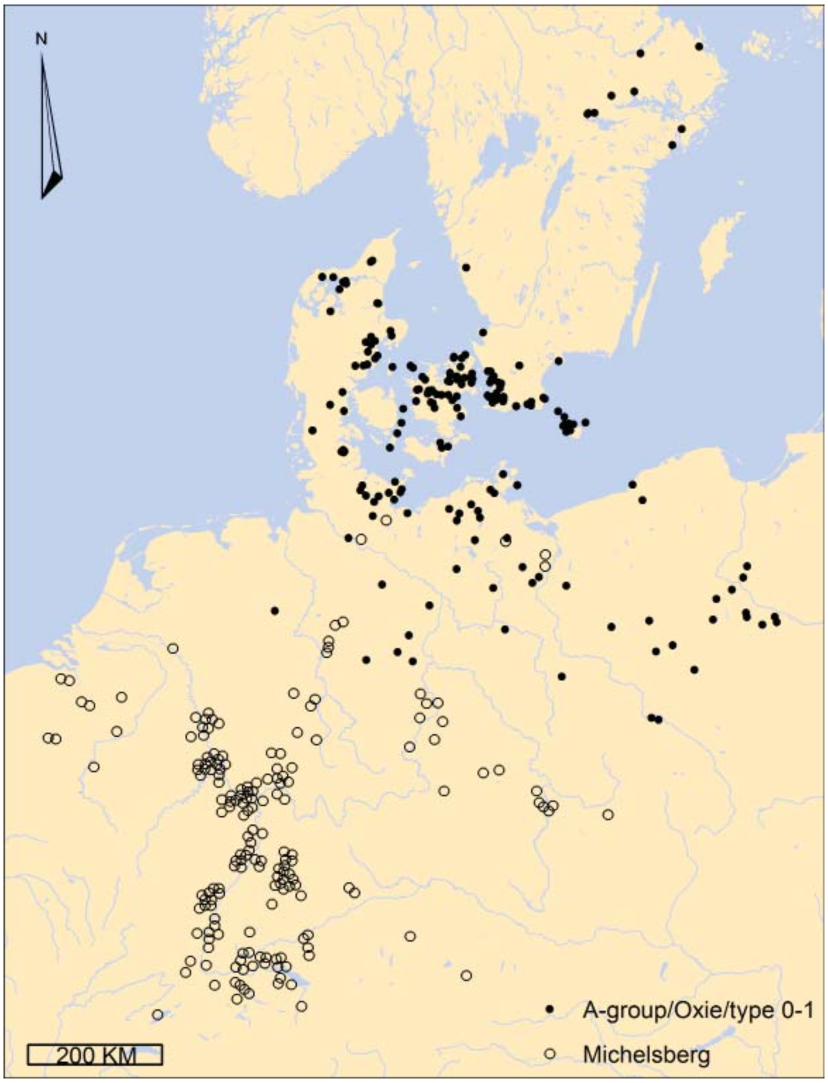

Fig. V. 56. Map of Michelsberg sites in central Europe and localities containing short necked funnel beakers in southern Scandinavia, northern Germany and northern Poland. After Lüning 1968 and data from Plate 4.

thus perhaps suggesting immigration from agrarian societies in Central Europe (Höhn 2002; Klassen 2004; Sheridan 2010).

9. AXES FROM CENTRAL EUROPEAN AGRARIAN SOCIETIES AND THEIR IMITATIONS IN SOUTH SCANDINAVIA

In the ongoing discussion regarding the adoption and expansion of agrarian societies, flint and stone axes have always played a crucial role in each of the proposed hypotheses supporting migrationism, indigenism and integrationism (see section 3.13). In particular, the exchange of foreign axes from agrarian societies in Central Europe with hunter gatherers in South Scandinavia has been interpreted as a movement of mediators of agrarian ideas and ideology, which makes the axes particularly important in the discussion of the Neolithisation process in Northern Europe (Sørensen 2012a).

The purpose of this section is to discuss whether there are functional or more ideological motives behind

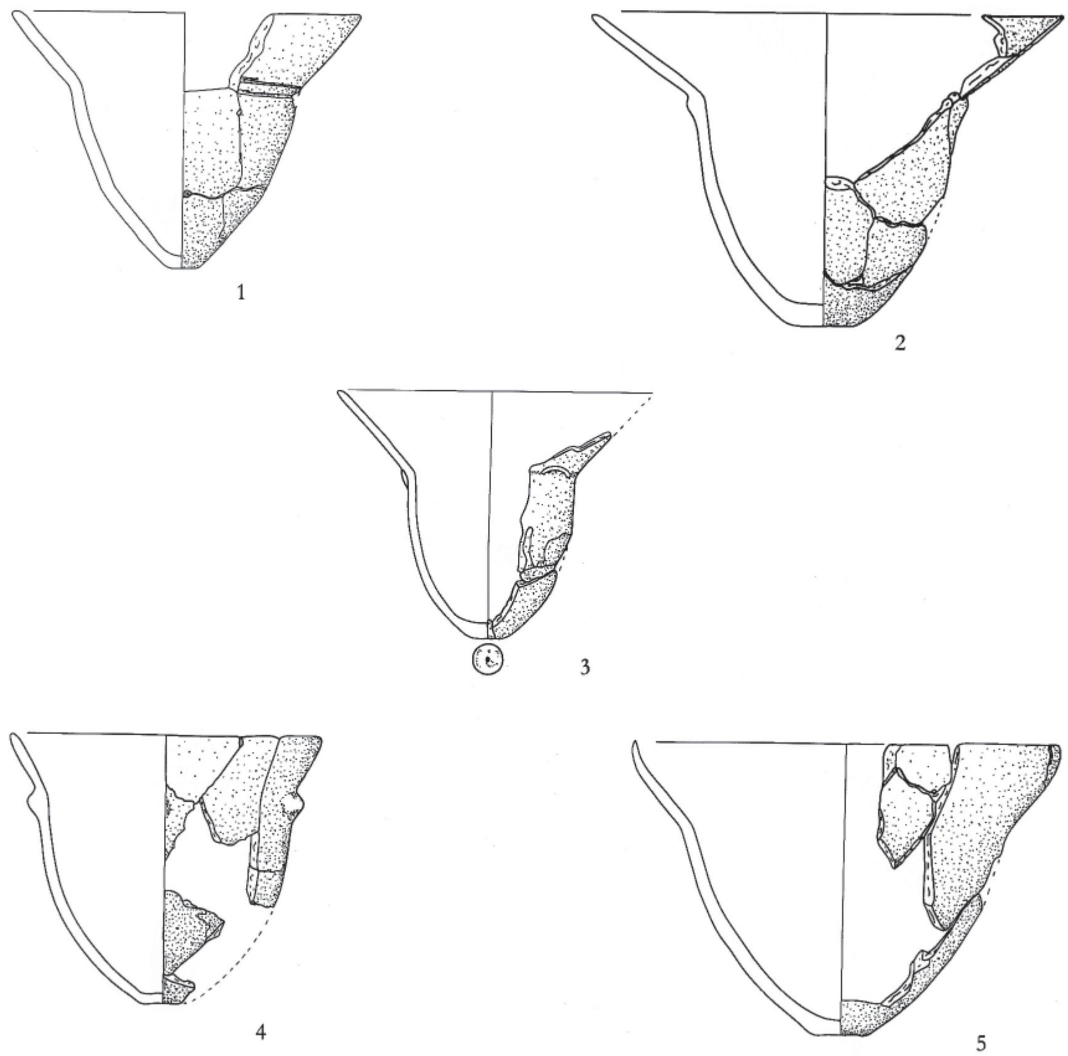

Fig. V. 57. Tulip-shaped funnel beakers from the site Brunn 17 in Mecklenburg-Vorpommern. After Vogt 2009.

the exchange of axes originating from Central European agrarian societies (shoe-last, jade and copper axes) and the South Scandinavia production of axes (Limhamn, Oringe, pointed- and thin-butted axes of flint, and stone and core axes with specialized edges) during the late 5th and early 4th millennium BC. The appearance of local South Scandinavian imitations of axes from Central European agrarian societies is especially significant, as these axes may have functioned as mediators of a meaning, which had been transferred to these local objects. This is an important aspect of the discussion of the emergence of large-scale agrarian networks.

9.1. Shoe-last axes

Provenance studies of shoe-last axes of amphibolite showed that they were thought to have originated from unknown quarries in the Balkans or the West Carpathian area, but recent research points towards outcrops located in the Czech Republic or the Slovakian Republic (Schwarz-Mackensen & Schneider 1983; 1986; Illásová & Hovorka 1995; Raemaekers et al. 2010; Bernardini et al. 2013). During the Ertebølle culture (4900-4000 cal BC) an increasing importation of shoe-last axes can be observed in southern Scandinavia, which reached its peak during the period 4300-4000 cal BC (Klassen 2004, 24ff)

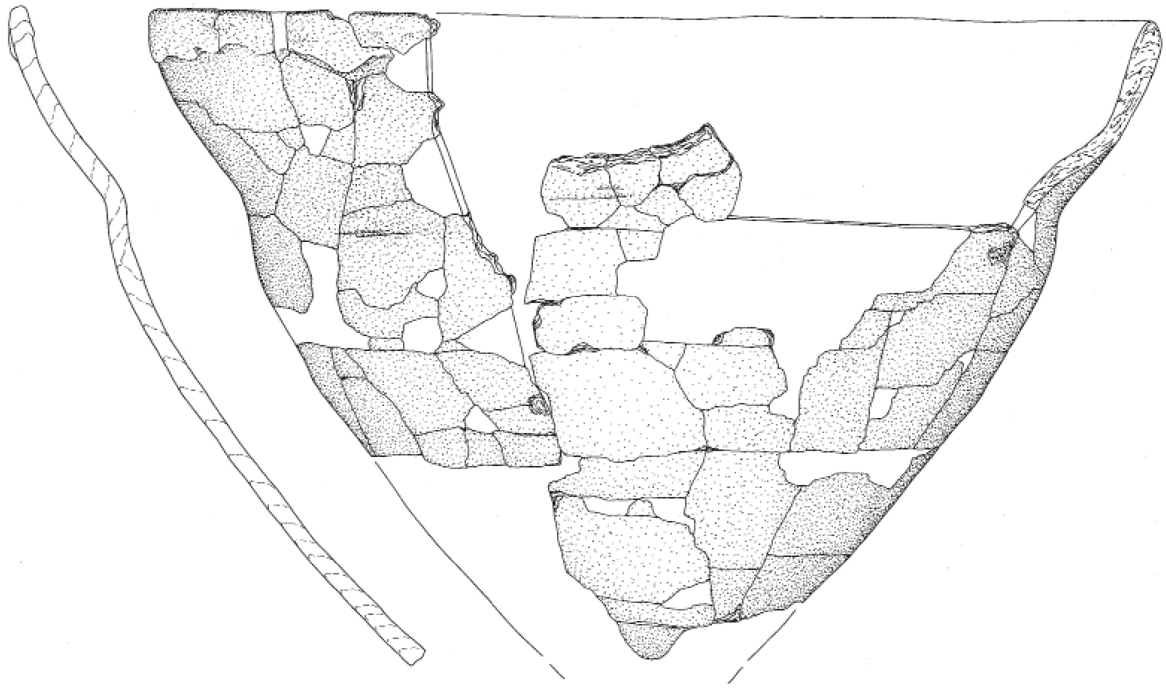

Fig. V. 58. A tulip-shaped beaker from Øgårde 19 on Zealand. After Koch 1998.

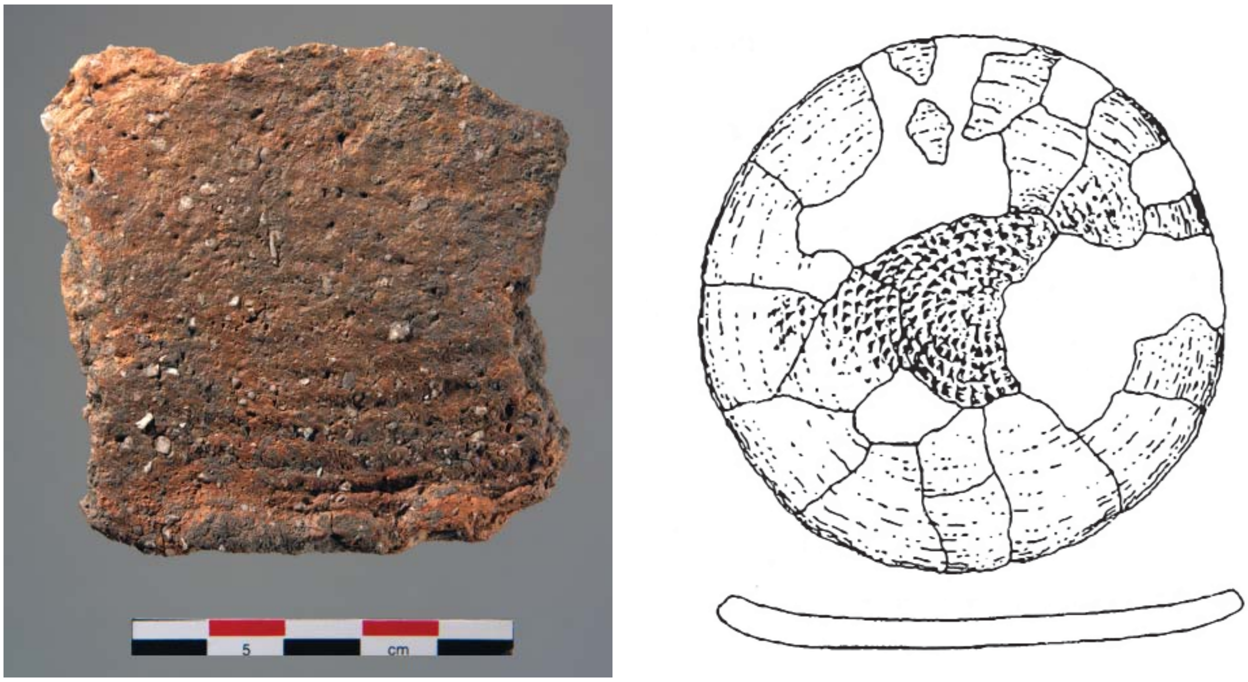

Fig. V. 59. Clay disc from pit A 2087 at Lisbjerg Skole contained impressions from a rush mat similar to clay disc from the Michelsberg site of Rübeland-Baumannshöhle in Harzen. After Klassen 2004; Skousen 2004; 2008.

(Fig. V.60). The distribution of shoe-last axes indicates that they probably came to southern Scandinavia via the major Central European rivers, such as the Elbe, Saale and Oder (Fig. V.61). The shoe-last axes had an important symbolic meaning to some of the earliest Central European agrarian cultures, as they have been found in burials and at settlements belonging to the Rössen culture (5500-4400 cal BC) (Klassen 2004). Inspired by many ethnographic parallels, shoe-last axes have been interpreted as prestigious objects, which were exchanged between Central European agrarian societies and Ertebølle hunter-gatherers (Sahlins 1968; Højlund 1979; Fischer 1982; 2002, 376f; Jennbert 1984; Larsson 1988; Laux 1993). The possession of such exotic objects would, according to the theories proposed, create an increased status for the local Ertebølle hunter-gatherers who owned the axes. The systematic exchange of shoe-last axes with Ertebølle hunter-gatherers has thus been interpreted as the movement of mediators of a gradual transfer of agrarian ideas, ideology and hierarchical structures.

