

NW Europe in Transition

The Early Neolithic in Britain and South Sweden

Edited by

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CHAPTER 2

FARMING NEW LANDS IN THE NORTH: THE EXPANSION OF AGRARIAN SOCIETIES DURING THE EARLY NEOLITHIC IN SOUTHERN SCANDINAVIA

Lasse Sørensen

Abstract: In this paper I will argue, through a series of 14C dates with primary evidence of agriculture, that the expansion of agrarian societies towards Southern Scandinavia was a swift process occurring from 4000 to 3700 BC. The expansion involved the migration of smaller groups of pioneering farmers originating from Middle Neolithic communities in Central Europe, thus ruling out local Ertebølle hunter-gatherers as the primary carriers of agrarian technology and ideology. The pioneering farmers brought with them a complete agrarian technology, new material culture and structures. The reason for the expansion is still uncertain, but a growing population pressure combined with the fact that cultivation by slash and burn method requires so much space, that it could force some pioneering farmers to cultivate new lands in The North. The transition towards an agrarian way of life probably occurred through a complex and continuous process of migration, integration and gradual assimilation between pioneering farmers and local hunter-gatherers.

Keywords: Southern Scandinavia, Neolithisation, Immigration, Ideology, Agriculture, Expansion and Transition.

Introduction

The objective of this paper is to investigate how fast the expansion of agrarian societies occurred in Southern Scandinavia (Northern Germany, Denmark and southern and western Sweden) during the Early Neolithic (4000-3500 BC). We have to acknowledge the fact, that there are problems when using 14C dates from the transition between the Late Mesolithic and Early Neolithic. The problem stems from two wiggles which have been observed on the calibration curve. The first one is located from 4200 to 4050 cal BC and the second one from 3950 to 3790 cal BC; thus limiting resolution and creating some division in our C-14 data (Reimer *et al.*, 2009). Nevertheless, the entrenched discussion of whether agriculture was introduced by migrating agrarian societies or indigenous populations could become a combination of the two hypotheses, because the transition towards agriculture happened at different speed in each region. Indigenous hunter-gatherers became farmers within one or two generations in some regions, thus playing an important role in the spreading of the agrarian way of life to other hunter-gatherer tribes. In other regions the transition was more of a slow process, lasting several generations. Within this transitional process it becomes important to discuss what separates a farmer from a hunter-gatherer.

Definition of farmers and hunter-gatherers

In my opinion hunting, gathering and fishing is practiced by both hunter-gatherer and farmers. What separates farmers from hunter-gatherers in a transitional context is crop cultivation and managing husbandry all year round. Firstly, cultivation requires a whole new set of

technology including slash and burn activities for opening the landscape, preparing fields, sowing and growing crops, grain processing and storing seeds. Secondly, keeping domesticated animals all year round requires storage of food for the winter. However, I do not see any problem with the fact, that Late Mesolithic or Early Neolithic hunter-gatherers could have kept a few domesticated animals for meat reserves and prestige reasons. The managing of a few domesticated animals could be interpreted as initial herding activities by communities that still live mainly as hunter-gatherers.

Cereal grains

Direct dating of charred cereal grains of Emmer wheat (*Triticum dicoccoides*), Einkorn wheat (*Triticum monococcum*) and Naked barley (*Hordeum vulgare convar nudum*) at Early Neolithic sites in Southern Scandinavia places them between 4000 and 3800 BC. Pollen analyses also shows that this period is synchronic with a higher degree of Ribwort plantain (*Plantago lanceolata*) and Birch (*Betula*). This could indicate slash and burn forest clearance (Andersen 1993, 161; Odgaard 1994, 1; Rasmussen 2005, 1116; Sjögren 2006) (Fig. 1). At the same time, a few grain impressions have been interpreted in some Late Ertebølle potsherds from the coastal sites of Löddeborg and Vik in Scania (Jennbert 1984). However, both sites contain intermixed layers with Late Ertebølle and Early Funnel beaker ceramics. Therefore, it is possible that these sherds originated from funnel beakers, as they have the same coarse tempering and thickness as the Ertebølle ceramics (Koch 1987, 107). Currently, there is no other archaeological evidence supporting any kind of cultivation during the Late Mesolithic in Southern Scandinavia.

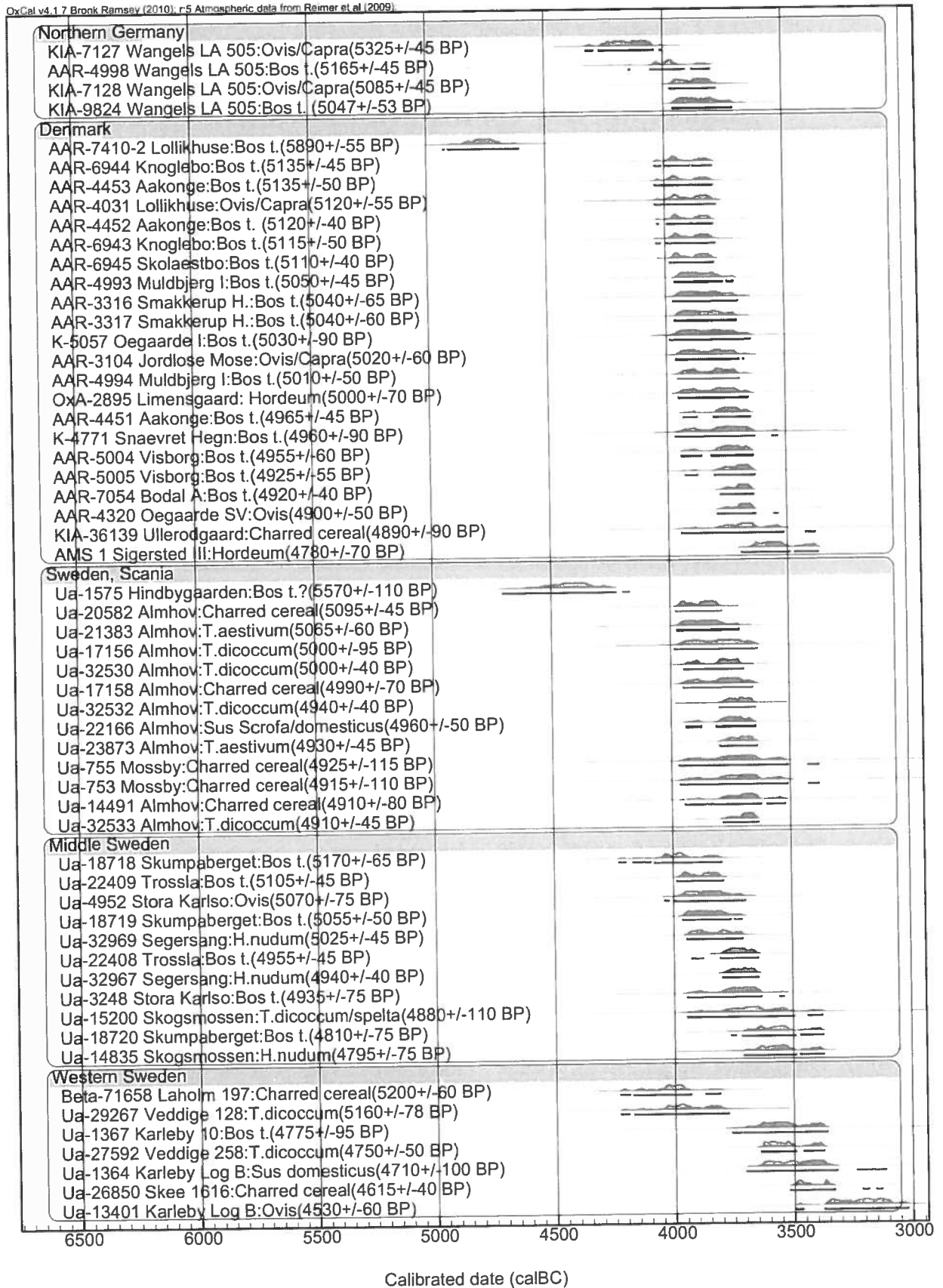


Fig. 1. C-14 dates showing the expansion of agrarian societies during the Early Neolithic. All radiocarbon dates have been calibrated using the OxCal v4.1.7 program. Data after: (Hartz and Lübke 2005, 119ff; Sørensen 2005, 304f; Heinemeier 2002, 273f; Heinemeier and Rud 1998, 303; 1999, 340; 2000, 302; Price and Gebauer 2005, 123; Koch 1998, 253; Fischer 2002; Hadevik 2009; Rudebeck 2010, 112ff; Larsson 1992, 74; Hallgren 2008; Lindqvist and Possnert 1997; Svensson 2010; Johansson et al. 2011; Persson 1999; Ryberg 2006; Westergaard 2008; Esben Aasleff personal communication; Karl Göran Sjögren personal communication).

