The Late Neolithic Expansion in Denmark

Ancient and new traditions 2350-1700 BC

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ABSTRACT

Although the Scandinavian Late Neolithic today is mainly defined by the introduction of bifacial flint work, particularly daggers, agricultural intensification must also be seen as a part of the Late Neolithic package, which developed under Bell Beaker-influence in Jutland around 2350 BCE. It is argued that the changes in subsistence led to a population increase, which was the background for the spread of the new Late Neolithic culture in Scandinavia. A delay in the introduction of the Late Neolithic in East Denmark is, among other things, reflected in the scarcity of Bell Beaker-related artefacts in the region. It is suggested that this must be understood on the background of old cultural differences between West and East Denmark.

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Introduction

The present paper is an attempt to understand the development of the Late Neolithic (LN, 2350-1700 BCE) in Denmark on the background of migration, changes in subsistence and regional cultural differences.

It is today widely accepted that the transition to the Late Neolithic happened simultaneously throughout Southern Scandinavia (Iversen 2015, 29; Madsen 1978; Müller and Vandkilde 2020) and that the cultural diversity, which reigned in Denmark during the last half of the Middle Neolithic (MNB, 2800-2350 BCE) ended with the beginning of the Late Neolithic (Iversen 2015, 117). This understanding is based on the rapid spread of bifacial flint work, particularly daggers, in most parts of Southern Scandinavia (Apel 2001; Earle 2004; Kristiansen 1987; Lomborg 1973; Madsen 1978; Müller 1902; Sarauw 2007b). The focus on the Late Neolithic flint work is so strong that the period also has been nicknamed 'the Dagger Period' in Denmark. However, the existence of several regional differences within Southern Scandinavia during the Late Neolithic has also long been recognised. Most significant is the variation in burial practices (e.g. Iversen 2015, 123-130; Lomborg 1973, 96-133; Müller and Vandkilde 2020, 37-38). Furthermore, the much-debated Bell Beaker influence mainly affected West Denmark, with additional expansion further north and north-east (Prescott and Glørstad 2015; Sarauw 2007a, 2007c; Vandkilde 2005; Østmo 2012). Not least, numerous settlement excavations in the last twenty years have contributed significantly to this picture of regional differences, especially regarding house types (Sparrevohn, Kastholm and Nielsen 2019). The settlement excavations have also broadened our understanding of Late Neolithic subsistence strategies. It is today widely accepted that the transition to the Late Neolithic in southern and western Norway also represents the Neolithisation, in the economic sense of the word, i.e. when hunting and fishing was succeeded by agro-pastoralism as the primary subsistence base (e.g. Prescott 1996, 2020; Østmo 1988). Recent interdisciplinary studies on the Late Neolithic in Western and Southern Sweden also focus on subsistence (Blank

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2021; Tornberg 2018). In Danish research, however, Late Neolithic subsistence strategies are only mentioned in passing (Iversen 2015, 121-122; Jensen 2001, 511-513; Sørensen 2014b: 64-67), probably because changes are blurred by an earlier Neolithisation, which occurred with the introduction of the Funnel Beaker Culture *c.*4000 BCE, around 1700 years before the Late Neolithic period (Sørensen 2014a). However, where the MNB has been characterised as an overall de-Neolithisation of Southern Scandinavia (Hinsch 1955, 104; Iversen 2013; 2015 69-73; Klassen 2005; Nielsen, Persson and Solheim 2019; Østmo 1988, 225-227), the LN must be characterised as a re-Neolithisation, where Southern Scandinavia's favourable conditions for agriculture were exploited to a hitherto unseen extent (Johannsen, in prep-a, in prep-b). In the present paper, it is suggested that increased agricultural production played a significant, nevertheless overlooked, role in the development of Late Neolithic Denmark. Thereby, the beginning of the Late Neolithic is understood as the introduction of a package, which besides the bifacial flint working technique, also included new subsistence strategies and settlement patterns.

Based on a review of regional cultural differences in MNB and LN, recent migration studies, and Late Neolithic subsistence, the present paper thus questions the current orthodoxy of bifacial flint technology as a common cultural denominator in Late Neolithic Denmark.

Methodological and theoretical approaches

In order to understand the cultural development in Southern Scandinavia in the Late Neolithic, the present study discusses Late Neolithic regional differences against a background of regional cultural diversity in the preceding period. The material used in the paper has primarily been found in published studies of various Late Neolithic artefacts and construction types with specific regional distributions. New observations are however also included. These are part of a larger ongoing study of the Scandinavian Late Neolithic subsistence and social development, which is based on a vast amount of previously unpublished material from databases, excavation reports, papers and monographs. This work is ongoing, and revealing its full extent lies beyond the boundaries of the present study. The presented analysis and interpretations must thereby be understood as preliminary.

