350 ± 100 cal BC (95% margins; Mol/Van Zijverden 2007). In other words the arrowheads are contemporaneous with the *älteste* LBK and earlier than the start of the Flomborn phase in Hessen (Lüning 2005). As for the Weelde-Paardsdrank finds, their dating is very much contested (Huyge/Vermeersch 1982; Vermeersch 1990; Gob 1990; Van Gijn *et al*. 2001) – anything goes, apparently.

A word or two should still be accorded to the presumed synchronicity of the first colonies on the Dutch Graetheide, the German Aldenhovener Platte and the Belgian Heeserwater *Siedlungskammer*. Grounds for synchronicity will be considered weak by many, firstly as they are based on pottery decoration, with 'scientific' dates only available for the Dutch area (as above), and secondly as the oldest pottery is taken to be contemporaneous with the first habitation.[6] It happens that the spectra and the structures of the pottery decoration of the earliest phases in those three regions are virtually identical, and can *therefore* be deemed contemporary: there is no rim decoration for *c*. 90% of the decorated ware from Geleen-De Kluis (Waterbolk 1959) long considered the oldest LBK settlement in the Netherlands (*e.g*., Modderman 1985: 75-76), Elsloo-Koolweg (Modderman 1970; Van de Velde 1979), Sittard (Modderman 1959), Langweiler-8 on the Aldenhovener Platte (Stehli 1994; Münch 2005), and Maastricht-De Klinkers belonging to the Heeserwater settlement area (Theunissen 1990). Especially the absence of rim decoration is considered a strong characteristic of the beginnings of the Flomborn phase by Modderman (1970) and Münch (2005), as well as the present author (2008c). Then, too, if the oldest pottery is not simultaneous with first settlement, the latter is likely to be off by a similar number of years in all three areas.

9.5 On colonization and LBK remains in the Low Countries

Recently there seems to be general agreement that the LBK was intrusive into the world of foragers between the Rhine and Scheldt Rivers in the 6th millennium BC (latest, Vanmontfort forthcoming). As the latter author has scrupulously demonstrated, the areas or 'islands' of the loess, where the LBK was later to settle had in fact largely been avoided and only rarely visited by the autochthonous hunters and gatherers of the Later Mesolithic, although the foragers in the River Area apparently maintained contacts with regions in Belgium and France throughout the centuries under discussion (Louwe Kooijmans 2007). Vanmontfort could not find a plausible explanation for the Mesolithic avoidance of parts of the loess belt, except for the dense Atlantic forest growing on that soil, unfriendly to game and so unrewarding for hunters too. The preceding Mesolithic absence in what were to become the LBK domains is remarkable at least, and suggests knowledge on the part of the first LBK settlers of local Mesolithic groups' aversions (Vanmontfort forthcoming) in combination with their own preferences: chance begs the question, so it seems. An additional argument for this fore-knowledge can be found in the undefended character of the earliest LBK settlements in the region: Bandkeramians knew almost demonstrably that they were not impinging on existing habits. For instance, though Geleen-Janskamperveld and Sittard do show palisades in their earliest generations, those are fences of at the most man's height and with posts more than a metre apart, which would not even have retarded a dedicated attack; instead they are likely to have served as corrals for the children and pigs inside, or deterrents to spirits and animals in the forest outside (Van de Velde 2008c). There are heavier defensive LBK constructions with deep ditches in these regions such as at Beek-Kelmond, Erkelenz-Kückhoven, Darion, or Beek-Hoolweg (Brounen/Rensink 2007; Lehmann 2004; Cahen *et al*. 1990; Wyns *et al*. in prep.) but these all date to the younger phases of the LBK (Golitko/Keeley 2007).

This, then, brings to mind the occurrence of arrowheads and adzes of indubitable LBK provenance *in forager contexts* even before there were LBK settlers in the area, together with the 'imitation LBK arrowheads' as they have been called (Huyge/Vermeersch 1982), found in the same places. Arrowheads and adzes were found sometimes in mutual association, more often alone, and when farther than a day's travel from the settlements never in the company of pottery (Huyge/Vermeersch 1982; Van der Graaf 1987; Vanmontfort forthcoming; cf. Verhart 2000 on imitation in contact contexts). Arrowheads or adzes are not 'the same as' people, any more than pots are, and their presence in alien find spots and camps can be interpreted in several ways: obtained in exchange by the locals (in recognition of hospitality, down-the-line or what not), stolen or captured from lonely wanderers in the forest, visits to the foreigners or *vice versa*, *etc*.; all instances will apply, presumably. To my mind the imitative arrowheads are suggestive of a visit to the locals; it is as if someone has sought to establish friendly contacts