Domesticated animals

Domesticated cattle (*Bos Taurus*) are observed throughout Southern Scandinavia around 4000-3700 BC (Fig. 1). Recently presumed domesticated cows from Rosenhof LA 58 and 83 were dated to 4700 BC. But after a DNA-analysis, they turned out to be small auroches (Hartz and Lübke 2005; Noe-Nygaard *et al.*, 2005). Another early cow tooth from Lollikhuse was dated to 5890±55 BP (4929-4612 cal BC. AAR-7410-2). It is probably an exotic pendant showing direct or indirect contacts with farming societies in Central Europe (Sørensen 2005, 305). Cow bones from Smakkerup Huse have also been used to promote the fact, that Ertebølle hunters had access to domesticated animals (Price and Gebauer 2006). These bones were dated to 5059±68 BP (3981-3701 cal BC. AAR-3316) and 5060±61 BP (3968-3711 cal BC. AAR-3317) and found in stratified Late Atlantic refuse layers. Unfortunately the actual site was eroded by transgressions and regressions in the Subboreal period, as such these bones could belong to an Early Funnel Beaker occupation. Sheep and goat (*Ovis/Capra*) also appear in Southern Scandinavia during the time 4000 to 3800 BC and a few centuries later in Western Sweden. Domesticated pigs (*Sus domesticus*) and wild boars (*Sus scrofa*), found together in a pit from the Early Neolithic site of Almhov in Scania, has been dated to 4960±50 BP (3937-3645 cal BC. Ua-22166) (Rudebeck 2010, 112ff). However, the identification of domesticated pigs has proven difficult and often judged on the fact, that they were smaller than wild boars and had different length and anterior breadth of the M3 (Magnell 2005; Brinch Petersen and Egeberg 2009, 562). Future DNA analysis could resolve this problem. Currently, there is no secure archaeological evidence of whole domesticated animals (except the dog) earlier than 4000 BC in Southern Scandinavia. Summarizing the early dates of cereal grains and domesticated animals clearly demonstrates that we are dealing with quick expansion (Hallgren 2008; Price and Noe-Nygaard 2009, 198ff; Sørensen 2012; Sørensen and Karg 2012).

Cultivation and crop processing

Plough marks found below a long barrow at Højensvej 7 near Egense on Funen covered an area of 85 square meters, thus illustrating an intensive cultivation (Beck 2009; in press). Some of the plough marks were cut by a pit, which was dated by a hazelnut shell to 4900±40 BP (3770-3637 cal BC. POZ-28068), thus proving a very early date of these plough marks. Currently they are the earliest from Southern Scandinavia. Other plough marks with more limited extensions have been documented below a few long barrows in Northern Germany, Jutland and Funen (Jørgensen 1977, 7; Fischer 1980, 23; Ebbesen 1992, 96; Mischka 2011, 742). We can conclude that cultivation of larger fields using the ard, in order to get maximum yield out of the soil, was present already from the beginning of the Early Neolithic.

Cereal crop processing and threshing waste from Emmer

(*Triticum dicoccoides*) used as chaff tempering in clay discs has been found in some pits from the Early Neolithic site at Lisbjerg Skole near Århus (Skousen 2008, 124). 14C dates of hazelnut shells from the pits (A-2087, A-2092 and A2165) dates the material to 5190±90 BP (4251-3785 cal BC. AAR-8542) and to 4975±55 BP (3942-3651 cal BC. AAR-9225). Straw or chaff tempering is also found in clay discs from the Early Neolithic site of Store Valby (Becker 1954, 134; Helbæk 1954, 198; Nielsen 1984, 119). Evidence of crop processing is supported by the existence of quern stones. These have been reported from Early Neolithic sites in Denmark and Sweden (Erantisvej, Vallensgård I, Almhov, Fågelbacken and Skogsmossen), which also contain short necked funnel beakers (Staal 2005; Hallgren 2008, 211; Nielsen 2009, 14; Rudebeck 2010, 112). Moreover, wear on sickles from Early Neolithic sites also document harvesting activities (Juel Jensen 1994). The 14C dates of the pits at Lisbjerg Skole are very important, because they document cultivation and crop processing, which could be earlier than the Ulmus-fall, which has been wiggle-matched to 3870 BC (Andersen and Rasmussen 1993, 125). Arguably, pollen analyses are showing cultivation from 3600-3500 BC, which does not correspond with the evidences from the archaeological record. Most of the pollen records have been taken from smaller lakes or bogs, thus showing the environmental change on a very local scale. Cereal pollen is rarely detected in these pollen diagrams, because wheat and barley are self-pollinated species, which means that the pollen does not spread over long distances (Diot 1992).

However, pollen found underneath long barrows demonstrates a higher rate of Ribwort plantain (*Plantago lanceolata*), which indicates clearances of the forest during the Early Neolithic (Odgaard 1994, 1; Rasmussen 2005, 1116; Sjögren 2006; Westphal 2009, 97). Maybe many pollen diagrams are showing initial stages of slash and burn cultivation combined with animal husbandry (Brinch Petersen and Egebjerg 2009, 560). The archaeological evidence is clearly proving the beginning of an agrarian subsistence strategy with cultivation from 4000 BC and onwards. The early appearance of a complete agrarian technology together with the evidences of a quick expansion could indicate that we are dealing with smaller groups of Central European pioneering farmers entering Southern Scandinavia around 4000 BC (Nielsen 1984, 116ff; Madsen 1987, 229ff; Kristiansen 1988, 27ff; Klassen 2004; Rowley-Conwy 2011, 431ff). Let us go through the secondary evidences from these Early Neolithic agrarian societies.

The secondary evidence

A different material culture, which occurs in Southern Scandinavia in the beginning of the 4th millennium BC points towards migrating farmers from Central Europe, which are expanding into Southern Scandinavia. It consists of pointed butted axes (Nielsen 1977, 65), jade axes (Klassen 2004), battle axes (Zápotocký 1992; Ebbesen 1998, 77), short necked funnel beakers (Koch 1998), clay discs (Davidsen 1974, 5) and copper artifacts (Klassen

2000). The structures includes two aisled houses (Nielsen 1997, 9), flint mines (Becker, 1980, 456; Olausson *et al.*, 1980, 183), long barrows (Rudebeck 2002, 119) and later on Sarup enclosures (Andersen 1997) and long dolmens (Ebbesen 2011).

Battle axes and pointed butted flint axes

The distribution of the battle axes are significant, because they illustrate dense concentrations in Central Europe, thus indicating an origin of these pioneering farmers within the Michelsberg and Baalberg cultures (Lüning 1968; Zápotocký 1992; Ebbesen 1998, 77; Hallgren 2008). The earliest type of battle axes, type 1 in Ebbesens typology (1998, 77) or type FI-III in Zápotocký's typology (1992), has been found in the Dragsholm burial. In this burial an antler pick was dated to 5090 ±65BP (4036-3712 cal BC AAR- 7418-2) and a human bone was dated to 5102±37 (3973-3797 cal BC. AAR-7416-2), thus dating the battle axes to the beginning of the 4th millennium BC (Brinch Petersen 2008, 33).