The paper's premise is that the beginning of the Late Neolithic in Southern Scandinavia began with migrations from the northwest European fringes (Germany and the Netherlands) of the pan-European Bell Beaker phenomenon to the northwestern part of Jutland at the end of MNB (Prescott 2009, 206). The areas which were influenced by the Bell Beaker phenomenon can be described as contact cultures, which Helle Vandkilde has defined as '*geographically extended and fairly confined zones of intense interconnectivity which may have differing backgrounds, but nevertheless display a high frequency of translations of shared ideas*' (Vandkilde 2016, 107-108). As the new ideas were translated to fit with local traditions, the concept of contact cultures implies that the degree to which new cultural habits were accepted varied from region to region in accordance with the existing traditions. This is in line with Rune Iversen's research on cultural development in Southern Scandinavia in the 3rd Millennium BCE (Iversen 2015, 2016). Iversen has described the mix of cultures within the period as a process of creolisation; a concept borrowed from linguistics, which in short describes when two or more languages fuse into a new language (Iversen 2015, 149). In line with Vandkilde's concept of contact cultures, Iversen describes the mix of cultures in the second half of the Middle Neolithic on Zealand as selective adoptions, transformation and use of new cultural elements in a way that resonated with existing Funnel Beaker traditions. In relation to the linguistic term creolisation Iversen concludes that 'the '*grammar*' [in MNB on Zealand], *(rules of usage, or in cultural creolisation the way which material things are made, used and perceived) remained principally Funnel Beaker culture whereas the 'lexicon'/vocabulary (words, or in this case the artefacts) appear to be Single Grave Culture*'. Iversen here extends the Funnel Beaker' grammar' beyond the use of artefacts to social practices such as burial customs and offerings (Iversen 2015, 151 with further references). The way new cultural elements were adopted and the willingness to do so is thereby understood as determined by existing

cultural traditions. On this background, it will be proposed that the new Late Neolithic culture was accepted faster in West than in East Denmark.

A tripartite partition of the Late Neolithic period based on typological variation of flint daggers has been suggested by Ebbe Lomborg (1973), but today most scholars follow Helle Vandkilde's division of the Late Neolithic in two periods (1996): LN I (2350-1950 BCE) and LN II (1950-1700 BCE), which is based on metalwork, flint daggers and radiocarbon-dates. Vandkilde's division is also used in the following.

Cultural diversity at the end of the Middle Neolithic

A brief overview of the MNB in Denmark and the southern part of Sweden is necessary to understand the background for the regional cultural variation in this area in the Late Neolithic. While there were regional differences throughout prehistory in South Scandinavia, the cultural differences in MNB are significant. Variations of the Corded Ware Complex (CWC) settled in West Denmark and Southern Sweden. The CWC is in Scandinavia mainly known for its single burials, which represent a profound break with the multiple burials in megalithic tombs of the preceding Funnel Beaker Culture. Only few houses from the MNB have been excavated and mainly from the end phase of the period. The settlements seem to have been small and dispersed, which may indicate they were only inhabited for short periods (Brink 2009, 268-277; Nielsen 2019, 20-24; Sarauw 2019, 283-286). The sandy, nutrient-poor soils of Western Jutland, corresponding to the core area of the Single Grave Culture (Danish CWC), were not suited for plant cultivation but offered good pastures. There is thus reason to believe that animal husbandry, possibly cattle breeding, played an significant role in subsistence here (Müller and Vandkilde 2020, 40). Crops were also cultivated, but evidence of this has mainly been found in the eastern part of the distribution area of the Single Grave Culture and from the end of the period (Andreasen 2009; Klassen, 2005). Several recent DNA studies indicate that the gene pool of the Early European Farmers was, to a large extent, replaced with Steppe-DNA in the areas affected by the Corded Ware Complex (Allentoft et al. 2015; Egfjord et al. 2021; Haak et al. 2015; Malmström et al. 2019; Mittnik et al. 2018). This has been interpreted as indications of massive migrations and violent takeover of land, possibly aided by a pandemic, which opened up Europa for migrations (Kristiansen et al. 2017, for a differing view see Furholt 2021).

While the different Corded Ware groups expanded in the western and eastern part of Southern Scandinavia, the Pitted Ware groups from the Scandinavian Peninsula affected the Kattegat Region. DNA analyses on Pitted Ware burials from the Baltic Sea area show that DNA profiles are best modelled with ancestry of European hunter-gatherers (Mittnik et al. 2018). The subsistence of the Pitted Ware groups in the East Baltic was almost exclusively based on hunting and fishing (Eriksson 2004; Fornander, Eriksson and Lidén 2008). The Pitted Ware influence in the Kattegat region is most profoundly reflected by the ubiquity of large, tanged arrowheads and increased activity along the coasts (Iversen 2010; Klassen 2020). Subsistence here seems to have been based on a mix of hunting/fishing and farming (Andreasen 2020; Makarewicz and Pleuger 2020).