However, shoe-last axes have only been found in ordinary refuse layers in South Scandinavia, thus making an interpretation of the axes as prestigious objects seem less plausible (Klassen 2004, 409ff). Although many of the ordinary waste deposits could be reinterpreted, as besides the shoe-last axes these layers also contained decorated antler axes and scattered fragments of human bones (Brinch Petersen 2001, 43ff; S. H. Andersen 2009, 187). Currently, there is no consensus over or clear distinction between the interpretations of normal refuse, as opposed to deliberately destroyed objects or symbolic deposits (N. H. Andersen 2000, 14; Holten 2000, 291; Andersson 2003; Hansson & Celin 2006, 121). It is therefore difficult to separate ordinary waste from symbolic deposits (Rech 1979; Karsten 1994; N. H. Andersen 2000). Moreover, there are only a few burials from the later phase of the Ertebølle culture (4400-4000 cal BC), which might confirm whether or not these shoe-last axes were prestigious objects (Brinch Petersen 2001, 49ff). On the other hand, a deposit has been recorded at Udstolpe on Lolland, which consisted of two shoe-last axes and one pointed-butted stone axe of amphibolite (Lomborg 1962, 20f) (Fig. V.62). The deposition of axes in hoards is characteristic of Central European agrarian societies, but an unknown phenomenon in the Late Ertebølle culture. The shoe-last axes from Udstolpe probably originated from southern Lower Saxony or Thuringia. Furthermore, the deposit

Fig. V. 60. A complete shoe-last axe from Store Åmose on Zealand. Photo. John Lee, the National Museum of Denmark.

from Udstolpe is one of the earliest axe hoards found in southern Scandinavia, as the shape of the shoe-last axes suggests a typological date around 4300-4000 cal BC (Klassen 2004). In addition, the pointed-butted amphibolite axe had a four-sided cross-section, thus showing similarities with copper axes of the Kaka type, which are dated to transition between the 5th and 4th millennium BC (Pétrequin et al. 2012e). The Udstolpe hoard could represent the emergence of new forms of rituals within the Ertebølle culture, which had their origins amongst the contemporary agrarian communities of Central Europe (Fischer 1982; Jennbert 1984). However, during this period there were increased social contacts between Central European agrarian societies and southern Scandinavian hunter-gatherers, which is shown by bone rings, combs and T-shaped antler axes (Vang Petersen 1984; Klassen 2000, 341ff; 2004, 64f; Klassen & Nielsen 2010, 37f; Klassen et al. 2012, 1288f). Therefore, it cannot be ruled out that the deposition at Udstolpe may have taken place right at the transition between the Mesolithic and Neolithic, and was a deliberate symbolic act by the first farmers or the result of a scouting expedition, as discussed in section 5.6 (Anthony 1990).

Another problem associated with the interpretation of shoe-last axes as prestigious objects is the lack of local imitations of these axes, except for a possible example found at the site of Ringkloster (Andersen 1998a, 34). If the ownership of such axes was associated with increased status and the objects functioned as powerful mediators of certain ideas, then local imitations would be expected. The Ertebølle hunter-gatherers had the necessary technological skills to make imitations of shoe-last axes using local raw materials, as they had knapped and polished stone axes and made shaft holes in antler axes since the Early Mesolithic (Nicolaisen 2003; Sørensen 2007; Sørensen & Casati 2010). Many of the local copies

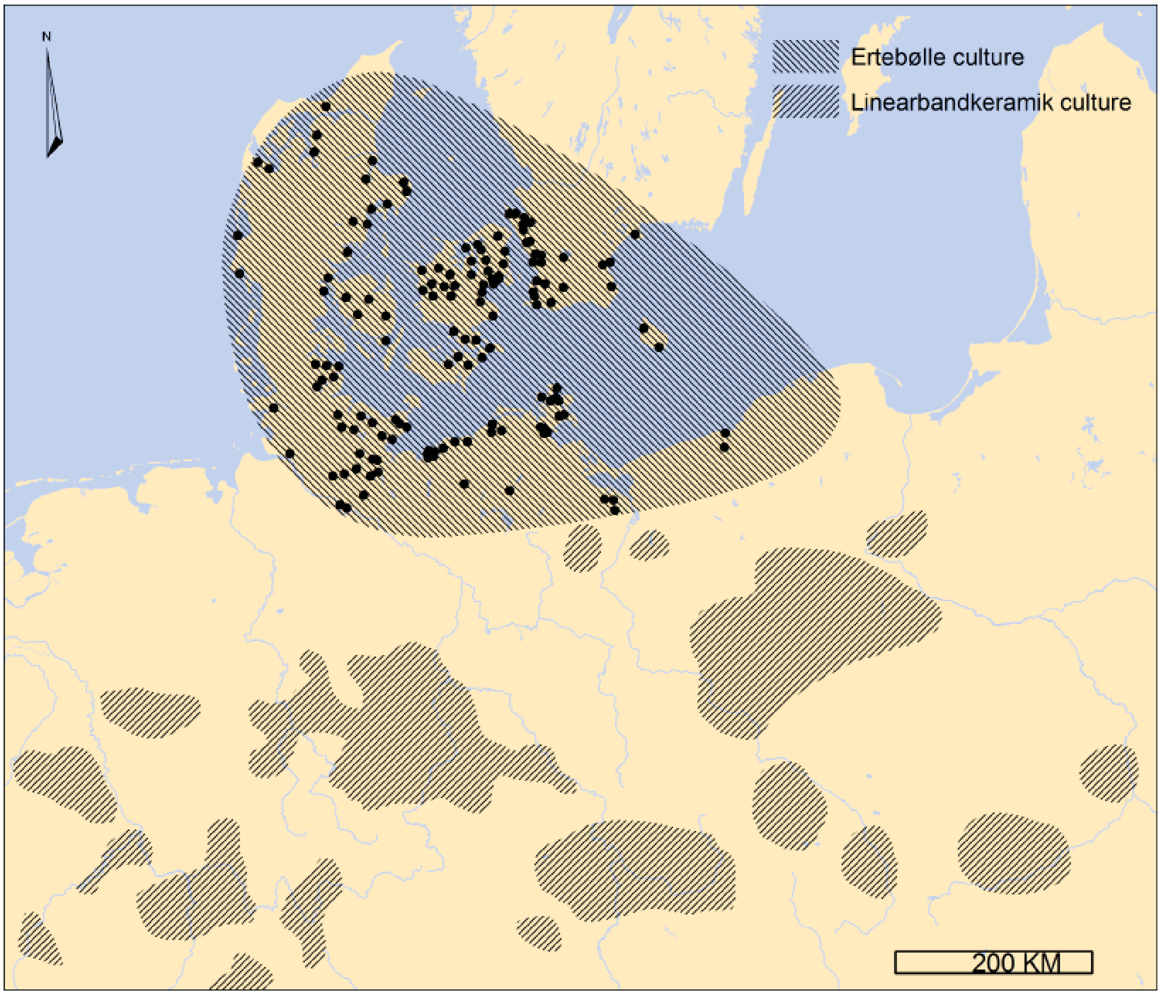

Fig. V. 61. The distribution of the Linearbandkeramik culture and the Ertebølle culture. After Hartz et al. 2007.

of jade and copper axes from the Early Neolithic appear to imitate foreign axes made from local raw materials, which was presumably linked to power and status (Klassen 2000; 2004; Andersen & Johansen 1992, 38; Ebbesen 1984, 113ff). However, some shoe-last axes have been recycled and converted into pointed-butted amphibolite axes, thus suggesting that some of these axes may have had their meaning and symbolic value altered in the centuries before and after 4000 cal BC (Fischer 2002). The transformation from one type of axe to another could also reflect the transition from a hunter-gatherer to an agrarian society between the 5th and 4th millennium BC in South Scandinavia.

9.2. The loss of agrarian ideas in a Mesolithic network

Generally, the lack of imitations of the shoe-last axes could indicate that the ideas behind the axes as items of prestige and status may have been lost in a Mesolithic network of contacts. If an artefact is exchanged indirectly several times and reaches marginal regions of a network, then the original meaning behind the object can be lost and change to something different, as discussed in section 5.4 (Latour 1996a) (Fig. III.18).

The distribution of the shoe-last axes in Northern Europe becomes less dense in South Scandinavia and can therefore be interpreted as a classic "down-the-line" exchange, which implies a more indirect contact between farmers and hunter-gatherer groups (Renfrew 1975,

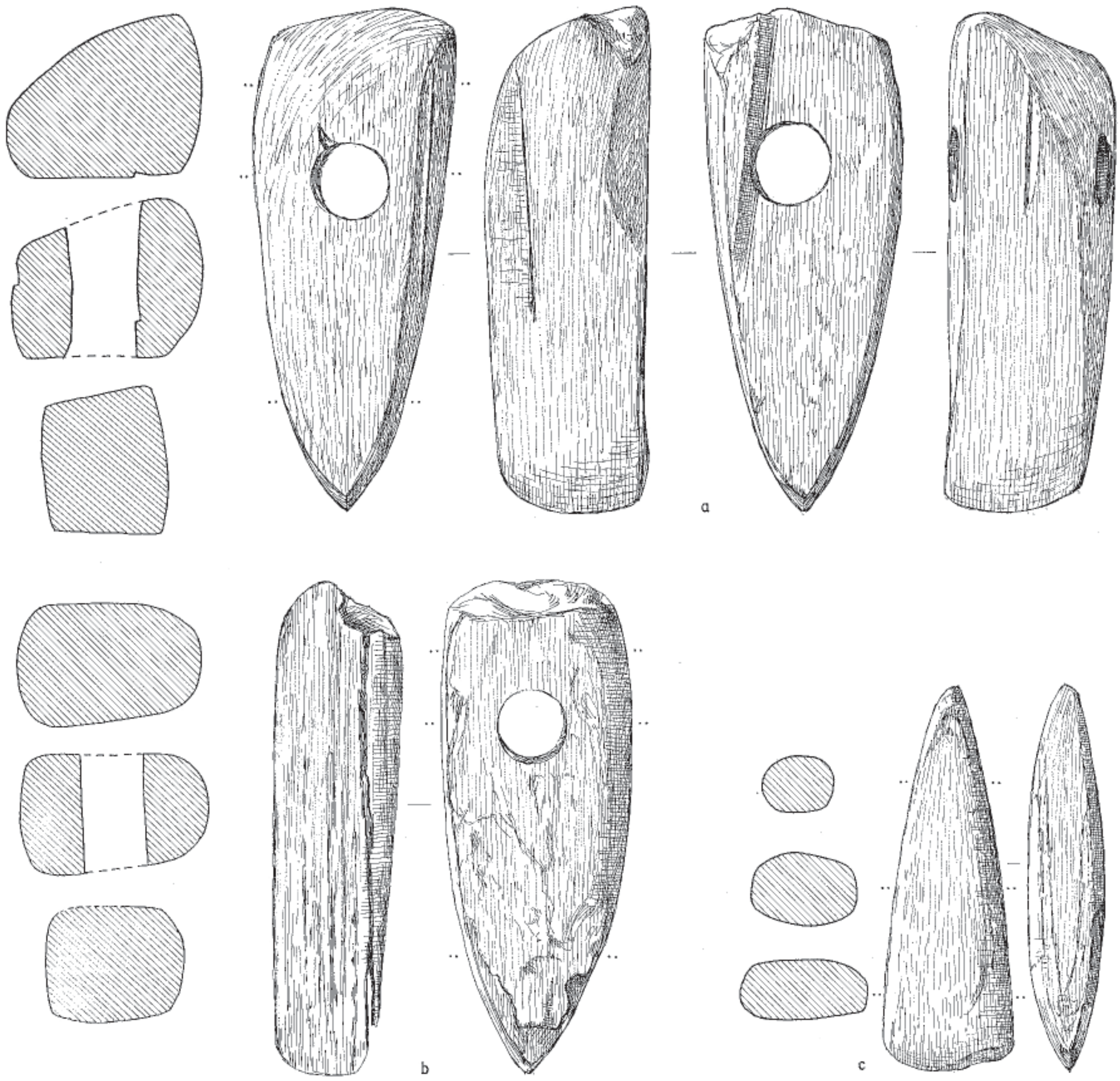

Fig. V. 62. Deposition of two shoe-last axes (a & b) and one pointed-butted stone axe of amphibolite (c) from Udstolpe, Lolland. After Lomborg 1962.

Klassen 2004; Brinch Petersen & Egeberg 2009) (Fig. V.63). This argument is also supported by the very limited evidence of domesticated animals and charred cereals grains that is found at Ertebølle sites, as discussed in section 7.1 (Jennbert 1984; Sørensen 2005; Price & Gebauer 2005). The Ertebølle hunter-gatherers probably had their own preferences regarding when and why certain objects could be associated with prestige and status, which could be the same as or different to the perceptions within agrarian societies in Central Europe (Vang Petersen 1984, 14f; Klassen 2004, 129; Pétrequin et al. 2012a; 2012c, 632ff; Klassen et al. 2012, 1287). The shoe-last axes seem to be an example of selective importation of amphibolite axes, which were used for specific functional purposes, such the preparation of dugout canoes and large hut constructions (Christensen 1990; Grøn 2003). The purely functional use of these shoe-last axes could explain why many of them show signifcant use-wear and fragmentation on the neck (Klassen 2004; Raemaekers et al. 2010, 19). However, this does rule out the possibility that some of the unused shoe-last axes could have been associated with prestige. The personal circumstances and preferences of

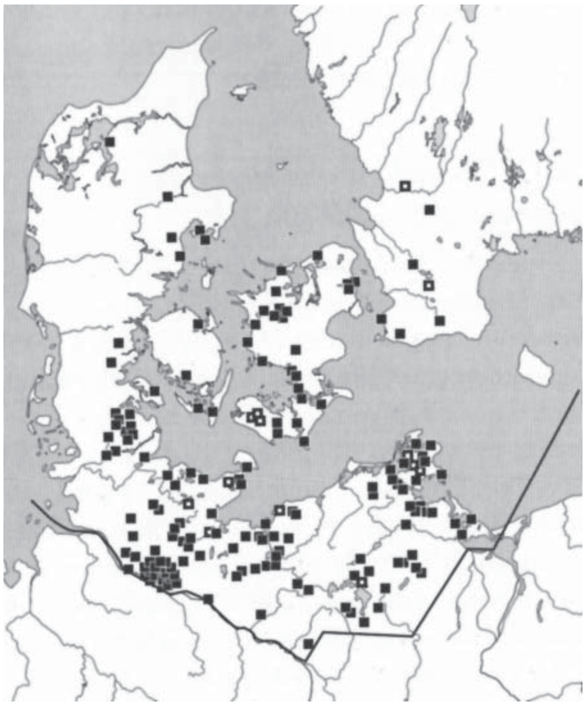

Fig. V. 63. Distribution of shoe-last axes in South Scandinavia. After Klassen 2004.

hunter-gatherers probably played an important role in defining what were perceived as objects of power and status during the Ertebølle culture (Sørensen 2012a).

9.3. The Limhamn axes and adzes

The Limhamn axe can be distinguished as a local type distributed in eastern Denmark, Scania and western Sweden, which were produced from a large flake or an oval-shaped nodule of diabase or basalt (Table 53). The cross-section of the Limhamn axes and adzes is two-sided and the polishing is more intensive at the edges than on the sides, which often display knapping scars (Kjellmark 1904, 187ff; Jennbert 1984, 102; Lindgren & Nordqvist 1997, 58). Some Limhamn axes have a pointed butt, which makes it difficult to distinguish them from pointed-butted stone axes from the Early Neolithic (Fig. V.64). Based on their morphological features, some of Limhamn axes could be interpreted as local imitations of jade axes, thus indicating contact with agrarian societies. Archaeological contexts containing Limhamn axes belong to the Late Ertebølle Culture, with dates concentrated from 4600 to 4000 cal BC, which makes them contemporary with the jade axes (Becker 1939, 238; Skaarup 1973, 81ff; Malmros 1975, 107; Pétrequin et al. 2012a) (Fig. V.65 and Table 23). However, one of the differences can be observed in the knapping scars on the sides of the Limhamn axes; the pointed-butted jade or stone axes from the Early Neolithic differ in that they were produced using the knapping and pecking technique, which minimizes the amount of scars on the axes. Furthermore, the polishing of the Early Neolithic stone axes was more pronounced. Moreover, all the axes have been found as stray finds and none have come from hoards, thus indicating that their role in the hunter-gatherer society was of a more functional character.