Particular important is also the distribution pattern of polished pointed butted axes, which is connected to Early Neolithic sites with short necked funnel beakers. Three types of pointed butted axes have been identified. Type 1 has an oval cross section, whereas type 2 and 3 has a three and four sided cross section (Nielsen 1977). Pointed butted flint axes from 14C dated contexts demonstrate overlap between the three types, which is also observed in the depositions of the axes. However type 1 has never been found together with type 3 or any of the thin butted axes (Rydbeck 1918, 9; Karsten 1994, 226; Rosenberg 2006), thus supporting the typology originally proposed by Nielsen (1977) (Fig. 3, 4). The distribution of the pointed butted axes illustrated a rather dense inland habitation during the Early Neolithic (Fig. 2). They seem to concentrate in regions with light easily arable soils. The pointed butted flint axes from Southern Norway are probably connected to the Early Neolithic agrarian expansion (Henningsmoen 1980; Østmo 1988; Prøsch-Danielsen 1996; Glørstad 2010, 275), whereas the ones from Trøndelag represent long exchange patterns with hunter-gatherer groups in the northern parts of Scandinavia. There must have been a huge and systematic production and distribution of these axes, which is revealed by clear concentrations of pointed butted axes near the flint mines on Stevns (now eroded by the sea) in Eastern Zealand and Södra Sallerup in Scania.

Flint mining and exchange system

Deep mining after flint is a characteristic feature in the Central European Michelsberg Culture (4400-3500 BC) (Lüning 1968). The mines at Spiennes in Southern Belgium, Rickholt in the Netherlands and Jablines/Le Haute Château in Northern France were all opened from 4400 to 4200 BC. (Bostyn and Lançon 1992; Collet *et al.*, 2004, 151ff; Grooth *et al.*, 2011, 77). Preforms of pointed butted axes found in all these mines prove, that we are dealing with

systemized production. The earliest evidence of mining in Southern Scandinavia is documented at Södra Sallerup and Hov, which has been dated to 4000 cal BC (Olausson *et al.*, 1980, 183; Personal communication Elisabeth Rudebeck and Jens Henrik Bech). The practice of mining flint probably came over together with these Central European pioneering farmers.

Reasons for the expansion

The reason for the expansion is still uncertain. One of the reasons could be the relatively easy access to some of the best flint resources in Northern Europe. Other possible explanations include growing population pressure combined with the fact, that cultivation by slash and burn method requires considerable space. These factors could have motivated some Central European farmers to cultivate new lands in the north. Recently Rowley-Conwy (2011) has suggested that pioneering farmers expanded to the north by leap-frog, punctuated or sporadic immigration (Moore 2001, 395ff). A similar model has been presented by Zilhao (2001, 14180) explaining a fast Neolithic expansion in the Mediterranean. The expansion towards Scandinavia happened so fast and covered such huge distances, that boats must have been used as indicated by very early Neolithic agrarian habitations on islands like Bornholm and Gotland (Lindqvist and Possnert 1997, 73; Casati and Sørensen 2006, 39; Nielsen 2009, 9).

Cultural dualism

During the Early Neolithic an agrarian way of life was practised on inland sites at the same time as hunting and fishing took place on sites near the coast, fjords or larger inland lakes. Are we dealing with commuting farmers or a cultural dualism? If hunter-gatherers went to the effort of keeping domesticated animals all year round, they would have to collect huge amounts of food for the winter months. In order to get enough food it would be necessary to cultivate larger fields of grain and grass for drying straw and hay for the winter. This would require a long term skill in agrarian technologies in order to succeed. If these hunter-gatherers were to succeed as farmers, they would gradually need to integrate with agrarian societies. Especially the use of slash and burn technique to clear the forest for cultivation required a necessity to plan several years ahead. Several experiments has shown, that after two to three years of cultivation the nourishment in the soil was used up with the consequence, that the yield would fall drastically (Lüning 2000, 174; Ehrmann *et al.*, 2009, 44; Schier 2009, 15). The field could hereafter be used as grazing areas for domesticated animals. But in order to continue cultivation it was necessary to start all over in another area, thus proving that this method requires access to huge areas. Recently, Kind (2010, 457) has proposed, that the transition towards agriculture is determined by an intensified social interaction between local hunter-gatherers and pioneering farmers, who is characterized as the "managers of neolithisation". The Dragsholm man, who was buried in a kitchen midden and

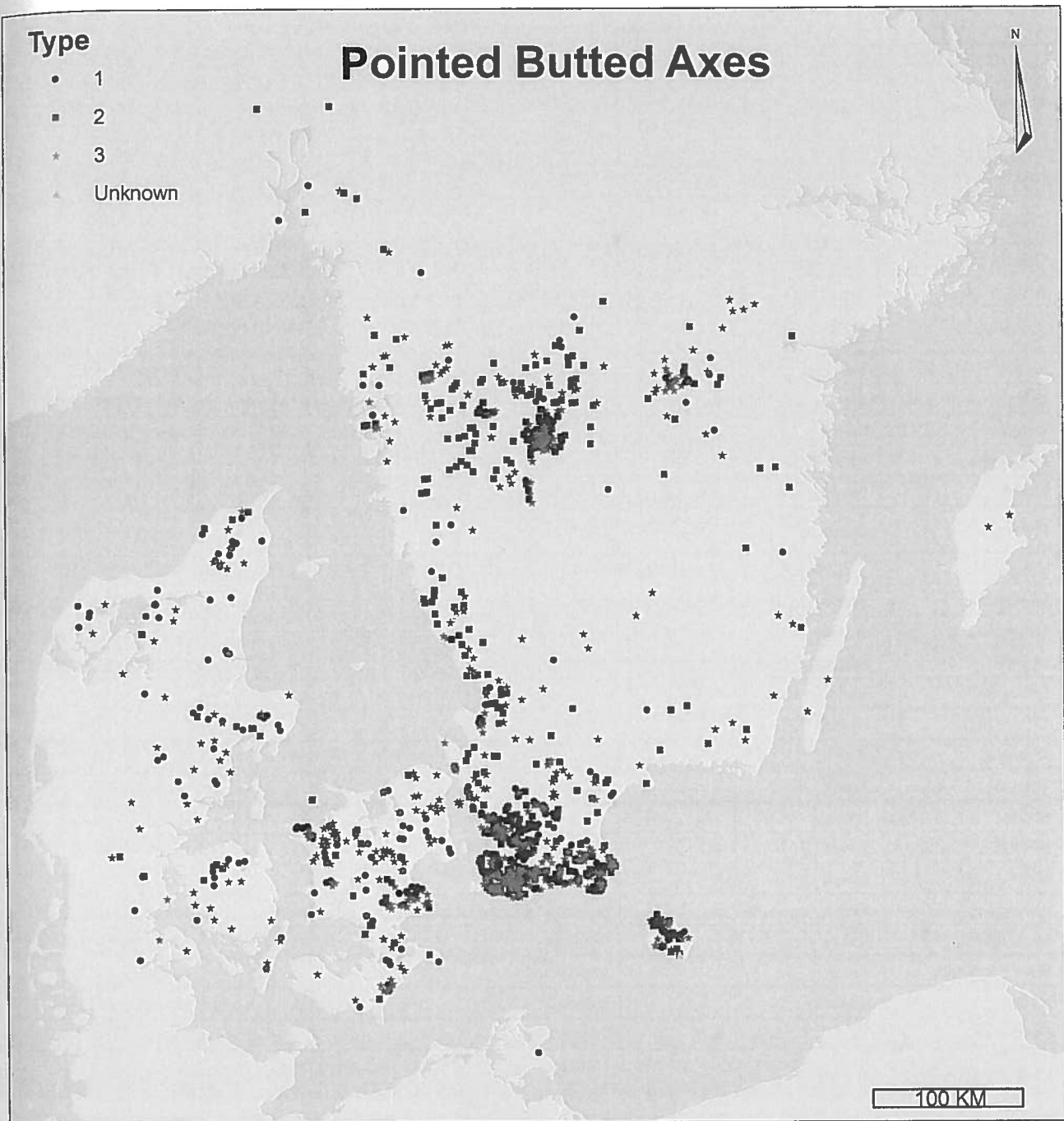


Fig. 2. Distribution of pointed butted axes in Southern Scandinavia based on data from Denmark (Brøndsted 1938, 130ff), Scania (Hernek 1988, 216ff), Bohuslän, Dalsland, Halland and Vester Götland (Blomqvist 1990), Bornholm (Nielsen 2009, 16ff), Middle parts of Sweden (Hallgren 2008), Southern Norway (Østmo 1986, 190ff), Middle parts of Norway (Valen 2007) and own studies.

equipped as a warrior, could be interpreted as one of these pioneering farmers expanding into a new territory with a complete agrarian technology and ideology, thus initiating the beginning of a cultural dualism in that area (Brinch Petersen 2008, 33ff).