To complicate the picture even further, the older Funnel Beaker traditions continued in Eastern Jutland, on Funen and on Zealand in particular. East Denmark has been called the megalithic heartland as megaliths were constructed here in large numbers during the 4th millennium BCE and used for burials throughout the 3rd millennium BCE (Iversen 2016, 168). Additionally, the construction of causewayed enclosures continued in the shape of palisaded structures on Zealand, Bornholm and in West Scania during the MNB (Brink 2009; Nielsen, Nielsen and Adamsen 2014; Struve 2018). Little is known of subsistence in the area; it may have consisted of a mix of field cultivation and animal husbandry, similar to the economy introduced with the Funnel Beaker Culture 1200 years earlier. There are, however, some indications of a decrease in cultivated land (Iversen 2015, 69-71), while finds of large fishing weirs of MNB-date may reflect that fishing was an important part of the subsistence (Sørensen 2018, 23; Andreas Kallmeyer Bloch, the Viking Ship Museum, pers. comm. 2022). Two human genomes

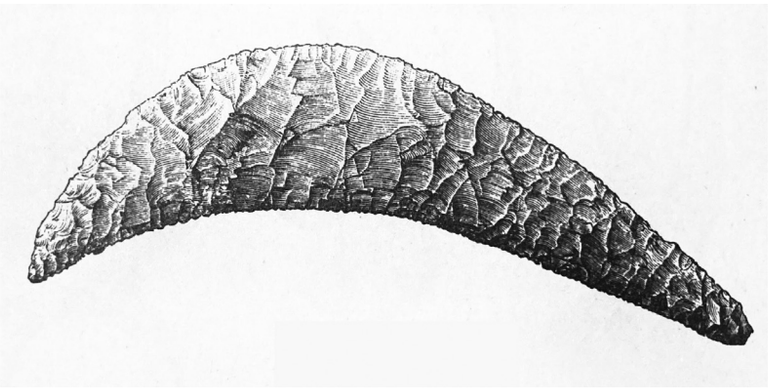

Figure 1. The asymmetrical early Late Neolithic sickle blade from Vallåkra in Kvistofta parish in Scania. Approximate length: 14 centimetres (after Montelius 1917).

from the MNB on Zealand have been published. The first comes from a passage grave in Kyndeløse and has mainly been modelled with ancestry of the Early European farmers and minor influence from European hunter-gatherers and steppe herders (Malmström et al. 2019, 6 and Figure 1). The second individual derives from a megalithic tomb, presumably a passage grave, on the East Danish island of Falster. This individual has been modelled with ancestry from steppe herders (Allentoft et al. 2022, NEO792). Although it is open to discussion whether the Kyndeløse individual is representative of the MNB population of eastern Denmark (Frei et al. 2019, 11), the genomic continuity corresponds well to the described Funnel Beaker continuity of the region, while the presence of a person with Steppe-DNA in a passage grave on Falster is perhaps the best example of the creolisation process described above.

From the Middle Neolithic to the Late Neolithic in Southern Scandinavia

Several changes in the material culture mark the transition to the Late Neolithic. Most evident for us today is the introduction of the bifacial flint working technique, and that the prime symbol of male identity changed from the battle-axe to the flint dagger. Finds of weaving weights, buttons and dress pins show that woven (woollen?) cloths were also introduced (Ebbesen 1995; Grundvad and Poulsen 2014; Lundø and Hansen 2015), while pottery with Bell Beaker inspired shape and decoration indicate the introduction of new social conventions (Prieto-Martínez 2008; Sherratt 1997). However, changes in subsistence were likely the most significant new element to the South Scandinavian population. Although bones from domestic animals are rare, livestock farming's importance to Late Neolithic subsistence is reflected by ard marks preserved under barrows and in the houses' sunken floors, assuming that oxen were used as draught animals (e.g. Borup 2019, 111-115; Johannsen in prep-b; Thrane 1989). Evidence of livestock farming is also reflected in palynological evidence. An example is the settlement Vinge in the northern part of Zealand, where massive clearance of the arboreal wetland vegetation during the second half of the Late Neolithic is most likely related to livestock farming (Johannsen in prep-b). While it is difficult to evaluate the significance of livestock farming to Late Neolithic society, the archaeological evidence is much more clear when it comes to plant cultivation. Changes compared to the MNB are obvious: the very rare blades from harvest knives associated with the MNB were succeeded by the more efficient flint sickles (Figure 1), which were serially produced in different shapes and overwhelming quantities throughout the LN and into the Early Bronze Age (EBA) (Johannsen, 2022; in prep-a; Norling-Christensen 1940). Systematic soil sampling of Late Neolithic houses, macrofossil analyses, radiocarbon-dating and increased awareness of ard marks have shown that a greater variety of cereals was cultivated and that crop rotation, cultivation of former house plots and likely also manuring improved and maintained field fertility (Andreasen 2009; Borup 2019; Gron et al. 2021; Kanstrup et al. 2014; Møbjerg, Jensen and Mikkelsen 2007; Simonsen 2017, 379-393). Agriculture favours sedentism, and the overall change in architecture to solid, permanent houses (Brink 2009, 268-277; Larsson 2009; Nielsen 2019, 20-24; Sarauw 2019, 283-286) may thus be understood as the most significant indication of changes in subsistence strate-

gies from MNB to LN. Scandinavian houses dated to the Late Neolithic must be counted in hundreds (Artursson 2005; Prescott 2020, 385; Sparrevohn, Kastholm and Nielsen 2019). That old houses were replaced repeatedly within relatively small settlement areas (Brink 2013; Sarauw 2006a; Simonsen 2017; Sparrevohn 2019) must reflect an agricultural strategy which was sustainable enough to allow people to stay within the same area for several generations.