across a wide language gap by simple and sympathetic gestures, perhaps by a local on the visitor's flint nucleus (rough-outs of adzes seem not to have been carried around, so it seems). That contacts were established is not controversial, as the ensuing (or contemporaneous) LBK avoidance of settlement in areas of autochthonous interest indicates.Similar non-inimical states of affairs slightly later in time are suggested by the presence of allogenic women in LBK villages (Van de Velde 2007).

Different types of sites can be distinguished in the areas outside the loess zone where local and non-local finds have been found together. There are sites which have, besides the local Mesolithic artefacts, either single or multiple occurrences of LBK arrowheads, their imitations, LBK adzes, and LBK pottery, or find groups with combinations of two or three of these categories both without and with pottery (Van der Graaf 1987; Wansleeben/Verhart 1990; Verhart 2000). The pottery-associated sites are generally found relatively near the loess areas and are commonly attributed to cattle transhumance in the later phases of Bandkeramik society, when the central regions had become ever more crowded leaving less room for grazing (Bakels 1978). Of the non-pottery sites with LBK arrowheads, their imitations, or LBK adzes the majority may tell of hunting expeditions; they occur both between the sites with pottery, and farther afield. Some of the finds, though, especially when associated with local (*i.e.*, Mesolithic, perhaps also including La Hoguette and Limburg styles) artefacts, can be interpreted as the visiting-cards of explorers gathering intelligence about or seeking relations with the locals.

Generally speaking, forays and planned reconnoitring of foreign areas belong to the first stages of colonization. For instance, the missionary trips from Christian Europe to Persia and China in the 13th century by André de Longjumeau, by Willem van Rubroek and by Nicolò, Maffeo and Marco Polo instigated by Louis the Saint can be interpreted as consciously explorative expeditions, in preparation of the expansion of direct trade between the Spice Land and Europe and the ardently desired subjugation of the East to the Catholic Faith. Another example, in the 15-thirties the north-west part of what later was to become Argentina was discovered by De Irala when based in Asunción, Paraguay. From there, he attempted to find the legendary Silver Mountains which in the end proved to be identical with Perú, then still to be conquered. After the fall of the Inca Empire a decade later the area, the future Province of Tucumán was further explored by several expeditions, both from Asunción in the East, and Chile and Peru in the West. Then, in the 15-sixties several 'cities' were founded in the area and with them the colony of Tucumán and the exploitation proper of the territory and its inhabitants started (Mandrini 2004, 19-21). And as a non-European instance, before the Polynesians settled on the Hawai'i Archipelago several voyages had been made to the islands, explored the possibilities of settlement there and mastered the hazards of the long trip from the Marquesas Islands (Graves/Addison 1995).

More generally, the exploration of future settlement areas consists in a sometimes accidental, sometimes deliberate *discovery* phase or event. When first impressions of the new land are positive that phase is sooner or later followed by a longer period of *exploration* proper, when the possibilities of the new environment are systematically gauged (*e.g.*, Burmeister 1996; Housley *et al*. 1997; Gronenborn 2003). Thus, when in the 1420s some unhappy seamen had sighted the Azores after being driven off their track by a gale and lived to tell their findings in Lisbon, some years later Henry the Navigator sent ships with cattle, pigs, sheep, vine and grain to establish their suitability under the conditions of the 'newly found' land (of which rumours had possibly circulated for centuries in South-European ports). Final settlement on these islands, the third phase of the process, or *colonisation* followed only after several years of testing (Melo Bento 1986). There is no reason to suppose that LBK people would have done differently in their days. The examples above imply that the duration of the phases of the colonisation process, and of especially the intervals in between, is different from case to case: oral tradition may easily span several generations as demonstrated by the colonisation of the Hawai'i Islands (Graves/Addison 1995).