Cultural dualism could be interpreted, when actual cultivation is found on a hunter-gatherer site. The Bjørnsholm kitchen midden could be one of these sites,

because the pollen of barley (*Hordeum*) and wheat (*Triticum*) was found under the neighboring long dolmen (Andersen and Johansen 1992, 38; Andersen 1993, 59). Visborg could be another example, because a burned layer under the kitchen midden indicates the use of the slash and burn clearance (Andersen 2008, 69). Another method of documenting a cultural dualism is by conducting DNA analysis. The burial site of Ostorf in Northern Germany was originally interpreted as a hunter-gatherer enclave

<i>Depositions of pointed butted flint axes and their combination of types</i>								
<i>Site</i>	<i>Region</i>	<i>Nr. of axes</i>	<i>Polished or unpolished</i>	<i>1</i>	<i>2</i>	<i>3</i>	<i>Thin</i>	<i>Reference</i>
Järavallen	Scania	11	unpolished	x				rydbeck 1918, 9
Hammelen	Scania	2	unpolished	x				rydbeck 1918, 9
Lackalånga	Scania	1+grinding stone	unpolished	x				karsten 1994, 226
Svedala	Scania	1+grinding stone	polished	x				rydebeck 1918, 9
Grönby	Scania	8	unpolished	x				nielsen 1977, 121
Arrie	Scania	4	unpolished	x	x			rydbeck 1918, 9ff
Ravnekær	Bornholm	5	polished and unpolished		x			P. O. Nielsen personal com.
Karaby	Scania	2	unpolished		x			Rydbeck 1918, 9
Dalby	Scania	2	polished		x			Rydbeck 1918, 12ff
Borgeby	Scania	2	polished		x			Rydbeck 1918, 12ff
V. Ågården	Vendsyssel	2	unpolished		x			Nielsen 1977, 121
Eslöv	Scania	2	unpolished		x			Nielsen 1977, 121
Fränninge	Scania	1+grinding stone	polished		x			Karsten 1994, 309
V. Ågården	Vendsyssel	3	unpolished		x	x		nielsen 1977, 121
Li Markie nr. 7	Scania	3	unpolished		x	x		rydbeck 1918, 11ff
Gualöv	Scania	3	polished		x	x	x	Karsten 1994, 348
Vanstad	Scania	2	polished			x		Rydbeck 1918, 16ff
Smeby Slöta	Västergötaland	5	polished			x		Nielsen 1977, 121
Ullerødgård	Zealand	3	polished			x	x	Rosenberg 2006
Kvistofta	Scania	3	polished			x	x	Karsten 1994, 215
Skegrie	Scania	2	unpolished			x	x	Karsten 1994, 294
Skurup	Scania	10	polished and unpolished			x	x	Karsten 1994, 303
Svedala	Scania	11	polished and unpolished			x	x	Karsten 1994, 274
Södra Åsum	Scania	2	polished			x	x	Karsten 1994, 310
Fjälkinge	Scania	2	polished and unpolished			x	x	Karsten 1994, 343
Kverrestad	Scania	3	polished			x	x	karsten 1994, 328
Öster Sönnarslöv	Scania	2	unpolished			x	x	Karsten 1994, 347
Hörby	Scania	6	polished			x	x	Karsten 1994, 238
Bodarp	Scania	6	unpolished			x	x	karsten 1994, 282

Fig. 3. Table showing the depositions of pointed butted flint axes and their combination of types.

surrounded by agrarian societies, because the individuals had a high intake of aquatic resources (Lübke *et al.*, 2009, 130; Shulting 2011, 21). However, three burials contained Palaeolithic/Mesolithic haplogroups U5 and U5a, while four other burials contained Neolithic haplogroups J, K and T2e (Bramanti *et al.*, 2009, 139). The individuals at Ostorf illustrate a rare example of hunter-gatherers and possible farmers, which may have integrated with each other. Currently the archaeogenetic evidence is pointing in two directions. Skoglund and his team (Skoglund *et al.*, 2012) argue for a migration of farmers, whereas Melchior and his team (Melchior *et al.*, 2010) suggest that this is unlikely, and that there occurs an abrupt replacement of the Mesolithic hunter-gatherer population with a new Neolithic population in Southern Scandinavia.

Future research areas

The hypothesis regarding cultural dualism can be proved or disproved by C-14 dates, stable isotope and DNA analysis. If the DNA influx from pioneering farmers consists of Paleolithic/Mesolithic haplogroups (D and U4 and U5) representing Central European hunter-gatherers who became farmers, then it will be difficult to detect any differences (Bramanti *et al.*, 2009, 137). Stable isotope analysis has already been made by Tauber (1981) and Fischer *et al.*, (2007, 2125). Currently marine values of $\delta^{13}\text{C}$ and $\delta^{15}\text{N}$ are all extracted from Mesolithic hunter-gatherers, while most of the Early Neolithic samples, except one from Sejrø, are showing non marine values. It is clear that human bones from the Early Neolithic coastal/kitchen

OxCal v4.1.7 Bronk Ramsey (2010); r.5 Atmospheric data from Reimer et al (2009);