Regional differences in Late Neolithic Denmark

Despite similarities in material culture over large parts of Southern Scandinavia, distinct regional differences continued in Denmark in the LNI. One difference between West and East is that finds associated with the earliest part of the Late Neolithic, i.e. the Bell Beaker Culture, have a marked western distribution: Bell Beaker-inspired pottery, which had its core phase at the very end of MNB and during LNI, has been found at several Late Neolithic settlements in Jutland but is very rare on Zealand (Sarauw 2019, Figure 15.1). The characteristic barbed and tanged arrowheads of the Bell Beaker culture have mainly been found in Jutland and on Funen (Ebbesen 1979, Figure 47; Sørensen 2014b, Figure VI. 21). V-perforated amber buttons have their main distribution in northern Jutland (Ebbesen 1995, 236). Late Neolithic wrist guards have in Denmark exclusively been found in Jutland and on Funen (Skov 1970, Figure 5). Archery burials containing elaborate parallel flaked flint daggers and clusters of arrowheads are also a distinct West Danish phenomenon (Sarauw 2007b, 64), and Type IC daggers, which are strongly connected to the South Scandinavian Bell Beaker environment, are entirely lacking on Zealand (Iversen 2015, 100; Lomborg 1973, Figure 14; Sarauw 2006b, 253).

The most frequently mentioned difference between West and East in Late Neolithic Denmark is the variation in burial practices. MNB and LN burial traditions are diverse and complex (Iversen 2015, 73-82; Lomborg 1973, 96-129). However, there seems to have been an overall continuation in burial traditions from MNB and LNI in both West and East Denmark. In the West, graves were in LNI placed in the top of Single Grave Culture mounds (Lomborg 1973, 113-121; Madsen 2020, 53; Müller and Vandkilde 2020, 37), and new small burial mounds were constructed when people settled in areas without Single Grave Culture barrows, exemplified by the site Kvindvad in Central Jutland (Ebbesen 2004, 94). Meanwhile, reburials in the old Funnel Beaker tombs continued in East Denmark, mainly reflected by numerous dagger finds in megaliths in the region (Iversen 2015, Figure 5.28; Lomborg 1973, 124-126).

The distribution of the various dagger types also differs from West to East. Northern Jutland was likely the primary production area of Type I A, B and C daggers. The northwest Danish daggers may have inspired the production of Type ID and II in South East Denmark, while Type III daggers have a more or less even distribution throughout the country (Lomborg 1973, Fig. 22-28; Vandkilde 2005, 17). Asymmetrical bifacial sickle blades dated to LNI are also far more common in West than East Denmark (Ebbesen 2004, 102; Johannsen in prep-a) (Figure 2).

Last but not least, both house types and settlement patterns differ from West to East. Sunken floor houses belong to the end phase of the MNB and were constructed throughout the LN and into the Early Bronze Age (Nielsen 2019, 22-24; Simonsen 2017, Figure 1.1). While hundreds of houses with sunken floors have been excavated in Jutland, only four are known from Zealand, and none of these belongs to the first half of the Late Neolithic (Johannsen 2017, 5; Sparrevohn, Kastholm and Nielsen 2019, cat. no. 12). Settlements with several houses emerged in the early Late Neolithic in West Denmark, with the Myrhøj and Bejsebakken as the most profound examples (Jensen, 1973; Sarauw 2006a), while large early Late Neolithic settlements are not known from Zealand.

Several of the early Late Neolithic Bell Beaker elements, which are rare in East Denmark, but common in Jutland, are found in South and West Norway and along the west coast of Sweden: daggers of Type IC, wrist guards (Figure 3), and the barbed and tanged arrowheads are found in both South and West Norway, and South West Sweden (Apel 2001, Figure 9.2-9.3; Holberg 2000, 205-206; Kaelas 1952; Prescott 2009; Sarauw 2006b,

Figure 2. Distribution of asymmetrical sickles in Southern Scandinavia and Northern Germany. The map is based on hoards containing the sickle type (Johannsen in prep-a).

253; Sørensen 2014b, Figure VI. 21; Østmo 2012, Fig. 6.1, Jan Apel, Stockholm University, pers. comm. 2021). Several two-aisled houses with sunken floors have been excavated in West Sweden (Artursson 2009, 43-44; Nordvall 2019), and also the early asymmetrical, bifacial sickle blades have been found in Norway and West Sweden (Figure 2).