To return attention to Neolithic times, in this context the massive presence of Lanaye flint – previously known by the names of Rijckholt, Maas Valley, or Maastricht flint (De Grooth 2008) – (incl. Vetschau and Lousberg flints) in *älteste* LBK sites in the Wetterau near Frankfort is telling of extended foreign contacts as well; the source outcrops are situated about 200 kms to the north-west (Gronenborn 1990). This presence, representing 80% of all flint employed in the Wetterau during the *älteste* LBK, has usually been explained as being the result of long-distance exchange via Late Mesolithic or La Hoguette intermediaries (*ibid.*).[7] Such almost complete dependency on foreign partners is highly improbable in almost any (not only Neolithic) situation. Rather, LBK mobility (Whittle 1996), or scheduled exploitation of the flint outcrops can be evoked and would better explain such quantity as well as why the majority of this flint still had some cortex (Brounen/Peeters 2001). It would also fit in with the occurrence of arrowheads and adzes even further afield, in a way illustrative of the setting up of the knowledge base needed for future migration to the area between Rhine and Meuse.

Discovery and exploration are different frames of mind, different ways of meeting unknown situations, and as such archaeologically difficult to perceive, if at all (Louwe Kooijmans 1993). Moreover, the chronological separation of

first engagement and closer investigation would perhaps require too much of present dating methods in some cases. Worse even, arrowheads and adzes with LBK attributes are only conspicuous in non-LBK areas, whereas they will not be noticed as different in timing within a *Siedlungskammer* where, sometime later, permanent habitation has been set up. For that reason it is virtually impossible to archaeologically distinguish exploration from settling within a colony. However, in the present case flint obtained from non-occupied areas (as with the Lanaye flint in W German or Middle Rhine-Main *älteste* LBK contexts) and the presence of LBK armoury in non-LBK settlements do allow the archaeological recognition of an explorative interlude before colonisation. The geographical separation of markers of presence in both instances (LBK elements in foreign contexts, exotic flint in LBK areas) can be taken as an index of exploration, in probably unmeditated though necessary preparation for future colonising endeavour.

9.6 Why migration? Some models in context

People do not leave their homes, kindred and fields for no reason, and that brings up the question of why Bandkeramians expanded into the north-western area, the loess zone between Rhine and Scheldt. A comparatively ancient answer is it was not the LBK who left home to move into this area, but that the local Mesolithicians stayed put and adopted the idea of farming, permanent settlement, pottery and all things commonly associated with the Neolithic way of life, with societies from the Balkans and the Near East as their ultimate inspiration (Schuchhardt 1918; Childe 1929; Clark 1952; Hodder 1990; Whittle 1996; Barker 2007). That, however, is a teleological or evolutionistic answer to the why-question for it assumes a categorical superiority of settled life or agriculture over roaming and foraging. Starting with Schuchhardt, the origins of the LBK proper have been situated in the area between Bavaria and Transdanubia, up to and including Moravia, spurred either by immigration ('demic diffusion') or adoption of agriculture ('stimulus diffusion') *etc*. from the Balkans (Schuchhardt 1918; Childe 1929; Buttler 1938; Paret 1946). Such an origin was firmly corroborated by Quitta (1960), since repeated by Sielmann (1972), Tillmann (1993), Kind (1998), Gronenborn (1999) and others.[8]

But this only accounts for the Central-European situation, and leaves the expansion into north-western Europe unexplained. Two answers or mechanisms have been sought: one in the economic sphere, and another demographic, with or without acculturation of local groups. The economic explanation is based either on a selective reading of the ethnographic literature, or on the supposition that LBK agriculture was so primitive as to exhaust the soil in a few years, resulting in so-called *Wanderbauernwirtschaft* ('itinerant agriculture', only approximately translatable as 'shifting cultivation'; cf. Conklin 1961, or Sahlins 1968, 29-30). The ethnographic version is found in Sangmeister 1950, the *Wanderbauern*-version in Childe 1929, Buttler 1938, and still in Clark 1952 and 1965, Soudský 1962 and Bailloud 1968. Modderman firmly rejected the ethnographic analogue as well as the *Wanderbauern* thesis as being founded on insufficient and exotic data (Modderman 1970, 208-211; Bogaard 2004). Instead, he postulated stress between groups in the LBK heartland as driving force behind the expansion (Modderman 1988, 130).