Perhaps the Limhamn axes that suddenly appeared in South Scandinavia should be interpreted as a local hybrid of the jade axes, resulting from indirect functional rather than symbolic impulses from the Central European farming communities. This hypothesis is supported by the fact that the Limhamn axes represent a new type of axe, which is functionally different, as some of them have been hafted as axes and not adzes. All the previous stone axes in the Mesolithic were adzes and not axes, as their edges were either U-shaped or asymmetrical (Nicolaisen 2003). Adding shafts to axes makes them an ideal tool for cutting down trees and for large-scale logging work, and during the Late Ertebølle culture it can be observed that such axes were used for the building of large dug-out canoes, huts and stationary fish structures (Christensen 1990, 119ff; Pedersen 1997; Grøn 2003; Price & Gebauer 2005, 84ff; S. H. Andersen 2009). A study of the Danish Limhamn axes indicates that the majority of them (75%) have symmetrical to slightly asymmetrical edges, and could have been shafted as axes. The remaining 25% have a U-shaped edge, and thus were shafted as adzes (Nicolaisen 2003; 2009, 854) (Fig. V.66). At present, only one shafted Limhamn axe with a symmetrical edge has been found, at Bålkåkra in Scania (Montelius 1917, 16) (Fig. V.67). In this case the Limhamn axe had been inserted as an axe into a piece of red deer antler. The antler has been ^{14}C dated to 5276±38 BP (4240-3980 cal BC, Ua-44079), and thus belongs to the latest part of the Ertebølle culture (Plate 5). It is possible that a new hafting method may have emerged locally, as some pecked axes from Central Sweden do show symmetrical edges (Lindgren & Nordqvist 1997; Hallgren 2008). However, in Denmark and Scania most pecked axes have either U-shaped or asymmetrical edges (Nicolaisen 2003). The innovation of the hafted axe could also have originated

Fig. V. 64. Limhamn axe with a pointed butt from the Ertebølle site of Vejlebro in North Zealand. Fokemuseet in Hillerød (FHM 3362).

from Central Europe, where the axes of Dechseln type from the Rössen Culture (5500-4400 cal BC) may be amongst the possibilities (Klassen 2004, 57ff). A few axes of this type have been found on Zealand (Henriksholm-Bøgebakken) and in Scania (Bökeberg III and Skateholm II / grave 2) (Larsson 1988; Karsten 2001). Dechseln axes are often D-shaped in cross section, which is similar to some of Limhamn axes. Furthermore, the edges of the Dechseln axes are both symmetrical and U-shaped, thus suggesting that they may have been hafted as both axes and adzes, like the Limhamn axes. Another explanation of the hafting method may be associated with the jade axes, as they all have symmetrical edges. Moreover, they have been depicted as hafted axes in rock carvings in several burials from northern France, which have been dated to 4900-4700 cal BC (Bailoud et al. 1995). The spreading of a particular technology, which in this case is the hafted axe, may have taken place very quickly in prehistoric times, which could have resulted in the appearance of the Limhamn axe in southern Scandinavia. There are several other examples from the Mesolithic period, which show that new types of arrowheads, along with new hafting methods, could have spread throughout Europe over a few hundred years (Kozłowski 2009). Such expansions of new technological trends, however, did not necessarily also result in the spread of new ideological trends that changed whole societies.

There was systematic production of Limhamn axes concentrated around the quarry sites of Kullens Fyr, Sjöholmen and Jonstorp in Scania. However, local production also occurred, as preforms of Limhamn axes have been reported from Hammeren on Bornholm, Sølager, Nivågård, Ordrup Næs, Birgittehøj, Torpe and Maglelyng on Zealand (Madsen et al. 1900; Nordman 1918; Nicolaisen 2003, 30f) (Fig. V.68). Up until now, about 400 Limhamn adzes and axes have been found in Denmark, and a recent excavation at Lollikhuse produced 40 Limhamn axes and adzes, thus representing 10% of the all known Limhamn axes and adzes in Denmark. However, at Lollikhuse no flakes of diabase or basalt were found, despite the large number of Limhamn axes, whereas many flakes were recovered from the production centres for Limhamn axes at the sites in Scania. It is therefore possible that some small-scale exchange patterns could have emerged between neighbouring hunter-gatherers on Zealand and in Scania at the time of the Ertebølle culture, which may have laid the foundations for the large-scale exchanges of flint axes during the Early Neolithic (Lidén 1938; Althin 1954; Sørensen 2007; Sørensen 2012a). But during the Late Ertebølle culture most axe production was local, and some of the characteristic types were core axes with specialized edges and Oringe axes.

9.4. Core axes with specialized edges and Oringe axes

Core axes with specialized edges were previously interpreted as the predecessors of pointed-butted flint axes (Åberg 1912, 29). The interpretation is supported by the shape of the preforms, where both types have a two-sided cross section. But core axes with specialized edges often display cortex on the broader sides/body and a U-shaped edge, thus proving that they were shafted as adzes, whereas the pointed-butted axes were axes (Vang Petersen 1993; Stafford 1999) (Fig. V.69). Generally, the two axe types show identical measurements in terms of length and thickness, which has caused some identification problems, as discussed in section 6.8 (Fig. V.70).

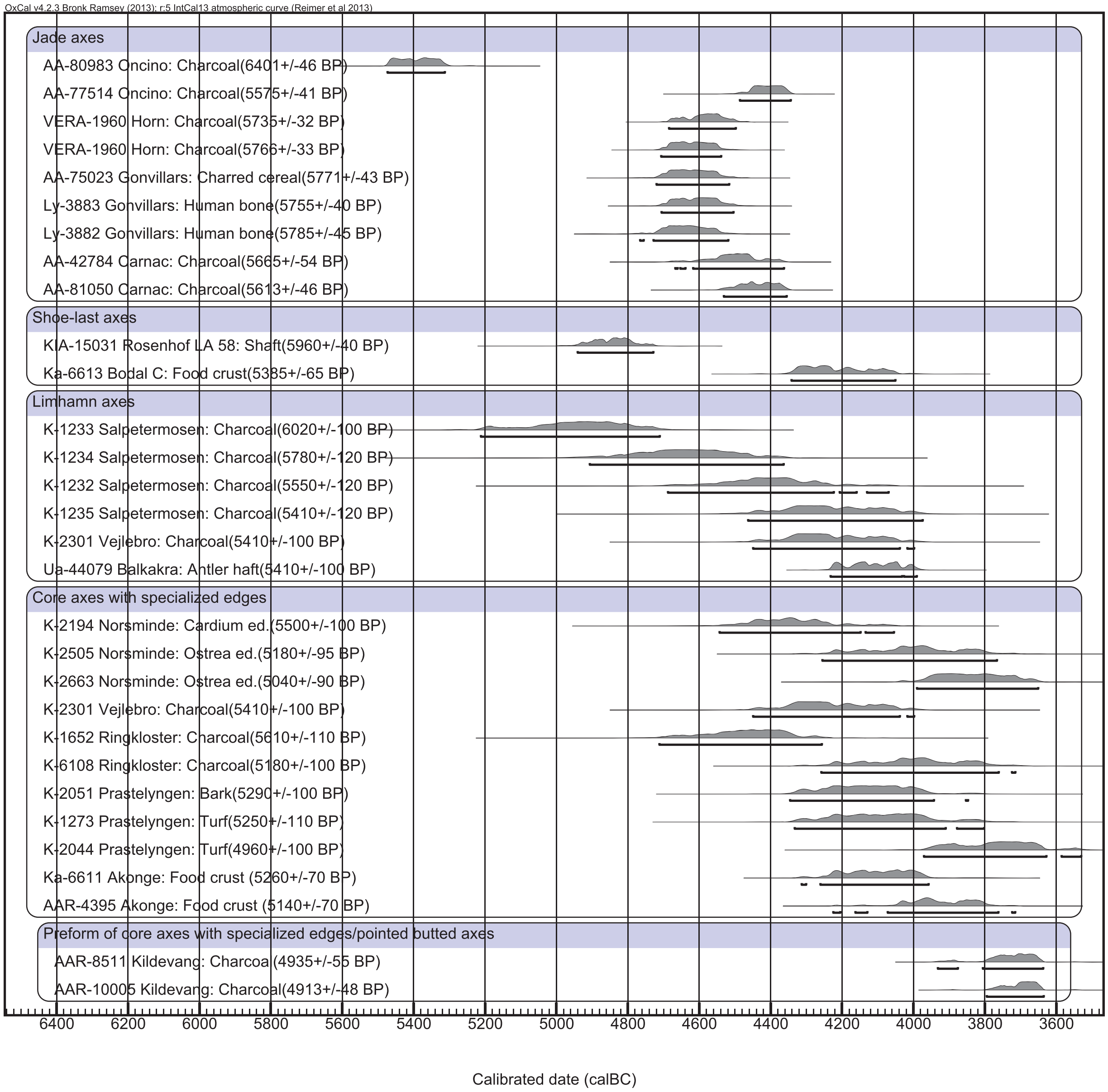

Fig. V. 65. [14]C dates of contexts containing jade axes, shoe-last axes, Limhamn axes, core axes with specialized edges and preforms of either core axes or pointed-butted axes. After Troels-Smith 1957; Salomonsson 1970; Tauber 1971; Malmros 1975; Andersen 1991; Kristensen 1991; 2000; Andersen & Johansen 1992; Liversage 1992; Nilsson 1996; Koch 1998; Rasmussen 1998; Stafford 1999; Nielsen 2000; Andreasen 2002; Fischer 2002; Hartz 2004, 67; Hartz & Lübke 2004; Lübke & Terberger 2004; Hallgren 2008; Hirsch et al. 2008; Skousen 2008; Lübke et al. 2009; Rudebeck 2010; Mischka 2011a; Pétrequin et al. 2012c, 633; Ravn 2012; Beck 2013; Esben Aasleff pers. comm. Data after Table 23.

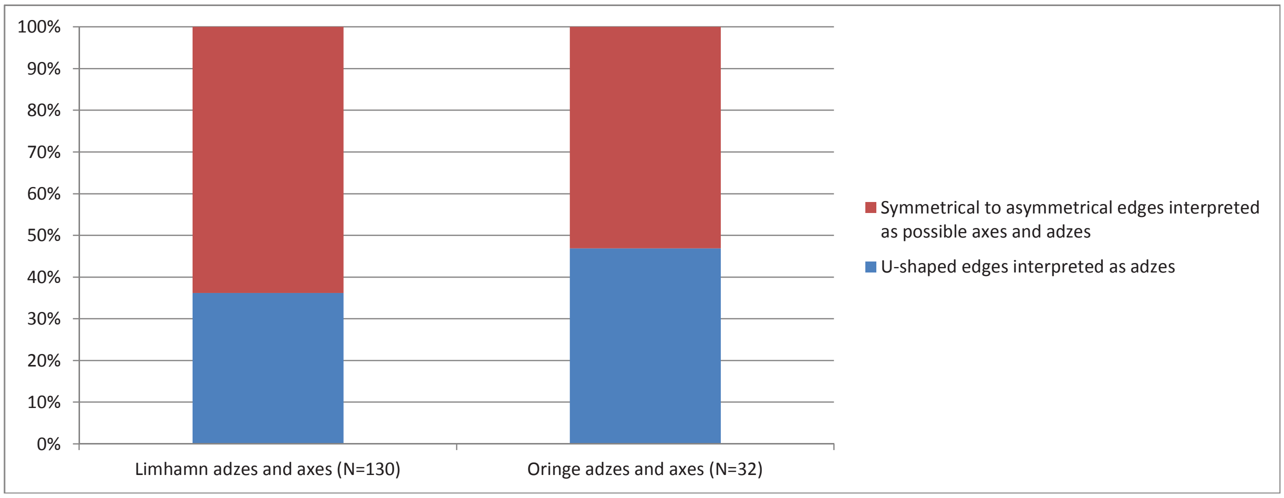

Fig. V. 66. Limhamn and Oringe axes or adzes which contain a symmetrical/asymmetrical edge (interpreted as axes) or an U-shaped edge (interpreted as adzes). After Madsen et al. 1900; Nordman 1918; Mathiassen 1943; Vang Petersen 1979; Andersen 1983; Nicolaisen 2003; Sørensen 2007. Data after Table 53.

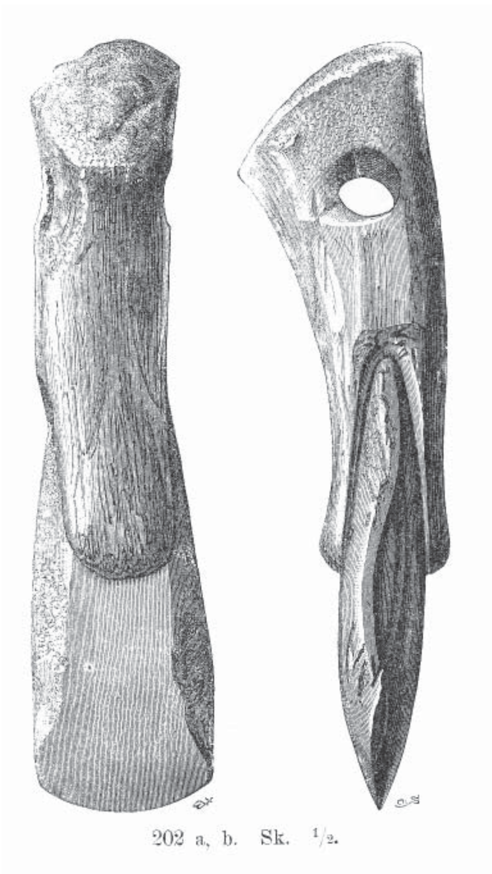

Fig. V. 67. Shafted Limhamn axe from Bålkåkra, Scania. After Montelius 1917, 16.

However, measurements of the edges indicate that the pointed-butted axes have an average edge width of between five and seven cm, whilst core axes with specialized edges have an edge width of between four and five cm (Fig. V.71 and Table 55). The differences in the width and shape of the edges have in the later production stages resulted in the use of different knapping approaches. The aim in the production of pointed-butted axes was to create a triangular or teardrop- shaped preform with a symmetrical cross section, while a more pointed oval shape with a rhombic cross section was made when knapping a core axe with specialized edges. The core axe with specialized edges has been interpreted as an important type in the Late Ertebølle culture, as it is commonly found in layers that have been ^{14}C dated between 4500 and 4000 cal BC (Brinch Petersen 1971; S. H. Andersen 1991; 1993; 1998a; Andersen & Johansen 1987; Malmros 1975; Andreasen 2002) (Fig. V.65 and Table 54).

Core axes are almost exclusively found at coastal or lake shore Ertebølle sites. However, recently the type has also been recovered from some potentially Early Neolithic contexts at sites like Åkonge in Åmosen and Helenelyst near Brabrand (Fischer 2002; Skriver 2003). But it is difficult to separate the Ertebølle and Early Funnel Beaker layers from one another at these settlements. Nevertheless, at the site of Kildevang near Aarhus several core axes with specialized edges have been found in pits that also contained Volling ceramics, thus placing the type within the late EN I (Ravn 2012) (Fig. V.72).