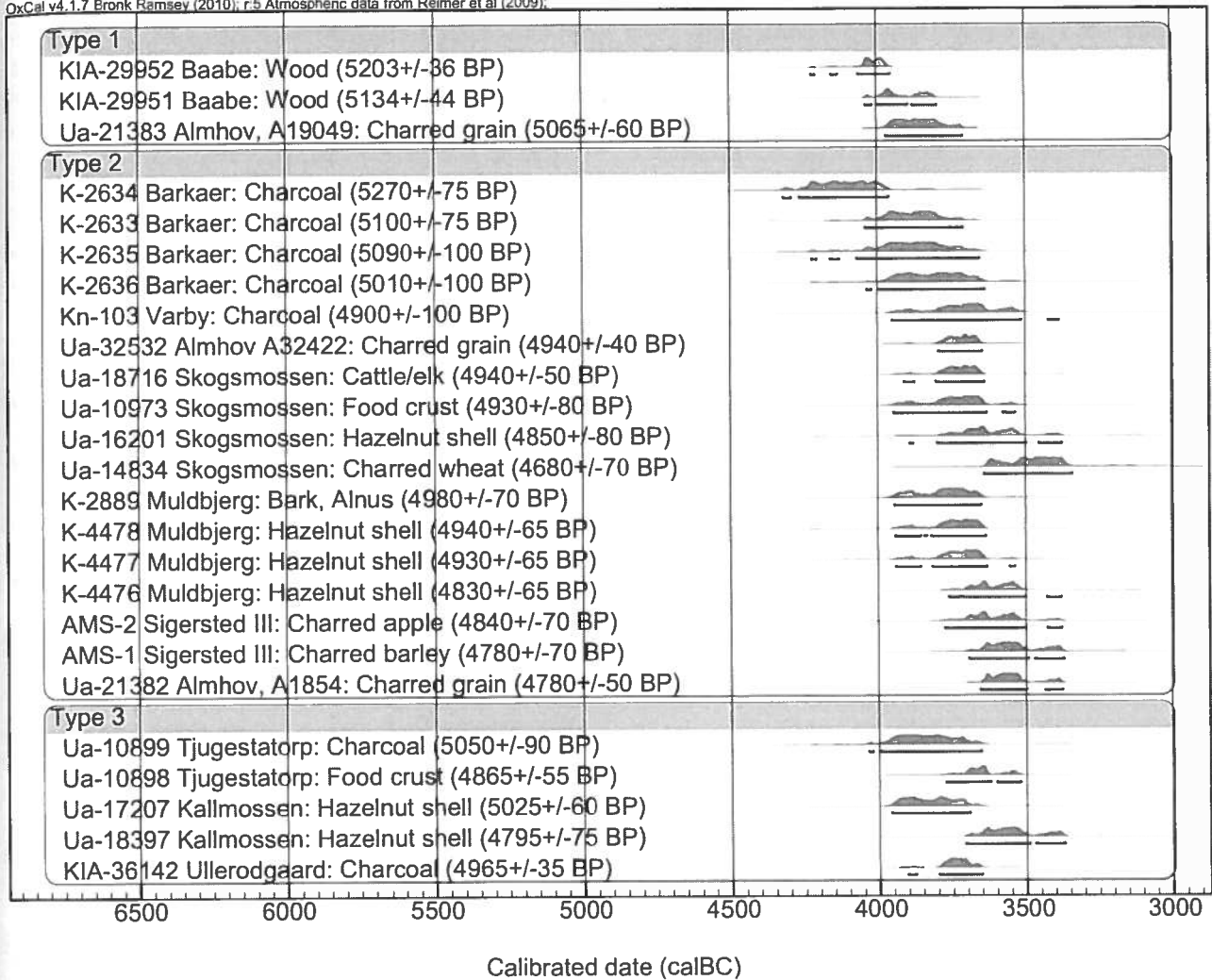


Fig. 4. C-14 dates of Early Neolithic sites or contexts containing pointed butted axes. All radiocarbon dates have been calibrated using the OxCal v4.1.7 program. Data after: (Hirsch et al. 2008, 25ff; Rudebeck 2010, 112f; Liversage 1992, 59; Salomonsson 1970, 72; Hallgren 2008, 233ff; Troels-Smith 1957; Stafford 1999, 91; Koch 1998; Esben Aasleff personal communication)

midden sites are lacking in these analyses. The abrupt shift in $\delta^{13}\text{C}$ values could be interpreted as a deliberately deselecting of marine food as a resource (Andersen *et al.*, 1986; Brinch Petersen and Egeberg 2009, 563; Milner *et al.*, 2004, 9). However, this does not necessarily mean that farmers moved away from the coastal areas, as funnel beaker hunting stations are documented through the Early and Middle Neolithic (Skaarup 1972). But it could reflect a gradual decline of marine resources.

Concluding remarks

The agrarian expansion during the Early Neolithic in Southern Scandinavia was a quick process lasting only a few centuries, between 4000 and 3700 BC. The speed of the expansion occurred so fast, that it must have involved smaller groups of migrating pioneering farmers possibly using boats as means of transportation. They originated from Middle Neolithic societies in Central Europe. The reason for the expansion is still uncertain, but growing population pressure combined with the fact, that cultivation

by slash and burn method requires substantial space, could motivate some pioneering farmers to move north. They brought with them a complete agrarian technology, structures, new material culture and ideology. The question of what happened to the local hunter-gatherers is still open for discussion. Either they became farmers really quickly within one or two generations and participated actively in the spreading of agrarian way of life. This could explain the settling of both inland and coastal sites, where they could exploit both agrarian resources together with hunting and fishing activities. Or we could be dealing with a cultural dualism consisting of pioneering farmers on inland oriented sites and hunter-gatherers on coastal sites. In this hypothesis the local hunter-gatherers quickly adopted the new material culture and domesticated animals, but in many cases they continued their hunter-gatherer lifestyle. Cultural dualism could be interpreted, when evidences of cultivation has been found on a hunter-gatherer site. Both explanations are plausible, but currently the archaeological evidences in Southern Scandinavia tend to favor a cultural dualism during the earliest part of the Early Neolithic. The

transition towards an agrarian way of life in Scandinavia can therefore be interpreted as a much more complex and continuous process of migration, integration and gradual assimilation between neighboring farmers and hunter-gatherers happening at different speed from region to region depending on environmental, social as well as ideological factors.

References

- Andersen, N. H. 1997. *The Sarup enclosures. The Funnel Beaker Culture of the Sarup site including two causewayed camps compared to the contemporary settlements in the area and other European enclosures.* Århus, Jutland Archaeological Society Publications XXXIII:1.
- Andersen, S. H. 2008. The Mesolithic – Neolithic transition in Western Denmark seen from a kitchen midden perspective. A survey. In: H. Fokkens, B. J. Coles, A. L. Van Gijn, J. P. Kleijne, H. H. Ponjee and C. G. Slappendel (eds.), *Between Foraging and Framing*, 67-74. Leiden, *Analecta Prehistorica Leidensia*.
- Andersen, S. H. and Johansen, E. 1992. An Early Neolithic Grave at Bjørnsholm, North Jutland. *Journal of Danish Archaeology* 9, 38-58.
- Andersen, S. H., Constandse Westermann, T., Newell, R. R., Gillespie, R., Gowlet, J. A. J. and Hedges, R. E. M. 1986. New radiocarbon results from two Mesolithic burials in Denmark. In: J. A. J. Gowlet and R. E. M. Hedges (eds.), *Archaeological results from Accelerator Dating*, 39-43. *Monograph 11. Oxford University Committee for Archaeology*.
- Andersen, S. Th. 1993. Early and Middle Neolithic agriculture in Denmark: pollen spectra from soils in burial mounds of the Funnel Beaker Culture. *Journal of European Archaeology* 1, 153-180.
- Andersen, S. Th. and Rasmussen, K. L. 1993. Radiocarbon wiggle-dating of elm declines in north-west Denmark and their significance. *Vegetation History and Archaeobotany* 2, 125-135.
- Beck, M. R. 2009. Lå Danmarks første pløjemark ved Egense? *Svendborgs Museums Årbog* 2009, 7-16.
- Beck, M. R. in press. Højensvej høj 7 – en tidligneo-litisk langhøj med flere faser ved Egense, Svendborg. To be published in: *Aarbøger for Nordisk Oldkyndighed og Historie*.
- Becker, C. J. 1954. Stenalderbebyggelsen ved Store Valby i Vestsjælland. Problemer omkring tragt-bægerkulturens ældste og yngste fase. *Aarbøger for Nordisk Oldkyndighed og Historie* 1954, 127-197.
- Becker, C. J. 1980. Dänemark. In: G. Weisberger (ed.), *5000 Jahre Feuersteinbergbau. Die Such nach dem Stahl der Steinzeit. Ausstellung im Deutschen Bergbau-Museum Bochum vom 24 Oktober 1980 bis 31. Januar 1981*, 456-471. Bochum. Deutschen Bergbau-Museum.
- Blomqvist, L. 1990. *Neolitisk Atlas över Västra Götland.* Falköping. Norders Bokhandel.
- Bostyn, F. and Lanchon, Y. 1992. *Jablins: Le Haut Château (Seine-et-Marne), Un minière de silex au Néolithique.* Paris, Documents d'Archéologie Française.
- Bramanti, B., Thomas, M. G., Haak, W., Unterlaender, M., Jores, P., Tambets, K., Antanaitis-Jacobs, M. N. Haidle, Jankauskas, R., Kind, C. J., Lueth, F., Terberger, T., Hiller, J., Matsumura, S., Forster, P. and Burger, J. 2009. Genetic discontinuity between local hunter-gatherers and central Europe's first farmers. *Science* 326, 137-140.
- Brinch Petersen, E. 2008. Warriors of the Neolithic TRB-Culture. In: Z. Sulgostowska and A. J. Tomaszewski (eds.), *Man Millenia Environment. Studies in honour of Roman Schild*, 33-38. Warsaw. Polish Academy of Science.
- Brinch Petersen, E. and Egeberg, T. 2009. Between Dragsholm I and II. In: L. Larsson, F. Lüth and T. Terberger (eds.), *Innovation and Continuity – Non Megalithic Mortuary Practices in the Baltic. New methods and research into the development of Stone Age Society*, vol 88, 447-467. Bericht der Römisch-Germanischen Kommission. Frankfurt. Philipp von Zabern.
- Brønsted, J. 1938. *Danmarks Oldtid I.* First edition. København. Gyldendal.
- Casati, C. and Sørensen, L. 2006. Bornholm i ældre stenalder. Status over kulturel udvikling og kontakter. *Kuml* 2006, 9-58.
- Collet, H., Collette, O. and Woodbury, M. 2004. Indices d'extraction et de taille du silex datant du Néolithique récent dans la Carrière CBR à Harmignies. Note préliminaire. *Notae Praehistoricae* 24, 151-158.
- Davidsen, K. 1974. Neolitiske lerskiver belyst af danske fund. *Aarbøger for Nordisk Oldkyndighed og Historie* 1973, 5-72.
- Diot, M.-F., 1992. Études palynologiques de blés sauvages et domestiques issus de cultures expérimentales. In: P. C. Anderson (ed.), *Préhistoire de l'agriculture: nouvelles approches expérimentales et ethnographiques*, 107-111. Monographie du CRA n° 6. CNRS, Paris.
- Ebbesen, K. 1992. Simple, tidligneo-litisk grave. *Aarbøger for Nordisk Oldkyndighed og Historie* 1992, 47-102.
- Ebbesen, K. 1998. Frühneolithische Streitäxte. *Acta Archaeologica* 69, 77-112.
- Ebbesen, K. 2011. *Danmarks Megalitgrave.* København. Forfatterforlaget Attika.
- Ehrmann, O., Rösch, M. and Schier, W. 2009. Experimentelle Rekonstruktion eines jungneolithischen Wald-Feldbaus mit Feueinsatz – ein multidisziplinäres Forschungsprojekt zur Wirtschaftsarchäologie und Landschaftsökologie. *Prähistorische Zeitschrift* Band 84, 44-72.
- Fischer, A. 2002. Food for Feasting ? An evaluation of explanations of the neolithisation of Denmark and southern Sweden. In: A. Fischer and K. Kristiansen (eds.), *The neolithisation of Denmark - 150 years of debate*, 341-393. Sheffield. J. R. Collis Publications.
- Fischer, A., Olsen, J., Richards, M., Heinemeier, J., Sveinbjörnsdóttir, A. E. and Bennike, P. 2007. Coast-land mobility and diet in the Danish Mesolithic and Neolithic: evidence from stable isotope values of humans and dogs. *Journal of Archaeological Science* 34, 2125-2150.