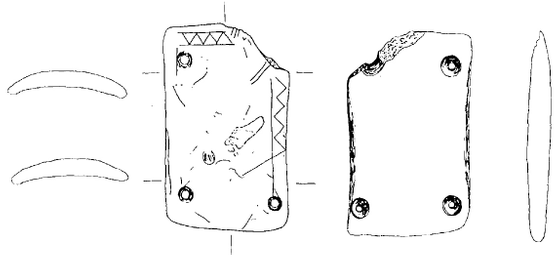

Figure 3. This wrist guard was found in what was likely a sunken floor of an early Late Neolithic house excavated in the southern part of the city Malmö in southwest Scania, Sweden. The wrist-guard is 6.2 centimetres long and 3.65 centimetres wide and made of slate (Salomonsson 1974). Another Swedish wristguard has been found in the Resmo passage grave on the East Swedish island Öland (Malmer 1962, Fig. 80).

As outlined above, finds associated with the early LNI are rare in East Denmark. When it comes to evidence of activity in the second half of the Late Neolithic, the material is, by contrast, overwhelming on Zealand. From around 2100 BCE, several new traits occur: Danish gallery graves have their main distribution in Northern Zealand (Figure 4). The majority of the dagger finds from the graves are of Types III, IV, and V (Lomborg 1973, Figure 75). As recent research shows that Type III daggers likely belong to the middle part of the Late Neolithic (Blank in press, 89), the construction of the Danish gallery graves seems to have started around 2100 BC. This has recently been confirmed by a series of radiocarbon dates made on human bones from Danish gallery graves (Allentoft et al. 2022; Frei et al. 2019, Tab. 1 and 2). While the sunken-floor houses were still the most common house type in Jutland into the Early Bronze Age (Nielsen 2019, 37), the so-called Fosie-houses, which are characterised by their solid construction and a rectangular outline, were constructed on Zealand from around 2100 BCE, and possibly slightly earlier in Scania (Johannsen 2017, Fig. 19; in prep-b).

Figure 4. Distribution of Late Neolithic gallery graves in Denmark. The map is based on Ebbesen 2007, where 119 Late Neolithic gallery graves are included. A review of gallery graves included in the national Danish database of prehistoric sites, Fund og Fortidsminder, added 32 examples to Ebbesen's list.

Settlements with several houses occur on Zealand and in Scania from around 2100 BC (Björhem and Säfvestad 1989; Brink 2013; Johannsen in prep-b; Sparrevohn, Kastholm and Nielsen 2019, cat. no. 41), and finally, new palynological evidence from East Zealand reflects a dramatic opening of the landscape from around 2100 BCE, which is most likely connected to intensified agricultural activities (Johannsen in prep-b, Fig. 7; Mortensen in prep).

Discussion

As outlined above, the strong Bell Beaker influence in Scandinavia at the transition between MNB and LNI left East Denmark more or less untouched, while there are several indications that the overall transition to the Late Neolithic, also in the economic sense, happened somewhat later in East Denmark. The question is what the background for this was.

Recent DNA studies show that the spread of the Bell Beaker phenomenon in Britain from around 2450 BCE was accompanied by rapid replacement of the gene pool (Olalde et al. 2018, 4-5). It therefore seems likely that the Bell Beaker influence, and consequently the beginning of the Late Neolithic in Southern Scandinavia, was also related to migration, although DNA evidence of this is still lacking from the region. The expansion of the Bell Beaker phenomenon in Scandinavia has been suggested to have been propelled by ideals of warriorhood, travelling and learning (Prescott 2012; Sarauw 2007b), while the quest for raw materials – metal and flint – has been suggested as pull factors (Melheim 2012; Sørensen 2014b, 15). The search for arable land may however also have played an essential role in the Bell Beaker expansion since the link between the Bell Beaker influence in Norway and the overall turn to agro-pastoralism as the prime subsistence base shows that farming was an integrated part of the Late Neolithic package (Prescott 1996, 2009, 2020). The increased permanence of the settlements, the development of the bifacial sickle, and the greater variety of cultivated crops also reflect intensification of cereal production in Late Neo-

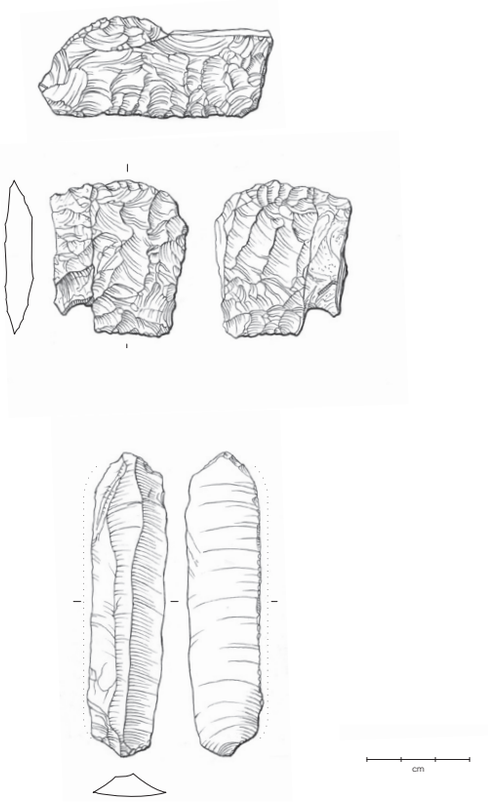

Figure 5. Blade and bifacial sickles from the Myrhøj site. From above find no. 1576-EKL, no. 1576-EJ and no. 1576-AOQ (Drawing: Louise Hilmar).