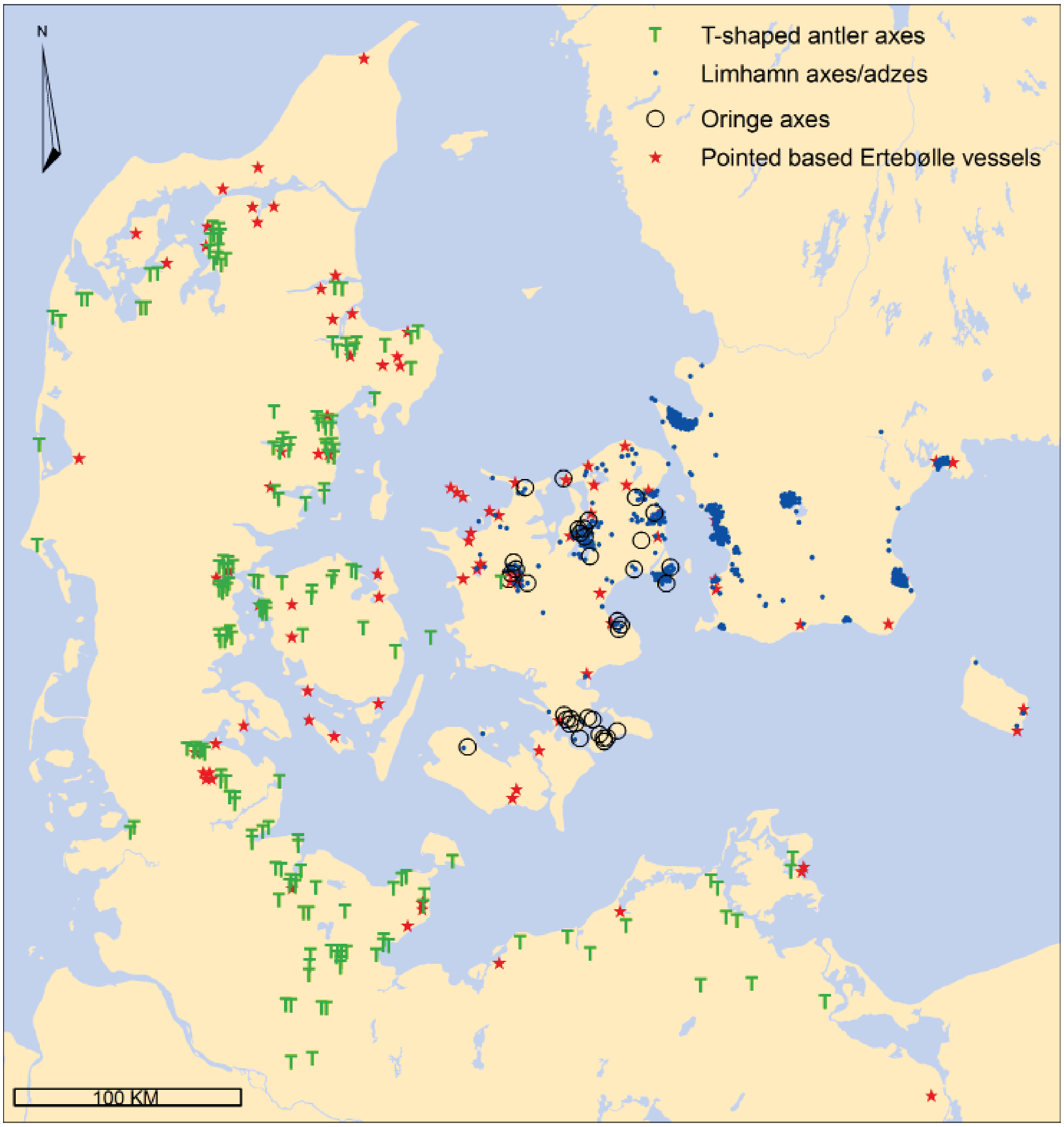

Fig. V. 68. Distribution of T-shaped antler axes, Limhamn axes and adzes, Oringe axes and pointed based Ertebølle vessels in southern Scandinavia. After Vang Petersen 1979; 1984; Andersen 1998a; Nicolaisen 2009; Sönke Hartz pers. comm..

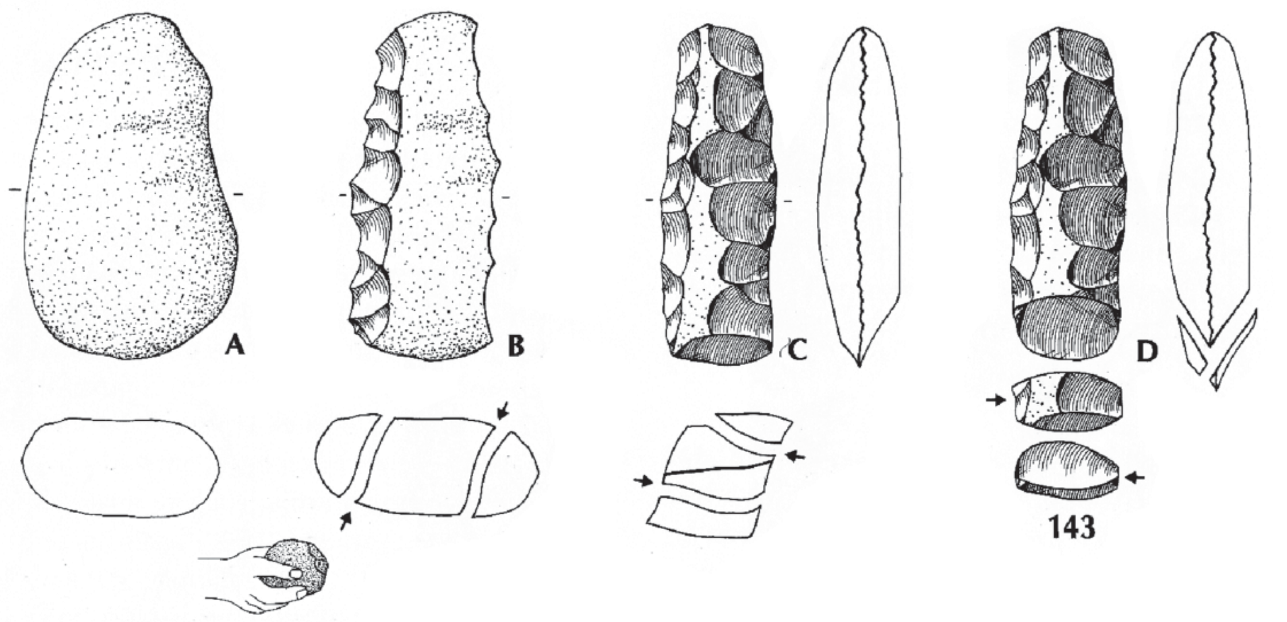

Fig. V. 69. Different stages in producing a core axe with specialized edges. A) Procurement of an oval shaped nodule. B) Bifacial knapping along the side of the nodule. C) Knapping of the broader sides of the preform in order to make it thinner and to make an edge. D) Resharpening the axe by knapping a rejuvenation flake, thus making the edge sharper. After Vang Petersen 1993. Drawing, Lykke Johansen.

The continuous use of the core axes with specialized edges may therefore demonstrate a more gradual adoption of technologies and ideas from agrarian societies in certain regions. Unfortunately, it is difficult to separate these presumed core axes with specialized edges from preforms of pointed-butted axes (Salomonsen 1970, 64; Sørensen 2012a). These problems of identification may be the reason why some researchers support the theory of the continued use of the core axes with specialized edges into the Early Neolithic. Furthermore, core axes with specialized edges have not been found in Early Funnel Beaker layers at any of the kitchen midden sites of North Jutland, thus refuting the argument for their presence in the Early Neolithic period in South Scandinavia. In addition, core axes with specialized edges are not present in hoards and the majority of the axes show signs of use, thus indicating that they belong to a Mesolithic tradition (Fig. V.73). Pointed-butted axes have, on the other hand, been found in hoards, in which at least 50% of them are unused, thus indicating that these axes also had a symbolic importance in the agrarian societies, just like the short-necked funnel beakers, as discussed in section 8.6. However, it is clear that the core axes with specialized edges display evidence of new trends from the agrarian societies, as some of them have been polished (Johansson 1999, 26) (Fig. V.74). The distribution of the polished core axes with specialized edges covers most of South Scandinavia, and they also have been found in Central Sweden, thus indicating that the indigenous hunter-gatherer populations also played an important role in spreading new ideas in the transition from the Mesolithic to the Neolithic period (Fig. V.75).

Unfortunately, all the polished core axes with specialized edges are stray finds, which makes it impossible to investigate when the polishing of these flint axes took place. But the dense concentration of polished core axes with specialized edges in South Zealand at the site of Oringe may indicate that this phenomenon occurred right at the transition between the Late Ertebølle and Early Funnel Beaker cultures. In the same region several pointed-butted stone axes with symmetrical edges of the Oringe type have been found as stray finds at the Late Ertebølle sites at Klintsø, Oringe, Sølager and Maglelyng (Nicolaisen 2003) (Fig. V.76). The Oringe axes may represent some of the earliest local imitations of jade axes, thus indicating that Lolland, Falster and South Zealand could be one of the regions where the Neolithisation process began in South Scandinavia. The hypothesis is further supported by the earliest axe hoard found at Udstolpe on Lolland,

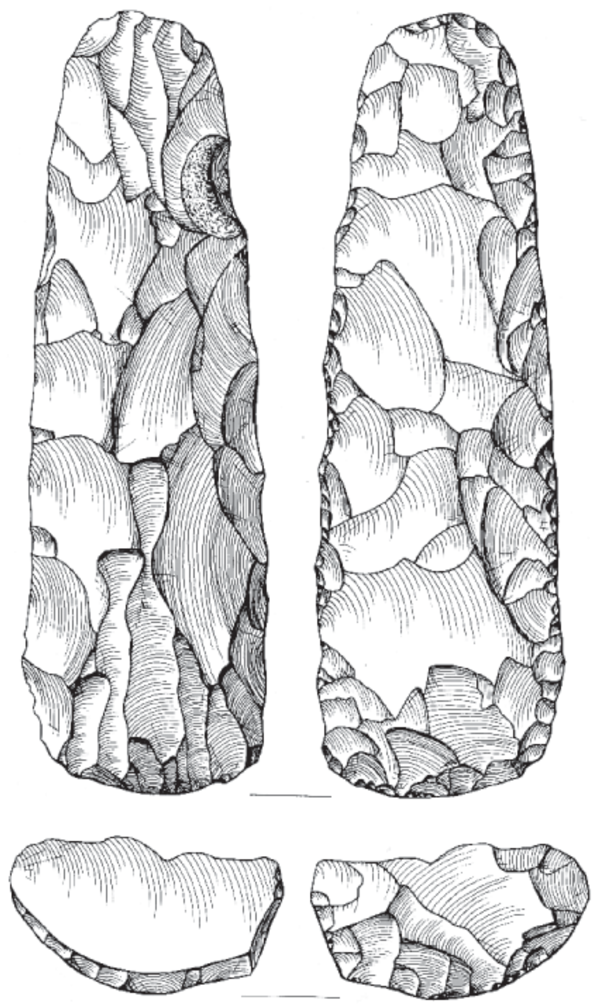

Fig. V. 70. Core axe with specialized edges. After Vang Petersen 1993. Drawing, Lykke Johansen.

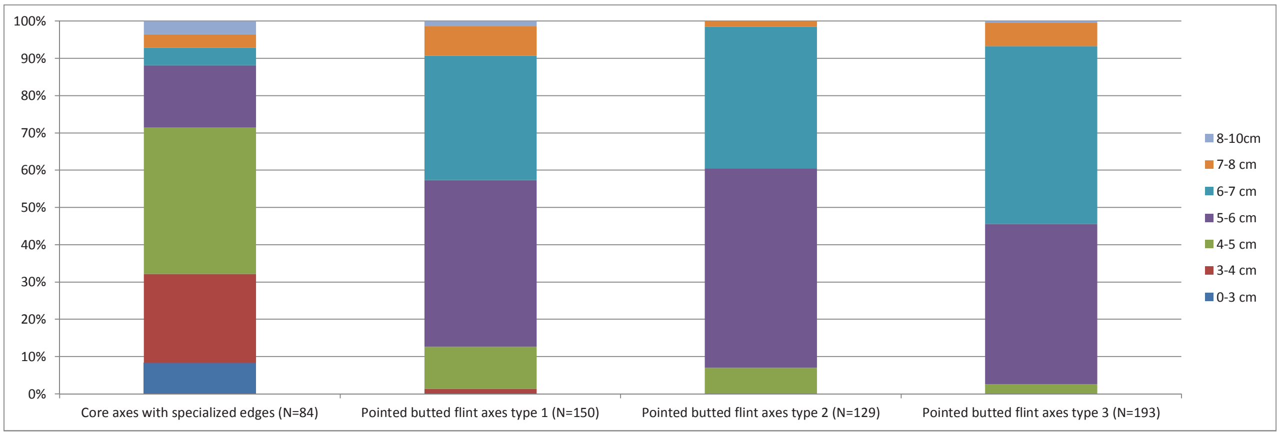

Fig. V. 71. Comparisons of the edge width between core axes with specialized edges and pointed-butted flint axes. Data after Tables Tables 54, 55 and 59.

Fig. V. 72. A preform of a pointed-butted axe, which have been interpreted as a core axe with specialized edges from Kildevang (FHM 4092, x1122) in Jutland. After Ravn 2004.

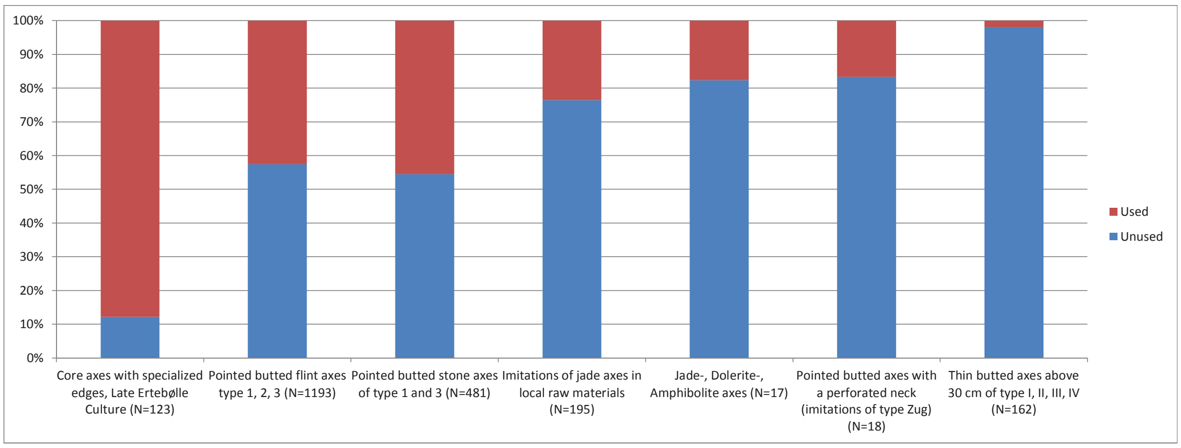

Fig. V. 73. Comparisons of used and unused core axes with specialized edges, pointed-butted flint axes, jade axes and thin-butted flint axes. Data after Tables 54, 55, 56, 59 and 60.

Fig. V. 74. Polished core axes with specialized edges from Oringe, South Zealand based on data from Tables 54 and 55.

as discussed in section 9.1 (Lomborg 1962; Nicolaisen 2003, Klassen 2004).