- Fischer, C. 1980. Brendkroggården. En langhøj/langdysse ved Salten i Midtjylland. *Antikvariske Studier* 4, 23-30.
- Glørstad, H. 2010. *The Structure and History of the Late Mesolithic Societies in the Oslo fjord area 6300-3800 BC*. Lindome. Bricoleur Press.
- Grooth, M. E. Th., Lauwerier, R. C. G. M. and Schegget, M. E. 2011. New C-14 dates from the Neolithic flint mines at Rijckholt-St. Geertruid, the Netherlands. In: M. Capote, S. Consuegra, P. Diaz del Rio and X. Terradas (eds.), *Proceedings of the 2nd International Conference of the UISPP Commission on Flint Mining in Pre- and Protohistoric Times (Madrid, 14-17 October 2009)*, 77-89. BAR International Series 2260. Oxford.
- Hadevik, C. 2009. Trattbägerkulturen i Malmöområdet. En sammenstilling med fokus på byggnader, gravar och rituelle gropar. In: C. Hadevik and M. Steineke (eds.), *Spåren i marken – tematisk rapportering från Citytunnelprojektet*, 13-90. Rapport nr. 48. Malmö. Malmö Museer.
- Hallgren, F. 2008. *Identitet i Praktik. Lokala, regionala och överregionala sociala sammanhang inom nordlig trattbägerkultur*. Uppsala.
- Hartz, S and Lübke, H. 2005. Zur chronostratigraphischen Gliederung der Ertebølle-Kultur und frühesten Trichterbecherkultur in der südlichen Mecklenburger Bucht. *Bodendenkmalpflege in Mecklenburg-Vorpommern. Jahrbuch* 2004, vol. 52, 119-143. Lübsdorf.
- Heinemeier, J. and Rud, N. 2000. Danske arkæologiske AMS C-14 dateringer, Århus 1999. *Arkæologiske Udgravninger i Danmark* 2000, 296-313.
- Heinemeier, J. 2002. AMS C-14 dateringer, Århus 2001. *Arkæologiske udgravninger i Danmark* 2001, 263-292.
- Heinemeier, J. and Rud, N. 1998. Danske arkæologiske AMS C-14 dateringer, Århus 1997. *Arkæologiske Udgravninger i Danmark* 1997, 282-292.
- Heinemeier, J. and Rud, N. 1999. Danske arkæologiske AMS C-14 dateringer, Århus 1998. *Arkæologiske Udgravninger i Danmark* 1998, 327-345.
- Helbæk, H. 1954. Kornavl i Store Valby. *Aabøger for Nordisk Oldkyndighed og Historie* 1954, 198-204.
- Henningsmoen, K. 1980. Trekk fra floraen i Vestfold. In: V. Møller (ed.), *Bygd og by i Norge, Vestfold*, 163-175. Oslo. Gyldendal Norsk Forlag.
- Hernek, R. 1988. Den spetsnackiga yxan av flinta. *Fornvännen* 83, 216-223.
- Hirsch, K., Klooss, S. and Klooss, R. 2007. Der endmesolithisch-neolithische Küstensiedlungsplatz bei Baabe im Südosten der Insel Rügen. *Bodendenkmalpflege in Mecklenburg-Vorpommern. Jahrbuch* 2007, vol. 55, 11-51. Lübsdorf.
- Jennbert, K. 1984. *Den Produktiva Gåvan. Tradition och innovation i Sydskandinavien för omkring 5300 år sedan*. Acta Archaeologica Lundensia, Serie 4^o 16. Bonn. Rudolf Habelt Verlag.
- Johansson, G., Westergaard, B., Artelius, T and Nieminen, J. 2011. *Arkeologiska undersökningar. Boplatser och gravar vid Viskan i Veddige. Fem fornlämningar undersökta för riksväg 41. Halland, Veddige socken, Vabränna 1:5, 10:5, 3:39 och 3:33; Kullagård 1:13 och Järlöv 7:3, RAA 323, 322, 128b, 320 och 321*. Riksantikvrieämbetet UV Rapport 2011:26. Riksantikvrieämbetet, Sweden.
- Juel Jensen, H. 1994. *Flint tools and plant working – hidden traces of stone age technology*. Århus. Århus University Press.
- Jørgensen, E. 1977. Brændende dysser. *Skalk*, vol. 5, 7-13.
- Karg, S. and Harild, J. 2009. Makrofossilanalyse af gyljeprøver fra Ronæs Skov. In: S. H. Andersen (ed.), *Ronæs Skov. marinarkæologiske undersøgelser af en kystboplads fra Ertebølle-tid*, 231-233. Århus. Jysk Arkæologisk Selskabs skrifter.
- Karsten, P. 1994. *Att kasta yxan i sjön*. Acta Archaeologica Lundensia, Series in 8^o, No. 23. Stockholm. Almqvist and Wiksell International.
- Kind, C-J. 2010. Diversity at the transition – a view from the Mesolithic. In: D. Gronenborn and J. Petrasch (ed.), *Die Neolithisierung Mitteleuropas – The Spread of the Neolithic to Central Europe, International Symposium, Mainz 24 June – 26 June 2005*, 449-460. Mainz. Römisch-Germanisches Zentralmuseums.
- Klassen, L. 2000. *Frühes Kupfer im Norden Untersuchungen zur Chronologie, Herkunft und Bedeutung der Kupferfunde der Nordgruppe der Trichterbecherkultur*. Århus. Jysk Arkæologisk Selskabs skrifter.
- Klassen, L. 2004. *Jade und Kupfer Untersuchungen zum Neolithisierungsprozess im westlichen Ostseeraum unter besonderer Berücksichtigung der Kulturentwicklung Europas 5500-3500 BC*. Århus. Jysk Arkæologisk Selskabs skrifter.
- Koch, E. 1987. Ertebølle and Funnel Beaker Pots as Tools. *Acta Archaeologica*, vol. 57, 107-120.
- Koch, E. 1998. *Neolithic Bog Pots from Zealand, Møn, Lolland and Falster*. Nordiske Fortidsminder serie B, vol. 16. København. Det Kongelige Nordiske Oldskriftselskab.
- Kristiansen, K. 1988. Det tidligste agerbrug i Danmark (4000-3600 f.Kr.). In: C. Bjørn, T. Dahlerup, S. P. Jensen and E. Helmer Pedersen (eds.), *Det danske landbrugs historie bind 1, oldtid og middelalder*, 21-40. Odense. Landbohistorisk Selskab.
- Larsson, M. 1992. The early and middle Neolithic Funnel Beaker Culture in the Ystad area (Southern Scania). economic and social change, 3100-2300 BC. In: L. Larsson, J. Callmer and B. Stjernquist (eds.), *The Archaeology of the Cultural Landscape*, 17-90. Acta Archaeologica Lundensia 4 (19). Stockholm. Almqvist and Wiksell International.
- Lindqvist, C. and Possnert, G. 1997. The subsistence economy and diet at Jakobs/Ajvide and Stora Förvar, Eksta parish and other prehistoric dwelling and burial sites on Gotland in long-term perspective. In: G. Burenhult (ed.), *Remote Sensing Vol. I. Theses and papers in North-European archaeology* 13:a, 29-90. Department of archaeology, Stockholm University. Hässleholm.
- Liversage, D. 1992. *Barkær, Longbarrows and Settlements*. Arkæologiske Studier vol. IX. København. Akademisk Forlag.