lithic Denmark, although this is less visible here since the Neolithisation, again in the economic sense of the word, already happened around 1700 years earlier (Sørensen 2014a). That the earliest bifacial sickle blades in Jutland are found in the areas with the strongest Bell Beaker influence (Figure 2) shows that the new sickle Type was developed in the Bell Beaker environment. Furthermore, the Myrhøj site (Jensen 1973), with its evidence of cereal cultivation (ard marks, quern stones, cereal impressions and sickles (Figure 5)) and finds from the earliest part of the Late Neolithic (wrist guard, thick-butted adzes and straight-walled beakers with Bell Beaker ornamentation), demonstrates that the subsistence of the early Scandinavian Bell Beaker tradition was primarily based on agriculture. Although agricultural production already increased in Jutland in the second half of the MNB (Klassen 2005), this strong association between the Danish Bell Beaker environment and agriculture indicates that the overall increase in cereal cultivation during LN in Southern Scandinavia took off with the Bell Beaker influence in Jutland at the transition between MNB and LNI.

It is commonly known that plants convert solar energy into human food much more efficiently than animals do (Pimentel and Pimentel 2003). A smaller area is therefore needed to support people with crops than with livestock, not to mention hunting and gathering (Sabaté and Soret 2014, 478). A landscape's bearing capacity for human population will thus increase significantly with a turn from a diet primarily based on animals to a diet primarily based on plants. The intensification in cereal cultivation during the LN may thereby have led to larger and more stable food production within the society. This formed the basis for decreased infant mortality, in the long run resulting in a population increase. A population boom in Northern Europe in the Late Neolithic is supported by recent population studies (Feeser et al. 2019; Hinz et al. 2012; Johannsen, Laabs and Mortensen in prep; Nielsen, Persson and Solheim 2019) and is further supported by a reduction of primary forest in the same period (Haak et al. in press, Figure 7; Johannsen in prep-b; Regnell and Sjögren 2006, 79).

While the increased food surplus and the derived population increase may have been the fuel for the expansion of the Late Neolithic culture, heritage systems may have been a motor. Recent DNA and strontium isotope analyses on Bell Beaker burials from Central Europe indicate that a male primogeniture and female exogamy system was part of the social structure. It has been suggested that the firstborn son inherited the ancestral land; younger sons had to move away and start their own community, while the daughters of a household established alliances with neighbouring settlements through marriage (Sjögren et al. 2020, Figure 9). The study of social systems through strontium isotopes and DNA analyses is still in its early phase, and there are indeed alternatives to Sjögren et al.'s interpretations (Brück 2021, 7). However, the study is interesting because the presented analyses support long-debated interpretations of kinship structure and social institutions in Copper Age Europe. If a similar inheritance system existed in Southern Scandinavia or was introduced with migrating Bell Beaker groups at the transition to the Late Neolithic, the suggested dynamic of younger sons of a household establishing new settlements could explain the expansion of the Late Neolithic culture.

The Neolithic is traditionally identified as the phase when social and political inequality emerged. The idea is that there is an inherent base for social inequality within the typical Neolithic economic system (e.g. Childe [1936] 1966; Service [1962] 1971). It has, however, been pointed out that this potential for centralisation and stratification was not broadly realised in Europe before several millennia after the Neolithisation and that this may be explained by a balance between top-down exploitation and power consolidation and bottom-up avoidance of elite manoeuvrings. It is suggested that the expansion of agricultural communities into Southeastern and Central Europe was driven by the relatively unsettled land of the European Continent, which made it possible for people to react against top-down attempts to centralise power by simply migrating into a nearby area of unsettled land. The gradual Neolithisation of the European Continent was thereby a product of people's will to make their living beyond the control of leaders (Furholt et al. 2019, 170-176). This model applies well to Late Neolithic Southern Scandinavia, where the expressions of social stratification are vague until the emergence of the monumental houses at the end of the period (Egelund Poulsen 2009; Johannsen 2017). Following Furholt et al.'s interpretation of the Neolithic expansion in Europe as a reaction against social control, an explanation of the seemingly egalitarian Late Neolithic society in Southern Scandinavia is that attempts to centralise power were avoided by resettling and cultivating new land. For instance, in line with Sjögren et al.'s interpretations (2020, Figure 9), when younger sons of a household were forced to find their own way of living if they did not want to work for their father and subsequently, their older brother. A combination of such a heritage system and population increase would have led to expansion.