9.5. Towards a unified material culture and the emergence of larger networks

The foreign shoe-last axes and local imitations, such as the Oringe axes, indicate that there was either direct or indirect contact between Ertebølle hunters and gatherers and Central European agrarian societies. However, the impulses were sporadic and different from region to region, which, according to the primary evidence of agriculture, did not lead to the emergence of an agrarian society during the Late Ertebølle culture. Instead, several regional differences within the material culture emerged during the Late Ertebølle culture: T-shaped antler axes, bone rings and bone combs are concentrated in Jutland and Schleswig-Holstein, whereas Limhamn greenstone axes and curved harpoons are found on Zealand and in Scania. Smaller regional groups on Zealand have also been suggested, based on differences within the flake axe assemblages (Vang Petersen 1984). The differences between Jutland, Zealand and Scania are clearly connected to the fact that these regions are separated by large straits of water, with the Great Belt (Storebælt) and the Sound (Øresund) serving as natural borders in prehistoric times. The fact that Zealand became an island during the continuous Boreal and Atlantic transgressions created differences in the faunal assemblages, which explains the lack of bone rings made of aurochs scapulae and T-shaped antler axes on Zealand. The aurochs became extinct after the Boreal phase and the red deer became so reduced in size that their antlers were unsuitable for making antler axes on Zealand, which could explain the emergence of Limhamn axes in this region. The lack of stone axes from the Late Ertebølle culture in Jutland may be explained by the presence of the T-shaped axes, which were used for working wood (Jensen 1991) (Fig. V.77). In general, the T-shaped antler axes, bone combs, hour shaped buttons of oyster shell (dobbleknöpfe) and the bone rings from Jutland clearly reflect continental impulses, thus show-

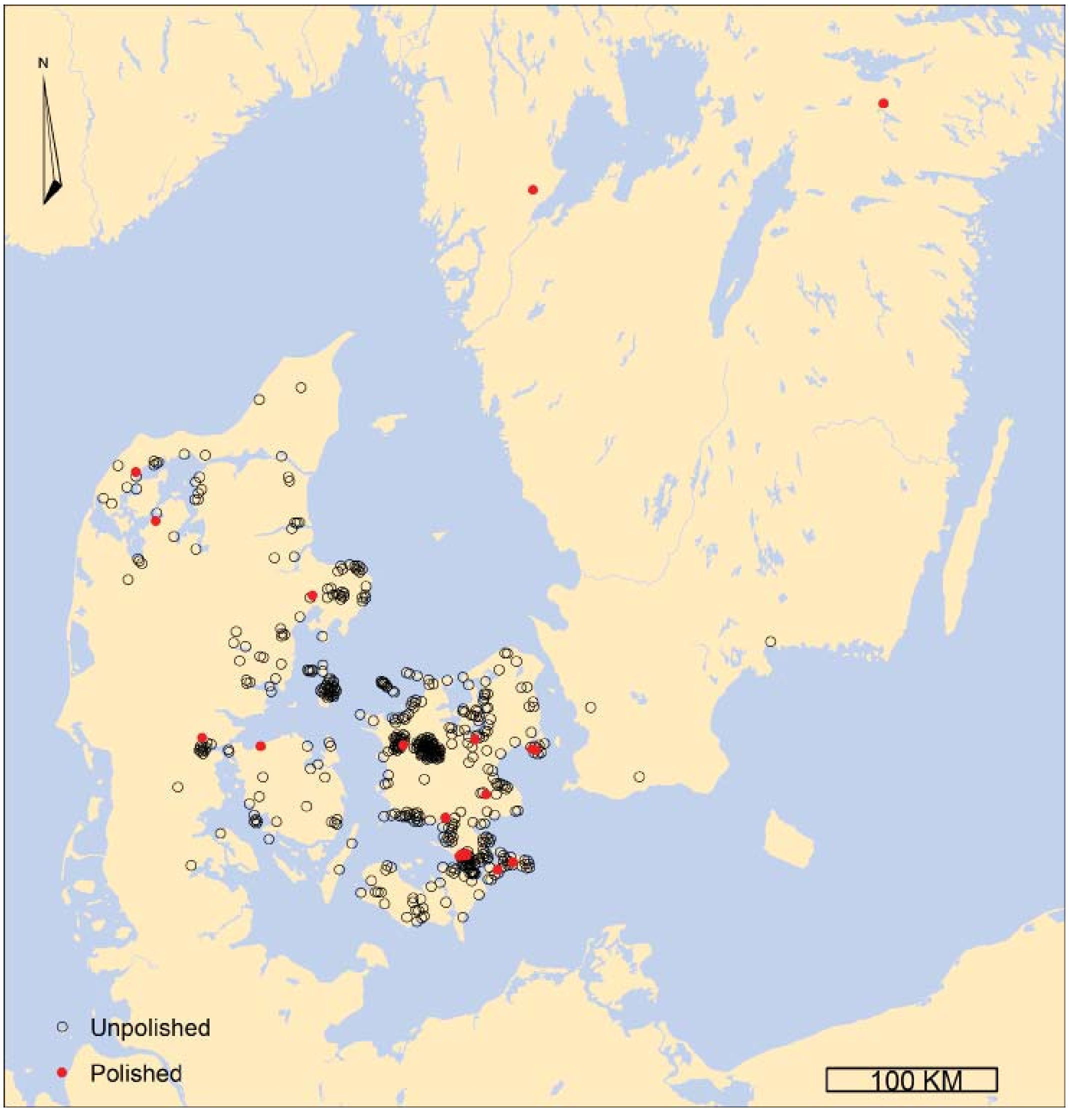

Fig. V. 75. Distribution of core axes with specialized edges in South Scandinavia based on data from Tables 54 and 55.

ing that the hunter-gatherers of the Ertebølle culture were either directly or indirectly linked to agrarian societies in Central Europe (Vang Petersen 1984; Andersen 2008b; Heumüller 2012). Some of these impulses could have originated from scouting expeditions, whilst others may have resulted from more indirect relations with agrarian societies.

The fact that there are regional differences in the distribution of certain artefacts indicates that the Ertebølle hunter-gatherers probably consisted of several small groups, which were interconnected with one another. However, these regional differences within the Ertebølle culture disappeared quite quickly and were replaced by a more unified material culture associated with the Funnel Beaker culture from around 4000 cal BC, which covered all regions of South Scandinavia, as already documented by the appearance of the short-necked funnel beakers in section 8.7. The distribution patterns of the typical Ertebølle objects also shows that habitation was concentrated in the coastal and lake shore areas (Fig. V.68). However, this settlement pattern was expanded during the Early Funnel Beaker culture, with a new type of inland-orien-

Fig. V. 76. Oringe axes from Oringe (A9636), South Zealand. Photo. The National Museum of Denmark.

tated settlement located on easily worked arable soils, as documented by the distribution of pointed-butted jade, flint and stone axes, which will be discussed in the following sections.

9.6. Jade axes

Southern Scandinavian jade axes have been interpreted as prestigious items of exchange, illustrating contact with the agrarian societies of Central Europe and reflecting agrarian ideas and ideology (Klassen 2004; 2014a; Klassen et al. 2012; Pétrequin et al. 2012a). Many of the jade axes that reached South Scandinavia could potentially have had a long circulation period of up to several hundred years, as many of the types have a wide chronology covering a timespan from the first half of the 5th millennium to the early 4th millennium BC (Fig. V.78). Despite the long circulation period, it seems as if the carriers of these axes had the power to penetrate important cultural and linguistic barriers. The jade axes have been interpreted as sacred objects and mediators of powerful myths, thus contributing to the spread of new rituals, ideas and knowledge, as well as the creation of networks (Fig. V.80). They are therefore important in the discussion concerning the process of Neolithisation in Northern Europe. However, the difficulties in differentiating between Neolithic axes of alpine jade and axes imported from other continents has attracted some attention, as discussed in section 6.8. Furthermore, some of the jade axes found in South Scandinavian collections originate from private collectors, many of whom had contacts all over Europe. The jade axes therefore lack secure archaeological contexts and may not have been found in Scandinavia (Sørensen 2013a) (Table 56). For many years it was believed that Danish jade axes came from former European colonies and this is one of the main reasons why some jade axes are found in ethnographic collections. At least one jade axe (ODIg 53; Klassen 2004, 88) was 'rediscovered' in the ethnographic collection of the National Museum of Denmark. It was believed to have originated from one of the Caribbean islands (Randsborg 2001). Another axe from Lolland or Falster (LFS3527; Klassen 2004, 88) was thought to have originated from Asia (Plate 6). The

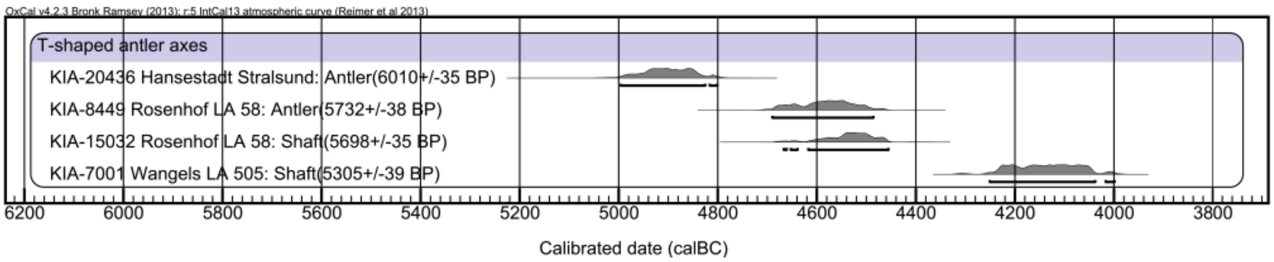

Fig. V. 77. [14]C dates of T-shaped antler axes. After Hartz & Lübke 2004; Hartz 2004; Lübke & Terberger 2004.

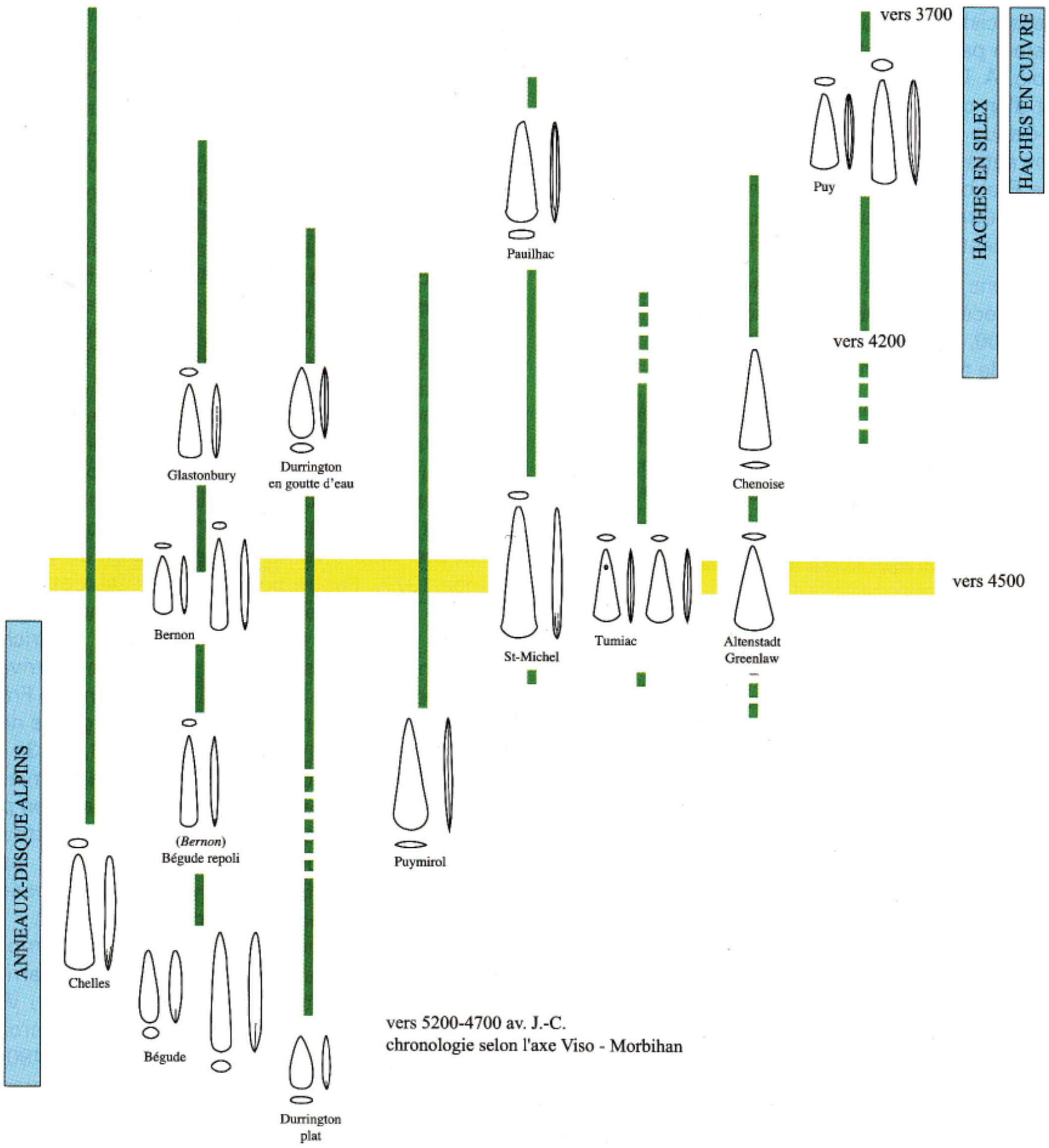

Fig. V. 78. Chronology of the different types of jade axes. After Pétrequin et al. 2012c, 627.

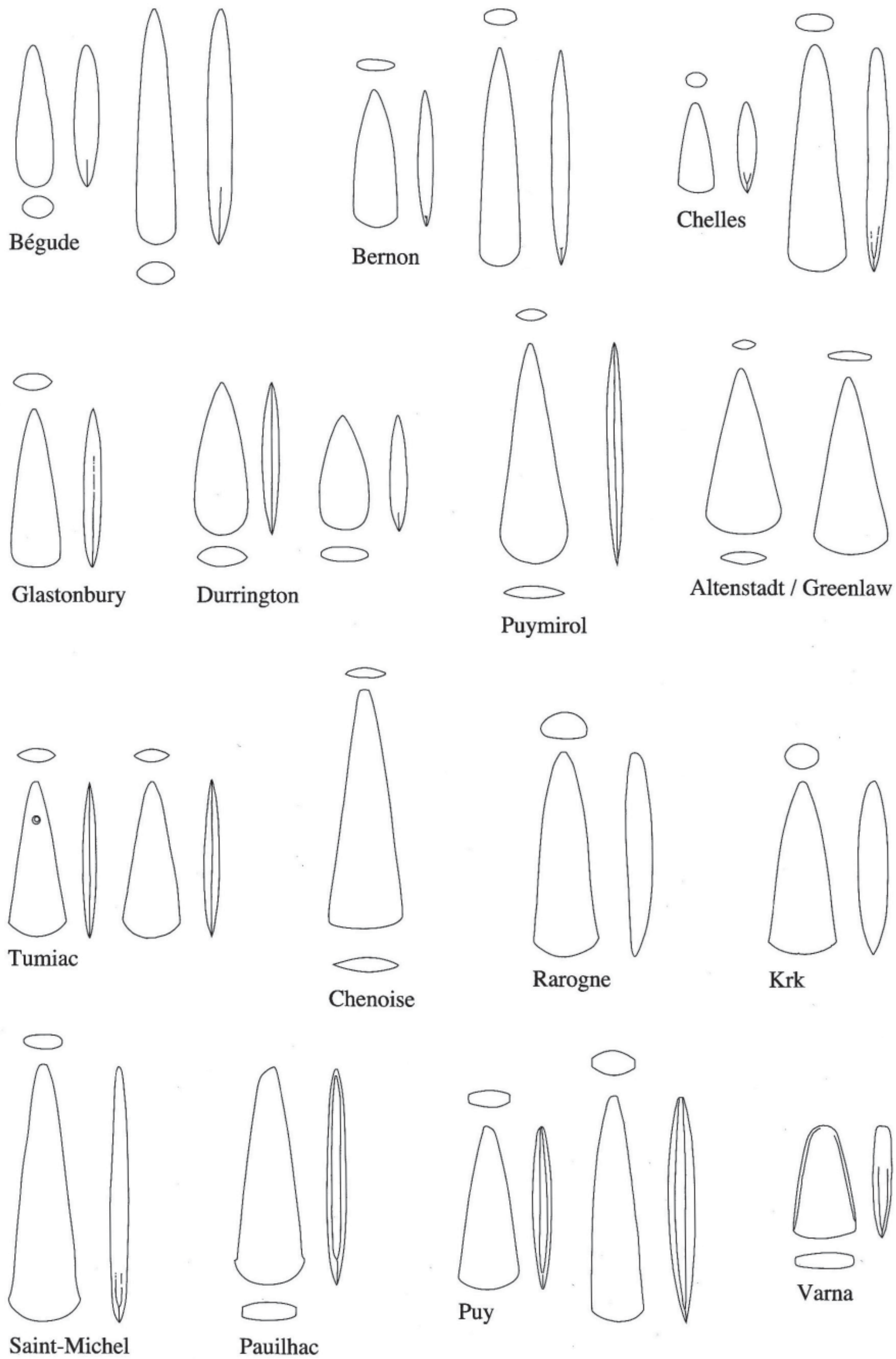

Fig. V. 79. Various types of jade axes. After Pétrequin et al. 2012c, 596.