- Lübke, H. Lüth, F. and Terberger, T. 2009. Fishers or farmers? The archaeology of the Ostorf cemetery and related Neolithic finds in the light of new data. In: L. Larsson, F. Lüth, T. Terberger (eds.), *Innovation and Continuity Non-Megalithic Mortuary Practices in the Baltic. New Methods and Research into the Development of Stone Age Society. International Workshop Schwerin 24-26 March 2006*. Bericht der Römisch-Germanischen Kommission, vol. 88, 307-38. Mainz. Philipp von Zabern.
- Lüning, J. 1968. *Die Michelsberger Kultur. Ihre Funde in zeitlicher und räumlicher Gliederung*. Bericht der Römisch-Germanischen Kommission, vol. 48, 1-350.
- Lüning, J. 2000. *Steinzeitliche Bauern in Deutschland. Die Landwirtschaft im Neolithikum*. Universitätsforschungen zur prähistorischen Archäologie, Band 58. Bonn. Rudolf Habelt.
- Madsen, T. 1987. Where did all the Hunters go? An assessment of an epoch-making episode in Danish Prehistory. *Journal of Danish Archaeology* 5, 229-239.
- Magnell, O. 2005. *Tracking wild boar and hunters. Osteology of wild boar in Mesolithic South Scandinavia*. Studies in Osteology 1. Acta Archaeologica Lundensia Series in 8° No 51. Almqvist and Wiksell International, Stockholm.
- Melchior, L., Lynnerup, N., Siegismund, H. R., Kivisild, T., Dissing, J., 2010. Genetic Diversity among Ancient Nordic Populations. *PLoS ONE*, July, Vol. 5, Issue 7, 1-9.
- Milner, N., Craig, O. E., Bailey, G. N., Pedersen, K. and Andersen, S. H. 2004. Something fishy in the Neolithic? A re-evaluation of stable isotope analysis of the Mesolithic coastal populations. *Antiquity* 78, 9-22.
- Mischka, D. 2011. The Neolithic burial sequence at Flintbek LA 3, north Germany, and its cart tracks: a precise chronology. *Antiquity* 85, 742-758.
- Moore, J. H. 2001. Evaluating Five Models of Human Colonization. *American Anthropologist* 103, nr. 2, 395-408.
- Møller, P. F., Odgaard, B., Rasmussen, P. and Aaby, B. 2010. Urskovslandskabets naturlige åbenhed. *Skoven* nr. 10, 450-453.
- Nielsen, A. B. and Buchwald, E. 2010. Urskovslandskabets åbenhed og græsningens betydning. *Skoven* nr. 10, 88-93.
- Nielsen, P. O. 1977. Die Flintbeile der Frühen Trichterbecherkultur in Dänemark. *Acta Archaeologica* 48, 61-138.
- Nielsen 1984. P. O. Nielsen, De første bønder. Nye fund fra den tidligste Tragtbægerkultur ved Sigersted. *Aarbøger for Nordisk Oldkyndighed og Historie* 1984, 96-126.
- Nielsen, P. O. 1997. De ældste langhus. Fra toskibede til treskibede huse i Norden. *Bebyggelseshistorisk tidsskrift* nr. 33, 9-30.
- Nielsen, P. O. 2009. Den tidligneolitiske bosættelse på Bornholm. In: A. Schülke (ed.), *Plads og Rum i Tragtbægerkulturen*, 9-24. Nordiske Fortidsminder Serie C. København. Det Kongelige Nordiske Oldskriftselskab.
- Noe-Nygaard, N., Price, T. D. and Hede, S. U. 2005. Diet of aurochs and early cattle in southern Scandinavia: evidence from N15 and C-13 stable isotopes. *Journal of Archaeological Science* 32, 855-871.
- Odgaard, B. 1994. The Holocene vegetation history of northern West Jutland, Denmark. *Opera Botanica*, 123, 1-171.
- Olausson, D., Rudebeck, E. and Säfvestad, U. 1980. Die südschwedischen Feuersteingruben – ergebnisse und Probleme. In: G. Weisberger (ed.), *5000 Jahre Feuersteinbergbau. Die Such nach dem Stahl der Steinzeit. Ausstellung im Deutschen Bergbau-Museum Bochum vom 24 Oktober 1980 bis 31. Januar 1981*, 183-204. Bochum. Deutschen Bergbau-Museum.
- Pelgar, S. M. and Birks, H. J. B. 1993. The mid-Holocene Ulmus fall at Diss Mere, South-East England – disease and human impact? *Vegetation History and Archaeobotany* 2, 61-68.
- Persson, P. 1999. *Neolitikums början. Undersökningar kring jordbrukets introduktion i Nordeuropa*. Göteborg. University of Gothenburg and University of Uppsala.
- Petersen, P. V. 1993. *Flint fra Danmarks Oldtid*. København. Høst og Søn.
- Pines, I. and Westwood, R. 2008. A Mark-recapture Technique for the Dutch Elm Disease Vector the Native Elm Bark Beetle, *Hylurgopinus rufipes* (Coleoptera: Scolytidae). *Arboriculture and Urban Forestry*, 34 (2), 116-122.
- Price, T. D. and Gebauer, A. B. 2006. *Smakkerup Huse: a Late Mesolithic Coastal Site in Northwest Zealand, Denmark*. Århus. Århus University Press.
- Price, T. D., Noe-Nygaard, N. 2009. Early Domestic Cattle in Southern Scandinavia. In: N. Finlay, S. McCartan, N. Milner and C. Wickham-Jones (eds.), *From Bann Flakes to Bushmills*, 198-210. Oxford, Oxbow Press.
- Prøsch-Danielsen, L. 1996. Vegetation history and human impact during the last 11500 years at Lista, the southernmost part of Norway: based primarily on professor Ulf Hafstens material and diary from 1955-1957. *Norsk geografisk tidsskrift* 50/2, 85-99.
- Rasmussen, P. 2005. Mid- to late Holocene land-use change and lake development at Dallund Sø, Denmark: vegetation and land-use history inferred from pollen data. *The Holocene* 15, 2005, 1116-1129.
- Reimer, P.J., Baillie, M.G.L., Bard, E., Bayliss, A., Beck, J.W., Blackwell, P.G., Bronk Ramsey, C., Buck, C.E., Burr, G.S., Edwards, R.L., Friedrich, M., Grootes, P.M., Guilderson, T.P., Hajdas, I., Heaton, T.J., Hogg, A.G., Hughen, K.A., Kaiser, K.F., Kromer, B., McCormac, F.G., Manning, S.W., Reimer, R.W., Richards, D.A., Southon, J.R., Talamo, S., Turney, C.S.M., van der Plicht, J. and Weyhenmeyer, C. E. 2009. IntCal09 and Marine09 Radiocarbon Age Calibration Curves, 0–50,000 Years cal BP. *Radiocarbon*, 51(4), 1111-1150.
- Rosenberg, A. 2006. *Beretning for Ullerødgård. Beretning over den arkæologiske forundersøgelse og udgravning på matr. 3x m.fl. Ullerød By, Tjæreby. (NFHA 2424)*. Excavation rapport from Folkemuseet in Hillerød. http://www.folkemuseet.dk/Bygherre/A2424_net.pdf