According to this model, the spread of the new Late Neolithic traits should gradually have covered Southern Scandinavia. However, this is not what happened. The development was not linear but abrupt: as presented above, the distribution of Bell Beaker-related artefacts shows that the new traits rapidly expanded from Jutland into Southwest Norway and West Sweden, while it took longer for new traits to gain a foothold in East Denmark, reflected by the emergence of sturdy houses, large settlements, and gallery graves in the area from around 2100 BCE. Today, the Bell Beaker tradition is described as a phenomenon, not a culture, because of significant regional variations in its material expression. One common element, however, is male graves furnished with bow, arrows, and dagger (Heyd et al. 2018, 3; Sarauw 2007b). The weapons may express a common warrior identity, indicating that violence was an integrated part of the Bell Beaker phenomenon. It is thereby tempting to explain the Bell Beaker expansion in Southern Scandinavia as a violent colonisation, as has been suggested for the expansion of the various Corded Ware groups in Europe (Kristiansen et al. 2017). In this view, the delay from West to East could be understood as the East Danish stronghold of Funnel Beaker-traditions managing to resist colonisation. Competition for farmland is a possible point of conflict in a society like the Late Neolithic, which was almost entirely based on agriculture (Earle 1997). Although osteological analyses made on Late Neolithic human bones show that violence was part of Late Neolithic life (Blank 2021; Tornberg, in press, Tab. 4), it is however questionable if the background for this was territorial conflicts when the pollen diagrams show that, except for Western Jutland, large parts of Southern Scandinavia were still covered by primeval forest at the transition to the Late Neolithic (Haak et al. in press, Figure 7; Regnell and Sjögren 2006, 40-79). Throughout the Late Neolithic, it was thus still possible to find large unoccupied areas which could be transformed into fertile farmland.

Furthermore, replacement of the existing culture must be expected with a violent colonisation. However, the continuity of several cultural elements in Denmark at the transition from MNB to LN shows that the existing culture was not replaced but reformed. This is clearly expressed by male burials, which at the transition to the Late Neolithic in Jutland were equipped with daggers instead of a battle axe, while other Single Grave Culture burial traditions continued. It has been pointed out that Bell Beaker burial rituals were not much different to Corded Ware burial rituals but variations of the same practice (Furholt 2019, 116-117). The Bell Beaker burial rituals thereby resonated with the existing burial traditions in

Jutland around 2350 BCE. It was therefore easy for the existing population in Jutland to adapt the new Bell Beaker traits introduced by migrating people, which may explain the rapid spread of the new Late Neolithic culture in this area. In the same way, the much larger differences between the existing Funnel Beaker-derived culture and the new expanding Late Neolithic culture may explain the unwillingness to adopt the new cultural elements in East Denmark and Zealand in particular. Here, the gallery graves may be a key to understanding the final breakthrough of Late Neolithic culture. The Danish gallery graves are most commonly east-west oriented, up to 3.8 metres long and 1.4 metres wide, constructed by flat stone slabs and covered by a small mound (Ebbesen 2007, 15). The east end of the gallery graves is typically less sturdy, easing the entrance when the graves were opened to successive burials. As many as 19 individuals have been identified in a Danish Late Neolithic gallery grave (Ebbesen, 2007 31). While 151 Late Neolithic gallery graves are registered in Denmark (Figure 4, Ebbesen 2007; Kjær 1910), about 2000 Late Neolithic gallery graves are registered in Sweden (Blank et al. 2021, 64; Blank, Sjögren, and Storå 2020, Figure 5; Johansson 1961, Figure 157). Thereby, it is reasonable to assume the new burial type reached East Denmark from the Scandinavian Peninsula, as also suggested by Ebbesen (2007, 7-10). Some Swedish gallery graves are considerably larger than the Danish examples, and as many as 80 individuals have been identified in a single gallery grave (Lennblad 2015; Retzius 1900). In that sense, the gallery graves are comparable to the ancient megalithic tradition of the Funnel Beaker Culture (Müller and Vandkilde 2020, 39). Around 2800-2350 BCE, when variations of the Corded Ware Complex settled in Southern Scandinavia, the tradition of single burial emerged in West Denmark and the southern part of Sweden. However, the tradition of reburials in megaliths, as mentioned, continued in East Denmark, and continuity thereby characterised the burial traditions here during the second half of the Middle Neolithic period and the Late Neolithic (Iversen 2015, Figure 5.28; Lomborg 1973, Fig. 77). When the new smaller megaliths in the shape of gallery graves were introduced on Zealand from the East in the middle of the Late Neolithic, it thereby resonated with the existing burial practice. It was thus not a break with the existing traditions but an expansion of a still vital megalithic burial practice. This may have been what made the new cultural elements acceptable to the conservative population of Zealand and finally opened up the region for the breakthrough of the Late Neolithic, including improvements in subsistence. The gradual decline of Funnel Beaker traditions on Zealand, as identified by Iversen, was thus not finalised with the MNB. To reuse Iversen's creolisation analogy, the continuation and revival of megalithic traditions in the Late Neolithic on Zealand can be seen as a continuation of the Funnel Beaker 'grammar'. The explanation as to why it was necessary to construct new megalithic monuments in East Denmark after more than 1000 years break may be sought in an increasing demand for new farmland: besides being expressions of the (Late) Neolithic religion and ideas of the afterlife, the revival of the megalithic tradition in East Denmark and Southern Sweden may also be an expression of expansion. Some gallery graves were built close to the shore (Johannsen 2021), but most were constructed on fertile soil inland, likely close to settlements (Figure 6). In a few lucky cases, ard marks have been recorded under Late Neolithic gallery graves, suggesting that they were constructed directly on the cultivated fields (Thrane 1989). The small megaliths with several inhumations could thereby be interpreted as family/kinship plots, which were the visible evidence of property rights to the land of the descendants of the buried, an interpretation which has also been suggested for the megaliths of the Funnel Beaker Culture (Brozio et al. 2019, 1566; Renfrew 1976), and is supported by a recent study of haplogroups of individuals found in gallery graves in Falbygden in Southwest Sweden (Blank et al. 2021, 25). The old megaliths, used for burials over several centuries, were no longer enough since new farmland came under plough with a population increase propelled by the agricultural improvements outlined above. Similar to the example from Kvindvad of Late Neolithic settlers coming into new areas in Central Jutland (Ebbesen 2004), the new settlers in East Denmark had to start from scratch, which included the construction of new megalithic burial monuments.