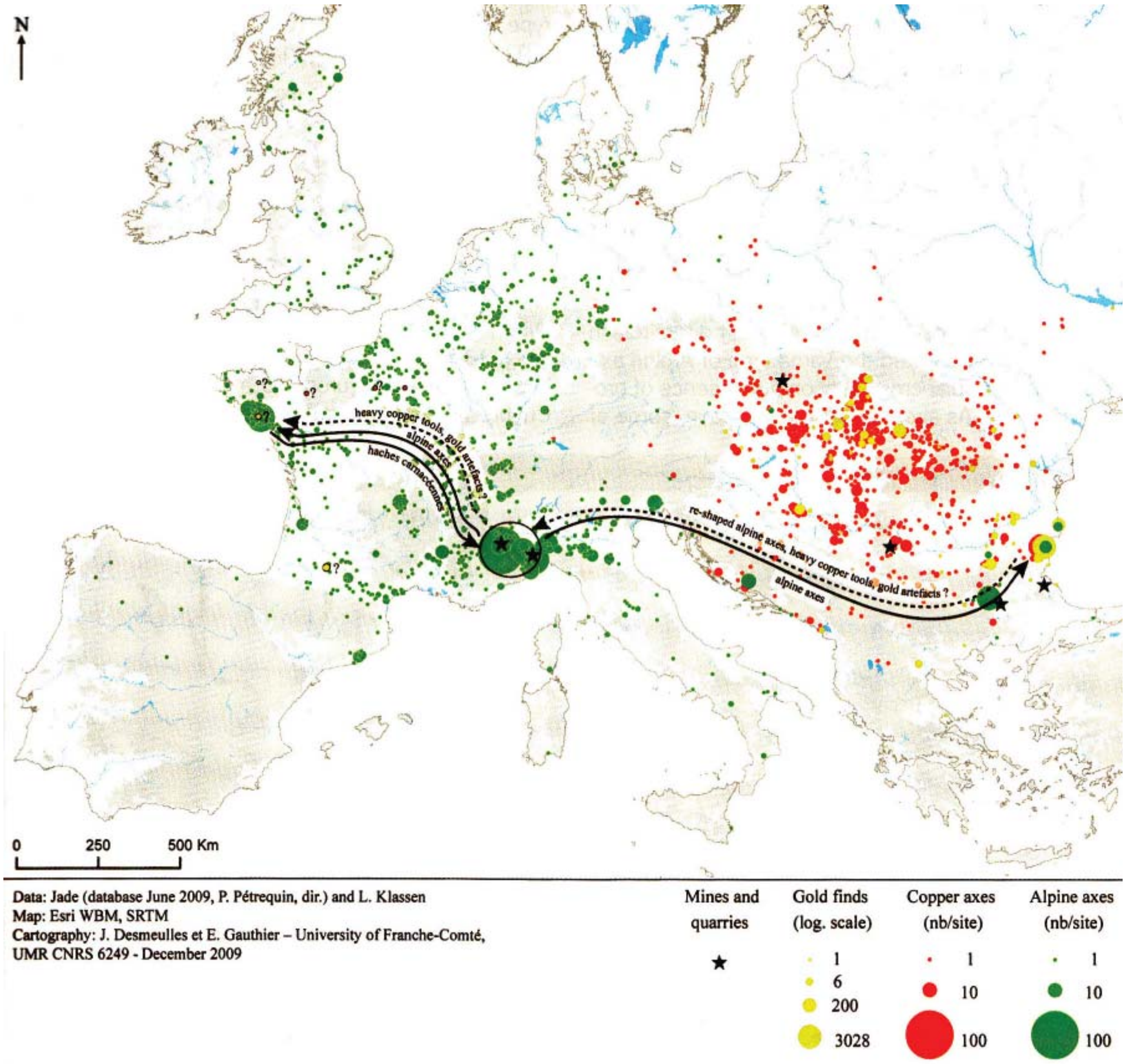

Fig. V. 80. Distribution of jade axes and copper objects from the 5th and early 4th millennium BC. After Klassen et al. 2012, 1301.

'ethnographic' interpretation of these axes was due to the fact that jade quarries were not known of in Europe until Pierre and Anne-Marie Pétrequin identified jadeite quarries in the Italian Alps and the northern Apennines (Pétrequin et al. 2012a). Based on petrographic studies, it was concluded that the two above-mentioned jade axes from Denmark (ODIg 53 and LFS3527) were made of jadeite procured at Mount Beigua. Another two axes from Denmark (OBM A258; Klassen 2004, 84f) were made of jade from Mount Viso (D'Amico 2012, 439). The European jade project also suggested a typological classification of the jade axes, based on axes found in dated contexts. The dominant jade axe in southern Scandinavia belongs to the Durrington type, which is almond shaped, with a pointed oval cross section (Fig. V.79). According to Klassen's *Jade und Kupfer* publication from 2004, a total of 13 jade axes are accepted as having been imported to southern Scandinavia during the Stone Age (Fig. V.81). Three of the 13 jade axes are from private collections and lack any information about their origin. They can be regarded as stray finds without a secure context. These three axes (Klassen 2004, 427: finds list 9. Nos. 3, 4, 9) could have been exchanged and traded by antique dealers, who had contacts all over Europe

Fig. V. 81. Axes of Alpine jade from South Scandinavia. 1, 2. Zealand, unknown find location, 3. Højgård, Tulstrup parish, eastern Jutland, 4. Danmark, unknown find location, 5. Lolland-Falster, unknown find location, 6. South Funen, unknown find location, 7. possibly south-western Scania, unknown find location. 1, 2, 6, 7 are jadeitite; 3 and 6 are eclogite; 4 is amphibolite. 1. Belongs to type Chelles. 2 and 6 is associated with type Puy. 3, 4, 5 and 7 belong to type Durrington. Photo. Louise Hilmar, Moesgård Museum. Aarhus University. After Klassen 2013, 87.

during the 19th and 20th centuries. The context of these axes within southern Scandinavia remains an open question. However, it was possible to determine a parish or region for the remaining ten axes (Klassen 2004, 427: finds list 9. Nos. 1, 2, 5, 6, 7, 8, 10, 11, 12 and 13). The main problem with all jade axes is that it is difficult to visually distinguish between Neolithic axes of alpine jadeite and imported ethnographic axes from, for instance, the Caribbean islands, as discussed in section 6.8. However, the many imitations of jade axes produced in local raw materials clearly indicate that the ideas behind these axes were so powerful, that they may reflect the advent of agrarian ideas and ideology during the Mesolithic and Neolithic transition in South Scandinavia (Fig. V.82). Imitations of jade axes have not only been found in South Scandinavia, but also in the British Isles (Sheridan 2010; Sheridan & Pailler 2012, 1046ff), as well as at several causewayed enclosures and sites of the Michelsberg Culture in Germany (Brandt 1967; Anding 1968; Lüning 1968; Rehbein 1970; Wilhelmi 1971; Raddatz 1972; Boeliche 1978; Willms 1982; Simon 1989; Wallbrecht 2000).

Jade axes reached southern Scandinavia during the Early Neolithic (4000-3500 cal BC), which is supported by imitations found in ^{14}C-dated contexts, thus making their introduction synchronic with the introduction of agriculture (Fig. V.83 and Table 57). A pointed-butted flint axe imitating a jade axe of the Durrington type was found at Lisbjerg Skole in pit A2247, together with Oxie ceramics and threshing waste from cereals, which was dated to the early EN I (Skousen 2008, 131). Other local imitations of jade axes from South Scandinavia include the Durrington, Chelles, Bègude, Bernon, Saint Michel, Rarogne, Altenstadt and Chenoise types, which were made in local raw materials, such as flint, diabase, basalt, porphyry and slate (Fig. V.84). The typological classification can of course be debated, but some of the imitations of jade axes with splayed edges (Saint-Michel and Rarogne) clearly suggest imitations of specific jade

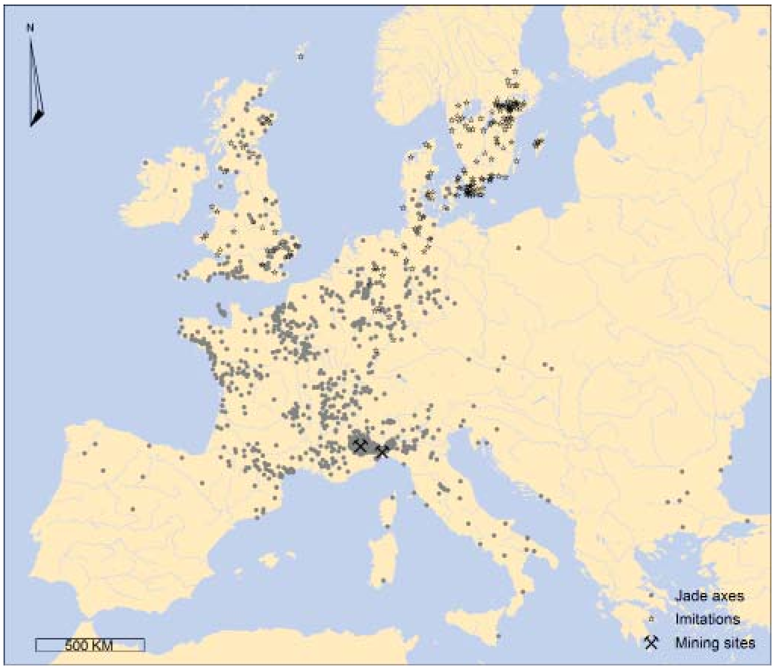

Fig. V. 82. Distribution of jade axes and their imitations in Northern Europe. After Kersten & La Baume 1958; Ahrens 1966; Brandt 1967, 84ff; Anding 1968, 117ff; Lüning 1968, 74; Rehbein 1970, 238ff; Wilhelmi 1971, 33; Raddatz 1972, 1ff; Boelicke 1978, 111; Willms 1982, 38; Simon 1989, 130; Wallbrecht 2000, 92; Pétrequin et al. 2012c, 584; Klassen et al. 2012; Sheridan & Pailler 2012, 1046ff.

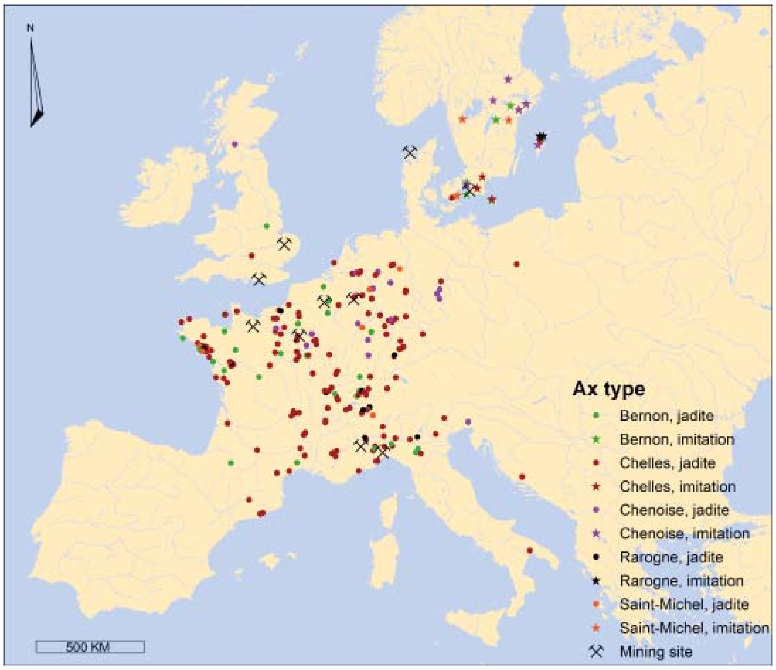

Fig. V. 83. Distribution of jade axes, jadeite quarries and imitations of jade axes made in local raw materials such as flint, slate, diabase or porphyry. After Klassen et al. 2012, 1301; Pétrequin et al. 2012c, 584; Sheridan & Pailler 2012, 1048.

axes found in Central Europe. Furthermore, the imitations of Chenoise jade axes show a connection with the Michelsberg culture, which may have been the place of origin for the first farmers who came to South Scandinavia, as the individuals who made these imitations must have seen such axes. A hoard from Amalienslund in Scania consisted of a pointed-butted flint axe of type III and a pointed-butted axe of diabase with a perforation in the butt, thus dating the hoard to the late EN I phase. In general, the pointed-butted axes with a perforation in the butt show similarities with the contemporary Zug type, which is concentrated in Switzerland (Pétrequin et al. 2012d, 1029) (Fig. V.85). The axes of the Zug type were often made of serpentine and have been interpreted as regional imitations of the jade axes of the Tumiac type (Klassen 2014a). The Tumiac type has been dated to around the late 5th millennium, whereas the Zug type is believed to date to around 3800 cal BC, which is supported by the hoard from Amalienslund (Fig. V.86). Several stray finds of the type Zug have been found in South Scandinavie as stray finds, thus showing impulses from Switzerland (Klassen 2014a) (Figs. V.87-88 and Table 58). Connections to Switzerland are also shown by a thin adze of a non-local, nephrite material, which was found at Växjö in Småland (Montelius 1917, 12) (Fig. V.89). The thin adze from Växjö is identical in material and shape to an adze of nephrite from Hallwillersee in Switzerland (Pétrequin et al. 2012b, 193). According to Bahnson (1889), nephrite flakes from the production of such adzes have been found at sites located near Maurach in Bodensee and at Forel, near Lake Neuchatel. Petrographic studies are, however, required in order to clarify the exact origin of the nephrite used to make the Växjö adze.

Numerous imitations of jade axes have been found especially in Scania, Gotland, Närke and Södermanland, which are regions where some of the earliest evidence of agrarian practices has been identified (Figs. V.90-93). Such regions could be interpreted as containing small colonies of immigrating pioneering farmers, based on the migration patterns discussed in section 5.5 (Fig. V.94). Furthermore, several pointed-butted flint and greenstone axes from Early Neolithic contexts in southern Scandinavia are unused and some are over 25 cm long (Fig. V.95). Locally-produced axes apparently had a non-utilitarian function similar to the Alpine jade axes. Imitations were not only made in local materials, as some rare examples of copper flat axes, like the ones from Pilegård on Zealand and Vester Bedegadegård on Bornholm, can also be interpreted as copies of jade axes (Klassen 2000; Klassen et al. 2012, 1285) (Fig. V.96). According to Klassen (2004), these axes are made of eastern Alpine Mondsee copper, which was imported to South Scandinavia during the late EN I and EN II phases (Fig. V.97). However, the imitations of jade axes in copper have a wide distribution, covering most of Eastern Europe (Todorova 1981; Zachos 2007; Klassen 2000; Klassen et al. 2012; Turck 2010) (Fig. V.98). It is therefore possible that the pointed-butted copper axes may also have originated from copper mines in Eastern Europe, such as Aibunar, Rudna Glava and Jarmovac (Davies 1937; Chernykh 1978; Jovanović 1980; Pernicka et al. 1993; 1997; Radivojević et al. 2010). The region of Mondsee could, however, have played an important role as a satellite centre in such exchange systems for copper artefacts from the south-east of Eastern Europe (Fig. V.99). The continuous exchanges may later on, during the transition between 5th and 4th millennium, have resulted in the exploitation of copper in the Mondsee region. The fact that jade axes were imitated in copper demonstrates that the ideas behind these axes were widely spread in a large-scale European agrarian network involving a "big men society", concentrated at Morbihan in northern France and at Varna in Bulgaria from the mid-5th to the early 4th millennium BC (Pétrequin et al. 2012a) (Fig. V.80). A direct connection between the Morbihan region and South Scandinavia may be indicated by a stray find of a fibrolite axe, which presumably was found by a local farmer in Hov parish in southern Jutland (Pailler 2012, 1168) (Fig. V.100). However, the exact provenance of this axe is uncertain, as it has been sold to various antique dealers, thus making it difficult to identify the original finder and confirm its provenance. Such a situation is unfortunately typical in relation to many of these very exotic axes. Nevertheless, the distribution pattern of the jade axes in Northern Europe could easily be interpreted as a classic down the line exchange pattern, in which limited interaction between the centres of power and more distant regions would have occurred. However, it is more likely that the distribution of jade axes reflects an exchange pattern between more dominant societies in Europe, in which ideas and knowledge relating to agriculture could spread alongside these axes. The fact that imitations were made of the jade axes suggests that the meaning behind these jade axes was not lost, but maintained and incorporated into the local communities. It can

Fig. V. 84. Pointed-butted axes of diabase, basalt or copper from southern Scandinavia, which have been interpreted as imitations of different jade axe types (Pétrequin et al. 2012c, 596; 2012d, 1029). 1. Imitation of jade axe type St. Michel or Krk (Stockholms Hist. Mus. 6643.1, Lokrume, Gotland), 2. Imitation of jade axe type Chelles (Stockholms Hist. Mus. 11495.287, Aska, Östergötland), 3. Imitation of jade axe type Chenoise (Stockholms Hist. Mus. 13376.5, Tysslinge, Närke), 4. Imitation of jade axe type Durrington (Lunds Hist. Mus. 22999, Västra Karup, Scania), 5. Imitation of jade axe type St. Michel or Rarogne (Stockholms Hist. Mus. 17573.3 V. Husby, Östergötland), 6. Imitation of jade axe type Altenstadt (Lunds Hist. Mus. 24736, Mjällby, Scania), 7. Imitation of jade axe type Durrington (Lunds Hist. Mus. 25174, Mjällby, Scania), 8. Imitation of jade axe type St. Michel (The National Mus. of Denmark, A24306, Varpelev, Stevns, Zealand) and 9. (The National Museum of Denmark, A52087, Vester Bedegadegård, Bornholm).