Best known among the demographic explanations of the LBK expansion is the Wave of Advance Model of 1971 (Ammerman/Cavalli-Sforza 1973). Based on the then rapidly growing number of ^{14}C-dates, the diffusion of early farming into Europe as visualised in a map drawn by Clark (1965) was fitted to a population-genetics model. Though the authors admitted that the model cannot decide between 'stimulus diffusion' (or cultural diffusion) and 'demic diffusion' (or population migration), they held strong reservations about the former, and instead proposed population expansion as agricultural vector: "…people carry with them their own culture, and … if they … expand geographically, so does their culture" (p. 344). Geographical expansion, according to them, occurred because early farming permitted and caused population growth based on augmented food production (a similar argument is developed in Bakels/Lüning 1990). The budding off of groups of people, generally in random directions over *short* distances, then results in a '*wave of population expansion*' moving outwards at a constant radial rate. Being geographically contiguous and chronologically continuous such a wave is clearly distinct from 'colonisation', appropriately defined by them as the intentional settlement of a foreign territory by a coherent group of people (p. 344). Expanding from Near-Eastern centres, the linear speed of the wave front was calculated at approximately 1 km per year, with quite good fits for the then available ^{14}C dates throughout. In 1979 the same authors published a text with almost identical contents and purposes, now tuned to the West German Aldenhovener Platte LBK. In a simulation, they worked with an occupation or fallow cycle much reminiscent of Sangmeister's (1950) without, however, acknowledging this. It is highly questionable whether the Wave of Advance Model really constituted an advance in our knowledge of the historical neolithisation process for, as Zvelebil rightly observed: "… pattern can be seen to emerge [in the dispersal of agriculture into Europe] which is far from the uniform, unidirectional 'wave of advance' postulated by those favouring agricultural diffusion from the Near-East" (Zvelebil 1986b, 185-186). Yet, a few years later it was remarked that "… the population of this Bandkeramik core area grew so fast that people had to emigrate to the west and the north" (Bakels/Lüning 1990). They offered no suggestion of why the

population would grow, probably implying the same argument as did Ammerman and Cavalli-Sforza.

It is my contention that the driving forces behind migration are situated first and foremost in the socio-economic sphere rather than in population growth pure and simple. So, instead of delving into evolutionistic axioms or demographic parameters, a look into possible social and economic factors might be of some help in the explanation of LBK expansion. On *a priori* ethnological grounds LBK society in all its historical phases will have been a rather decentralized society composed of fairly large family units, or lineages, with members of these families in several villages and hamlets.[9] Based on analyses of the archaeological evidence (Van de Velde 1979 and 2008c; Schwerdtner 2007), the LBK lineages were probably grouped in two, even larger bonds, so-called moieties. At the lowest level of society, in the villages, several families of distinct parentage, sub-units or segments of the larger lineages, made up everyday social and economic life. Lineages had customary, or traditional marriage arrangements for their members: certainly they had to marry outside their lineage-of-birth, and in all likelihood they had to obtain marriage partners from stipulated other lineages — most probably from the other moiety, and within that moiety from one or more particular lineages, and not from the others although that cannot be substantiated as yet. As also usual in most societies, the social system of the LBK was based on both male and female oriented structures: here, male members of the lineages stayed put in their birthplace, with sons continuing in the village or farmstead of their fathers. Female members of other lineages married in, either from another part of the village but apparently preferably from other locales (in anthropologese: *patrilocal* or *virilocal* arrangements), though not necessarily from outside Bandkeramia (as supposed by Bickle and Hofmann 2007). Additionally, some rights and duties, some kind of authority was transferred through female descent lines, from mothers to daughters (*matrilinear* arrangements). Based on the distribution of gifts in the LBK graves (there are more indicators) the two genders were more or less equal in status (Van de Velde 1979; 1990; 1995; parts of the picture have been confirmed by others: a.o., Strien 2000, Price *et al*. 2001, Eisenhauer 2003, Frirdich 2005, Claßen 2006, Schwerdtner 2007).

It is known from ethnology that the political structures of lineage societies are weak, as the lineages rather than society as a whole provide the basis of individual and group identities. On top of this, local lineage segments are likely to split on disputes, especially so since these family units are also economic entities. Thus younger men getting less than their older peers, or sons fed up with parental authority, may vote with their feet and set up affairs elsewhere; and discontented women return to their folks. Yet they keep on belonging to their lineage, and in case of need they may fall back on, even require their lineage's solidarity. Being socio-economic units, segments may compete with each other for resources, exchange partners and items, or prestige – which may result in tensions within the settlement (or between settlements), again leading to groups moving out.