Figure 6. A gallery grave at Marbäck near Ulricehamn in Sweden. The main part of Denmark is cultivated farmland today. Agrarian reforms during the last 200 years have significantly contributed to this development. But in the less intensively cultivated Sweden, it is still possible to get an impression of the Late Neolithic landscape. It is thus fascinating to see that the Late Neolithic gallery graves, like the one from Marbäck, are found in open areas, cleared of wood and glacial erratics. These areas are often still used for grassing, haymaking and cereal cultivation (Photo: Jens Winther Johannsen).

The next question is whether this Late Neolithic expansion on Zealand was caused by people migrating from the East or the diffusion of cultural traits from the same area. Both suggestions could be the answer. However, it seems unlikely that the introduction of a distinct new house type (the Fosie house), the construction of a new kind of megalith, the introduction of several new tool types and changes in subsistence were only the result of the existing population's contacts on the other side of Øresund. People most likely migrated from East to West during this period. But that the new cultural elements, rooted in the Bell Beaker expansion several hundred years earlier, for the first time gained a foothold on Zealand, were, as argued, also rooted in a congruity between the new cultural elements and the ancient Funnel Beaker traditions. This supports the idea that the Late Neolithic expansion in East Denmark was not a violent takeover of land but a combination of migration from the East and adaptation of new cultural customs by the existing population on Zealand.

Conclusions and implications

The development outlined above is an attempt to understand the expansion of the Late Neolithic culture as more dynamic than in previous studies. Southern Scandinavia did not turn to the Late Neolithic overnight around 2350 BCE and remained so until the Bronze Age's onset 650 years later. The expansion of the Scandinavian Late Neolithic culture was multi-laned and rooted in migrations, changes in subsistence, and possibly a social system motivating people to colonise unsettled land.

Finally, the suggested delay from West to East Denmark in the spread of Late Neolithic culture makes it worth reconsidering the critique of Lomborg's chronological division of the South Scandinavian Late Neolithic. Lomborg interpreted daggers of Type I as the earliest chronologically, followed by Type II, followed by Type III and so on. Based on this, Lomborg divided the Late Neolithic into the three chronological phases A, B and C, where daggers of Type I belong to LN A, Type II

and III to LN B, Type IV and V to LN C and Type VI to the Early Bronze Age (Lomborg 1973, 64-80). The marked lower frequency of Type I daggers in East Denmark compared to West Denmark was used as the main argument in a critique of Lomborg's chronological division. The typological differences between Types I, II and III were suggested to be a question of spatial variation. Type I daggers were thought to have been produced and used in West Denmark mainly meanwhile Type II, and III daggers were mainly produced and used in East Denmark (Apel 2001; Madsen 1978; Rasmussen 1990; Vandkilde 1989). The dagger types may not be as chronologically distinct as Lomborg thought; combinations of various dagger types in hoards show that overlaps exist, which was already pointed out by Lomborg himself (1973, 67). However, considering the indications of a delay from West to East in the introduction of Late Neolithic culture, the lower frequency of Type I daggers in East Denmark may be explained by only a small number of flint daggers reaching Zealand in the earliest part of the Late Neolithic. The complete absence of daggers of Type IC on the island supports this interpretation. Late Neolithic culture did not widely reach Zealand before Type I daggers were largely replaced by Type II and III daggers. This interpretation is in line with Iversen's interpretation of the Type K and L battle axes on Zealand, the use of which is suggested to continue to 2250 BCE (Iversen 2015, 29). As the prime symbol of male identity on Zealand, these were succeeded by daggers – of Lomborg's Type II and III. Consequently, it is reasonable to consider the reinstitution of Lomborg's tripartite division of the Late Neolithic Period in Southern Scandinavia.

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