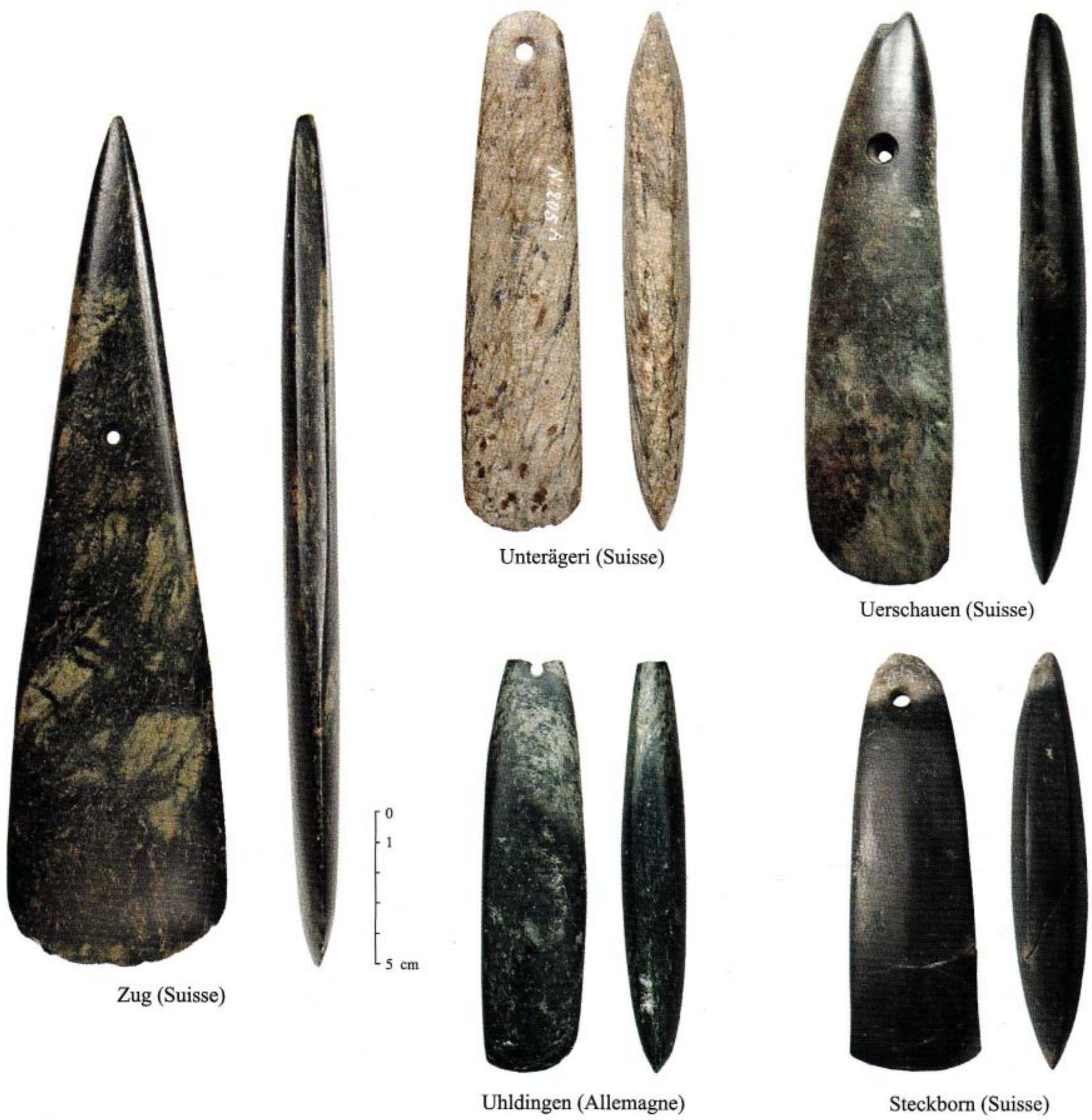

Fig. V. 85. Pointed-butted stone axes of type Zug having a perforation through the butt found in Switzerland. After Pétrequin et al. 2012d, 1015.

Fig. V. 86. Hoad from Amalielunds Gård (Lunds Hist. Mus. LUHM25491) consisting of a pointed-butted flint axe of type 3 (right) and a pointed-butted stone axe of type Zug, which had a perforation through the butt (left).

Fig. V. 87. Pointed-butted axes with a perforation in the butt of diabase or basalt from Denmark and Scania, Sweden, which have been interpreted as imitating type Zug (Pétrequin et al. 2012d, 1029). 1. Højbjerg, Zealand (Odsherred Mus., 2371), 2. Holbæk, Zealand (Holbæk Mus., 3149), 3. Kirkerup, Zealand (The National Mus. of Denmark, A40876), 4. stray find, Scania (Lunds Hist. Mus., 5049), 5. Amalielunds Gård Sövde, Scania. Found together with a pointed-butted flint axe of type 3 (Lunds Hist. Mus., LUHM 25491), 6. Tolstrup, North Jutland (Moesgård Mus., 2694), 7. Attrup (Museum Østjylland, DJM2461x1), 8. Rude Eskilstrup (Nationalmuseet, A39162) and 9. Østrup Holme (Nationalmuseet, A40876).

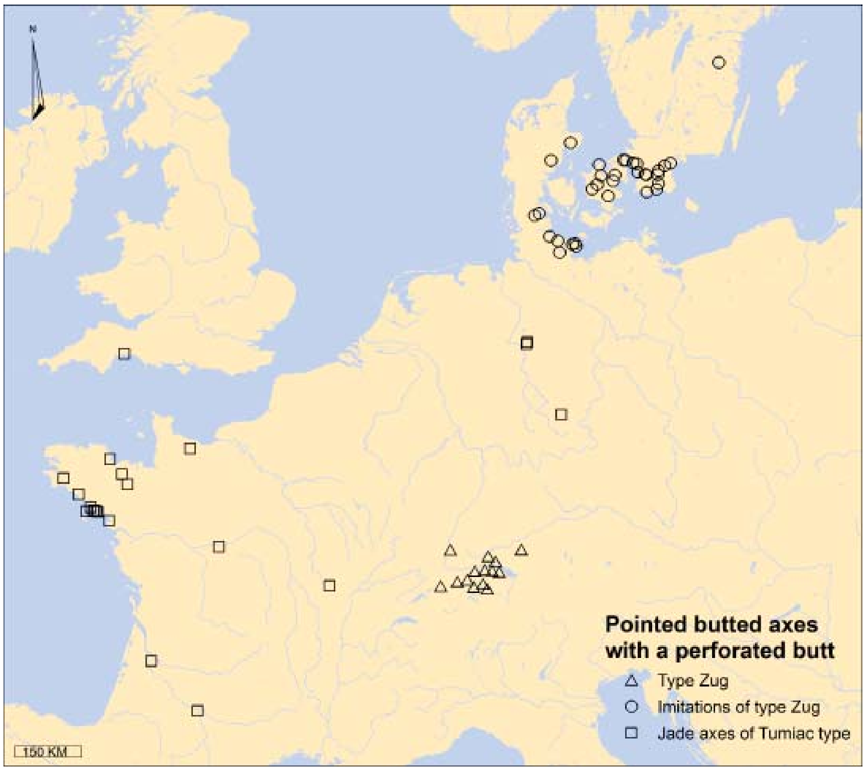

Fig. V. 88. Distribution of pointed-butted stone axes with a perforated butt of the types Tumiac, Zug and imitations of type Zug. After Brandt 1967; Pétrequin et al. 2012d, 1015; Klassen 2014a.

Fig. V. 89. Chissel of nephrite from Växjö in Småland. Stockholms Hist. Museum (SHM 12628). After Montelius 1917, 12, no. 146.

Fig. V. 90. Pointed-butted axes of flint, diabase or basalt from Denmark and Scania, which have been interpreted as imitations of jade axes (Klassen 2004; Skousen 2008; Pétrequin et al. 2012c). 1. Lisbjerg Skole (Moesgård Mus. A2247, Early Neolithic site, Jutland), 2. Gislöv, Scania (Lunds Hist. Mus. 2549), 3. Håstad, Scania (Stockholms Hist. Mus. 2918), 4. Ingelstorp, Scania (Stockholms Hist. Mus. 3414.36), 5. Stray find, Scania (Stockholms Hist. Mus. 7577.319,), 6. stray find, Zealand (The National Mus. of Denmark, A4476), 7. Torna, Scania (Lunds Hist. Mus. 6226), 8. Räng, Scania (Lunds Hist. Mus. 18011), 9. Västra Karup, Scania (Lunds Hist. Mus. 22999), 10. Mjällby, Scania (Lunds Hist. Mus. 24736), 11. Mors, Jutland. Photo. Morslands Mus. MHM 1046-2.

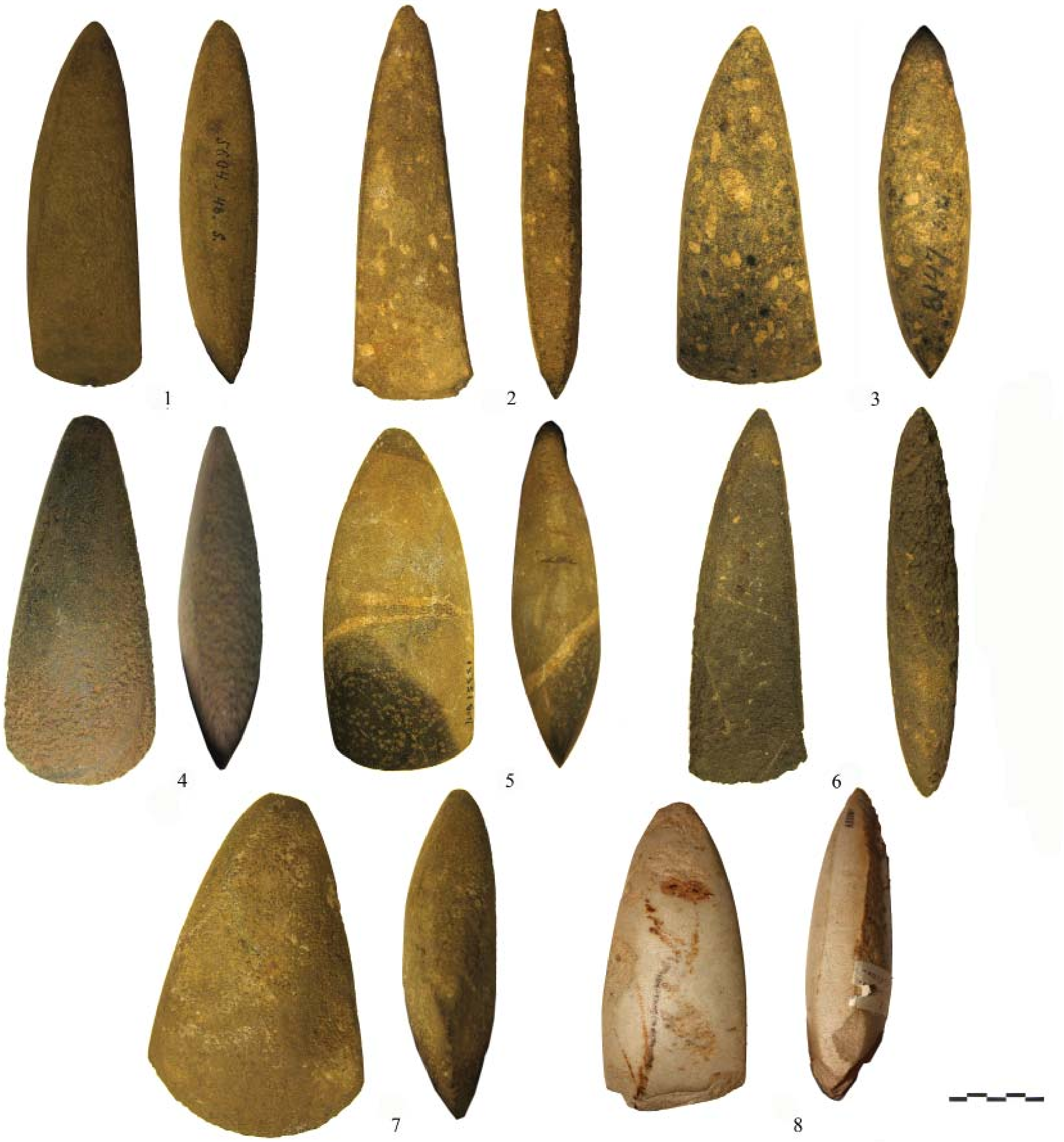

Fig. V. 91. Pointed-butted axes of diabase, basalt, porphyry or quartzite from Gotland, Öland (all from Stockholms Hist. Mus.) and Bornholm (The National Museum of Denmark), which have been interpreted as imitations of jade axes (Pétrequin et al. 2012c). Some of the axes from Gotland is also depicted in Montelius (1917, 10ff). 1. Ekeby, Gotland (Stockholms Hist. Mus. 5604.48), 2. Lokrume, Gotland (Stockholms Hist. Mus. 6643.1), 3. Stenkyrka, Gotland (Stockholms Hist. Mus. 8147), 4. Gårdløsa, Öland (Stockholms Hist. Mus. 12326.2), 5. Roma, Gotland (Stockholms Hist. Mus. 12351), 6. Tingstäde, Gotland (Stockholms Hist. Mus. 14778), 7. Eskelhem, Gotland (Stockholms Hist. Mus. 16486), 8. Åker, Bornholm (The National Mus. of Denmark A53361).