- Rowley-Conwy, P. 2011. Westward Ho! The spread of agriculture from Central Europe to the Atlantic. *Current Anthropology* 52, 431-451.
- Rudebeck, E. 2002. Likt och olikt i de sydsandinaviska länghögarna. In: L. Larsson (ed.), *Monumentala gravformer i det äldsta bondesamhället*, 119-146. Report Series No. 83. University of Lund. Department of Archaeology and Ancient History.
- Rudebeck, E. 2010. I trästoderna skugga - monumentala möten i neolitiseringsens tid. In: B. Nilsson, and E. Rudebeck (eds.), *Arkeologiska och förhistoriska världar. Fält, erfarenheter och stenåldersplatser i sydvästra Skåne*, 83-251. Malmö Museer, Arkeologienheten. Malmö.
- Ryberg, E. 2006. *Arkeologisk undersökning. Vägen till Veddige. Huslämningar och annat från neolitikum och skiftet bronsålder/järnålder. Halland, Veddige socken, Veddige 33:3, RAÄ 258*. UV Väst Rapport 2006:5. Riksantikvarieämbetet, Sweden.
- Rydbeck, O. 1918. *Slutna mark- och mossfynd från stenåldern*. Lund. Lunds Universitets Historiska Museum.
- Skaarup, J. 1972. *Hesselø – Sølager. Jagdstationen der südsandinavischen Trichterbecherkultur*. Arkæologiske Studier vol. 1. København. Akademisk Forlag.
- Salomonsson, B. 1970. Die Värby-Funde. Ein Beitrag zur kenntnis der ältesten Trichterbecherkultur in Schonen. *Acta Archaeologica*, vol. 41, 55-95.
- Schier, W. 2009. Extensiver Brandfeldbau und die Ausbreitung der neolithischen Wirtschaftsweise in Mitteleuropa und Südsandinavien am Ende des 5. Jahrtausends v. Chr. *Prähistorische Zeitschrift*, Band 84, 15-43.
- Schulting, R. 2011. Mesolithic-Neolithic Transitions: An Isotopic Tour through Europe. In: R. Pinhasi and J.T. Stock (eds.), *Human Bioarchaeology of the Transition to Agriculture*, 17-41. New York. John Wiley and Sons.
- Sjögren, K. G. 2006. *Ecology and Economy in Stone and Bronze Age Scania. Skånska spår – arkeologi längs Västkustbanan*. Riksantikvarieämbetet, UV Syd.
- Skoglund, P., Malmström, H., Raghavan, M., Storå, J., Hall, P., Willerslev, E., Gilbert, T. P., Götherström, A., Jacobsson, M. 2012. Origins and Genetic Legacy of Neolithic Farmers and Hunter-Gatherers in Europe. *Science* 336, 466-469.
- Skousen, H. 2008. *Arkæologi i lange baner. Undersøgelser forud for anlæggelsen af motorvejen nord om Århus. Højbjerg*. Moesgård Museum.
- Staal, B. 2005. *Udgravningsberetning for den arkæologiske undersøgelse i forlængelse af arkæologisk forundersøgelse på Erantisvej i Nørre Alslev*. Nykøbing Falster. Museum Lolland-Falster.
- Stafford, M. 1999. *From Forager to Farmer in Flint: a lithic analysis of the prehistoric transition to agriculture in southern Scandinavia*. Århus. Århus University Press.
- Svensson, M. 2010. What time is it? *In Situ* 2009-2010, 7-26.
- Sørensen, L. 2012. Pioneering farmers cultivating new lands in the North – The expansion of agrarian societies during the Neolithic and Bronze Age in Scandinavia. In: H. C. Gulløv, P. A. Toft and C. P. Hansgaard (eds.), *Challenges and solutions*, 87-124. Northern Worlds report from workshop 2 at the National Museum, 1. November 2011. Copenhagen. The National Museum.
- Sørensen, L and Karg, S. 2012. The expansion of agrarian societies towards the North – new evidence for agriculture during the Mesolithic/Neolithic transition in Southern Scandinavia. To be published in: *Journal of Archaeological Science*.
- Sørensen, S. A. 2005. Fra Jæger til bonde. In: C. Bunte., B. E. Berglund and L. Larsson (eds.). *Arkeologi och Natirvetenskap. Gyldenstiernska Krabberup Stiftelsens Symposium Nr. 6*, 298-309. Gyldenstiernska Krabberup Stiftelsen. Lund.
- Tauber, H. 1981. C-13 evidence for dietary habits of prehistoric man in Denmark. *Nature* 292, 332-333.
- Troels-Smith, J. 1957. Muldbjerg-bopladsen. Som den så ud for 4500 år siden. De første spor af agerbrug i Danmark. *Naturens Verden*, juli 1957, 1-30.
- Valen, C. R. 2007. *Jordbruksimpulser i neolitikum og bronsealder i Nord-Norge? En revisjon av det arkeologiske gjenstandsmaterialet og de naturvidenskapelige undersøkelsene*. Unpublished MA thesis in archaeology. Tromsø. University of Tromsø.
- Westergaard, B. 2008. *Arkeologisk undersökning. Trattbägare i O-bygd. Arkeologiska undersökningar längs E6 i Bohuslän, delen Lugnet-Skee. Bohuslän, Skee socken, Neanberg 1:14 och S:a Slön 2:4, Skee 1616*. UV Väst Rapport 2008:40. UV Väst. Riksantikvarieämbetet, Sweden.
- Zápotocký, M. 1992. *Streitaxte des mitteleuropäischen Äneolithikums*. Weinheim, Acta Humaniora.
- Zilhao, J. 2001. Radiocarbon evidence for maritime pioneer colonization at the origins of farming in west Mediterranean Europe. *Proceedings of the National Academy of Science*, November 20, Vol. 98, No. 24, 14180-14185.
- Østmo, E. 1986. New observations on the funnel beaker culture in Norway. *Acta Archaeologica* vol. 55, 190-198.
- Østmo, E. 1988. *Etableringen av jordbrukskultur i Østfold i steinalderen*. Universitetets Oldsaksamlings Skrifter, Ny rekke Nr. 10. Oslo. Universitetets Oldsaksamling.

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