As there are no signs of over-population or land-shortage for this (Flomborn) period of the LBK, precisely these aspects of lineage society, internal tensions, would be the major *push factors* behind the expansion across western Europe.[10] (Frirdich 2005 writing about the *älteste LBK*; cf. Hayden 1990) – and compare the branching off of Flomborn-style villages from älteste LBK settlement in the Lower Main area (Cladders/Stäuble 2003, 502; Lüning 2005). Individual and group power, status and prestige may not only be sought in the acquisition of valuables, or the outdoing of each other in feasts and similar ritual pursuits, they can also be secured externally, in braving dangers in the forest, in hunting, in travelling to non-kin groups to attain valuables for oneself, from high quality flint to an exotic beauty of Mesolithic, or far-away Bandkeramian stock. We simply don't know how high the stakes were in the internal status games, but they must have been mounting with time, given the violent character of especially the Younger LBK (Van de Velde 1995; Petrasch 1999; Golitko/Keeley 2007). Concomitantly, we could even suppose that the poppy seeds, available among the semi-Neolithic groups such as La Hoguette to the west and southwest of Bandkeramia, might have been wanted for their hallucinatory properties (Bakels, pers. comm.), of use in bravura and brawl at home. These attractions all can be interpreted as *pull factors*, to which the availability of empty, yet agriculturally fertile land should be added as soon as its existence became known, through explorative enterprises.

9.7 Summary and conclusion

I started out with the question *how* the LBK people migrated into the loess belt between Rhine and Scheldt Rivers and suggested as an answer that such an enterprise should have been a well-planned colonisation. On an analogue model, a colonisation process goes through three distinct stages: discovery, exploration, and final settlement or colonisation proper. This then, brought up the question *When* have these stages occurred, and the widely strewn arrowheads and adzes of unmistakably LBK make (sometimes accompanied by other artefacts) in the areas beyond the loess belt were set into a context of discovery and exploration, as some of the arrowheads clearly antedated the founding of the colonies. Also, the early presence of comparatively huge quantities of Lanaye flint in the Lower Main Area, the putative homeland of the future colonists, was set into this context of exploration. Exploration can also be evoked to explain the exclusive

occupation by the LBK of areas which were rarely visited by Mesolithicians and their simultaneous avoidance of settlement in areas of Mesolithic interest. After generations of exploration, colonies were established between Cologne and Brussels in about 5220 cal BC, a date based on four ^{14}C readings that have recently become available. Finally an answer to the question of *why* this migration took place was tentatively sought in the segmentary character of LBK society, which ethnologically should have featured frequent quarrels because of economic competition and social striving, resulting in schisms or migration of the underdogs. They and their families went off to make new lives for themselves in previously explored, well-known target zones.

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Notes

1 I am referring to the years before the 'Deltaplan' (1950-1997) which resulted in the closure of the Rhine estuary to the spring tides of the North Sea which were often swept higher up by autumn and winter storms along the Dutch coast.

2 Excavations by Louwe Kooijmans and Kamermans (Kamermans *et al*. 1992; Louwe Kooijmans *et al*. 2003); I participated as one of the students' tutors.

3 Earlier ^{14}C readings from LBK sites in the Netherlands have all been on carbonized wood from house posts, and thus likely to be a century or so off (Lanting/Van der Plicht 2002). Three are seemingly 'older' than the Geleen-Janskamperveld date: 6370 ± 60 (Geleen-De Kluis), 6320 ± 90 and 6270 ± 85 BP (Elsloo).

4 Almost exclusively known from their pottery, which is quite distinct from LBK ware; see below.

5 A date of 5360 BC can also be inferred, but is rejected by them on *a priori* grounds, as that would imply a duration of the *älteste* phase of nine settlement or house generations.

6 However, especially in the case of the LBK pottery, decoration is probably as telling as written records: already in 1979 I had read the virilocal and matrilinear social structure of this society from it, only in 2001 corroborated by isotope analysis on skeletons (Price *et al*., 2001). Recently, several authors have attained interesting results along similar (pottery) lines: Claßen 2006, Eisenhauer 2003, Frirdich 2003.

7 Another 15% was also obtained elsewhere, from similar distances of 200 kms (Gronenborn 1990).

8 However, archaeological evidence for a Proto-LBK (a neolithisising Mesolithic) is not available although there are many Mesolithic components in the local LBK technology.

9 Apart from thousands of ethno*graphic* examples, there is also a quite extensive body of ethno*logical* theory attempring to make sense of them.

10 Note that overall population increase would be a likely effect of this splitting off, not its cause.

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