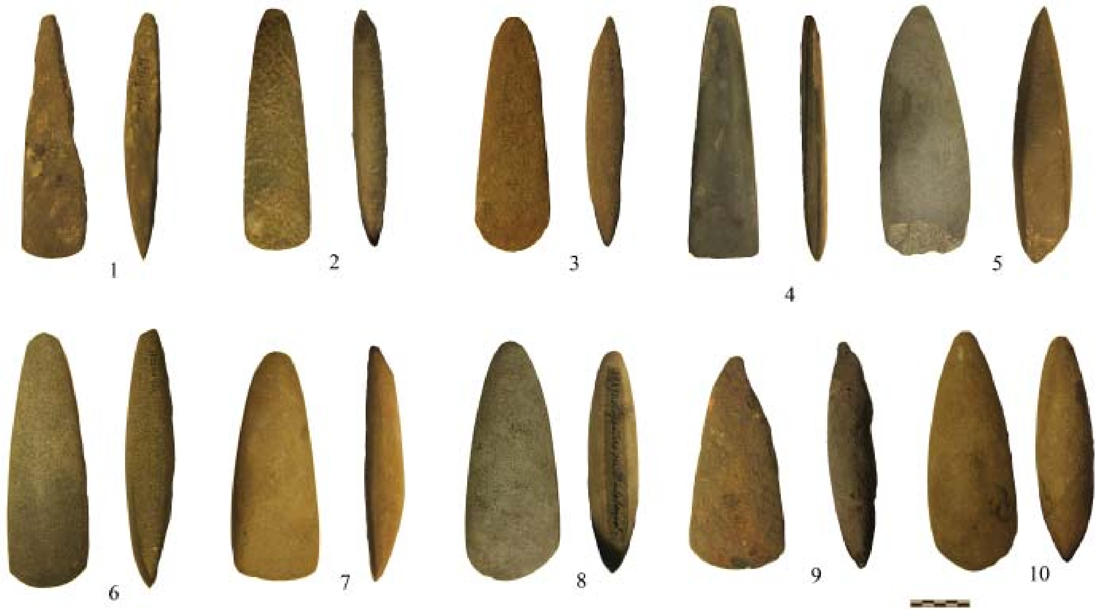

Fig. V. 92. Pointed-butted axes of diabase or basalt from central parts of Sweden (Södermanland, Dalsland, Närke, Uppland, Gästrikland and Värmland), which have been interpreted as imitations of jade axes or pointed-butted flint axes (Klassen 2004; Pétrequin et al. 2012c). All axes are from Stockholms Hist. Museum: 1. Lid, Södermanland (5631.3), 2. Frandefors, Dalsland (8646.1011), 3. Skollersta, Närke (13233.6), 4. Tysslinge, Närke (13376.5), 5. Dunker, Södermanland (13404.2), 6. Floda, Södermanland (15260.2), 7. Västerlövsta, Uppland (16862.3), 8. Högsatar, Dalsland (17343.842), 9. Arsunda, Gästrikland (18252), 10. Kila, Värmland (20149).

Fig. V. 93. Pointed-butted axes of diabase, basalt, nephrite or flint from southwest and southeastern parts of Sweden (Västergötland, Östergötland, Bohuslän, Blekinge and Småland), which have been interpreted as imitations of jade axes or pointed-butted flint axes (Klassen 2004; Pétrequin et al. 2012c). All axes are from Stockholms Hist. Museum: 1. Yxnarum, Östergötland (6013.78), 2. Foss, Bohuslän (9000.42), 3. Tollstad, Östergötland (9170.1, V), 4. Ronneby, Blekinge (10869.26), 5. Vikingstad, Östergötland (11362.18A), 6. Aska, Östergötland (11495.287), 7. Växjö, Småland. Nephrite axe/chissel possibly import from Switzerland as a parallel has been found in Hallwillersee (12628 (Montelius 1917, 12, no. 146; Pétrequin et al. 2012b, 193)), 8. Folby, Västergötland (13130.1), 9. Vester Husby, Östergötland (17573.3), 10. Gårdved, Småland (21001).

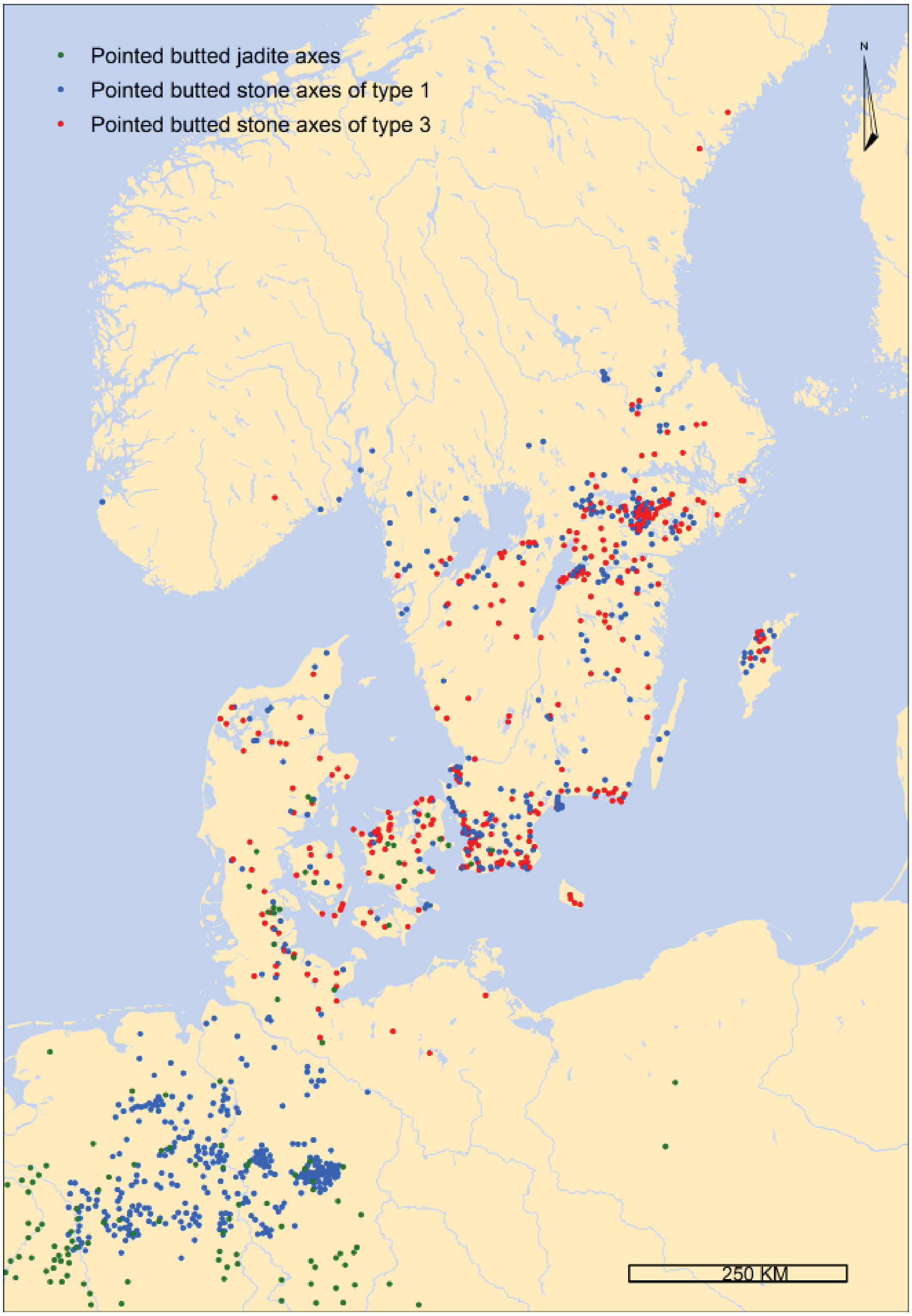

Fig. V. 94. Distribution of pointed-butted jade and pointed-butted stone axes in Northern Europe. After Brøgger 1906; Åberg 1937; Kersten 1939; 1951; S. Florin 1958; Hingst 1959; Lomborg 1962; Röschmann 1963; Ahrens 1966; Brandt 1967; Skaarup 1975; 1985; Ebbesen 1984; Klassen 2004; Gustafsson 2005; Hallgren 2008; Lübke et al. 2009; Klassen et al. 2012; Peter Vang Petersen pers. comm. Data after Table 56.

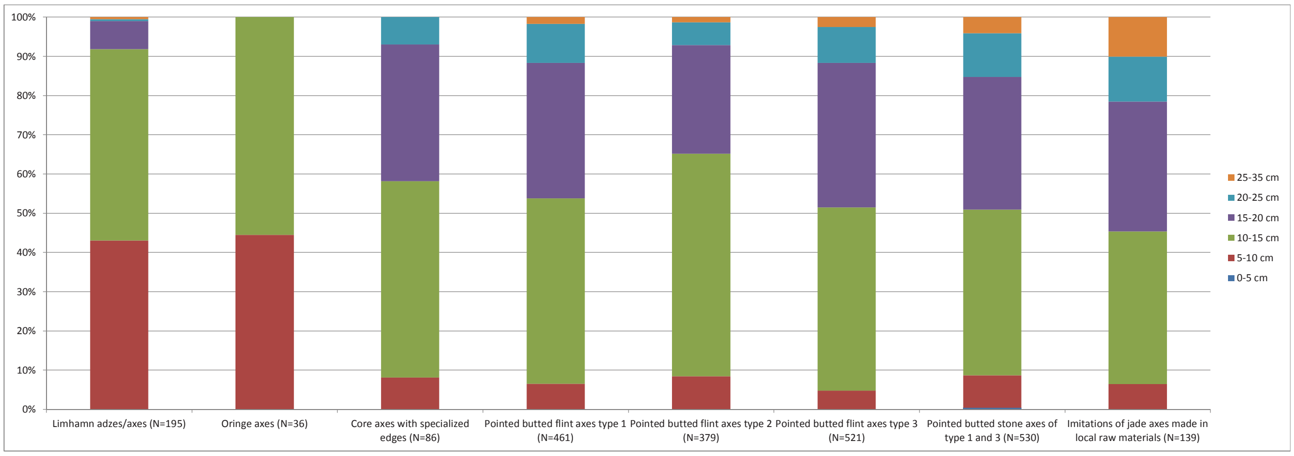

Fig. V. 95. Length of Limhamn axes/adzes, Oringe axes, core axes with specialized edges, pointed-butted flint, stone and jade axes. Data after Tables 53, 55, 56, 57, 58 and 59.

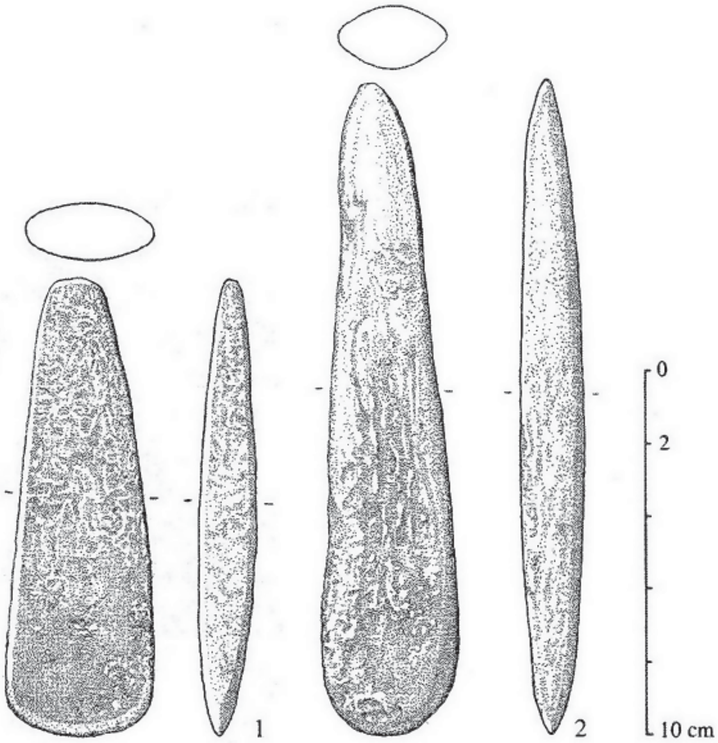

Fig. V. 96. Pointed-butted copper axes from Pilegård on Zealand (1) and Vester Bedegadegård on Bornholm (2). After Klassen 2000.

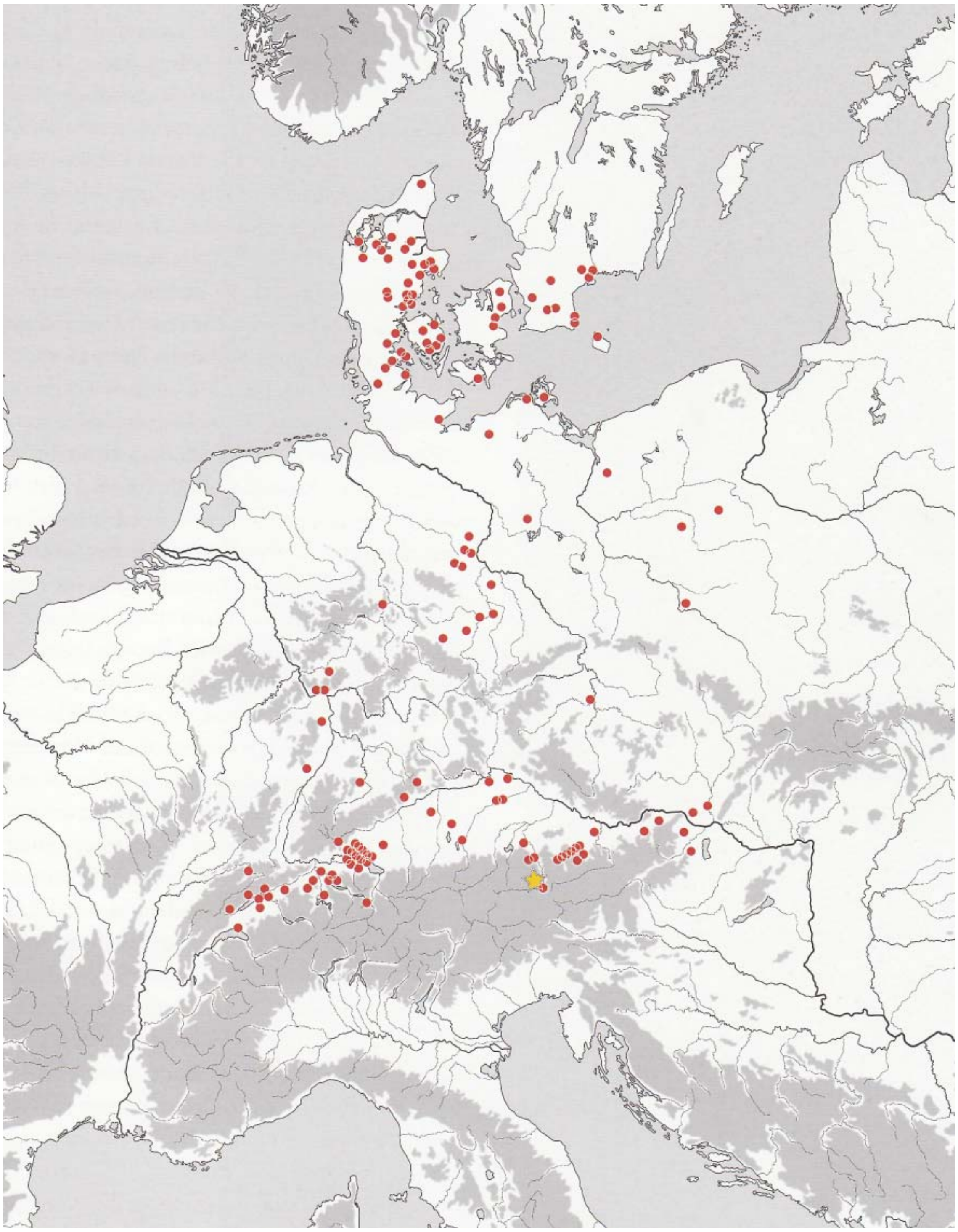

Fig. V. 97. Distribution of copper objects made of Mondsee copper. After Klassen 2000; 2004; Klassen & Nielsen 2010.

Fig. V. 98. Distribution of pointed-butted copper axes having an oval and four-sided cross-section together with known copper mines (Aibunar, Rudna Glava, Jarmovac and Mondsee) from the fifth and fourth millennium BC. Pointed-butted copper axes after Todorova 1981; Zachos 2007; Klassen 2000; Turck 2010; Klassen et al. 2012. Copper mines after Davies 1937; Chernykh 1978; Jovanović 1980; Pernicka et al. 1993; 1997; Radivojević et al. 2010. Data after Table 56.

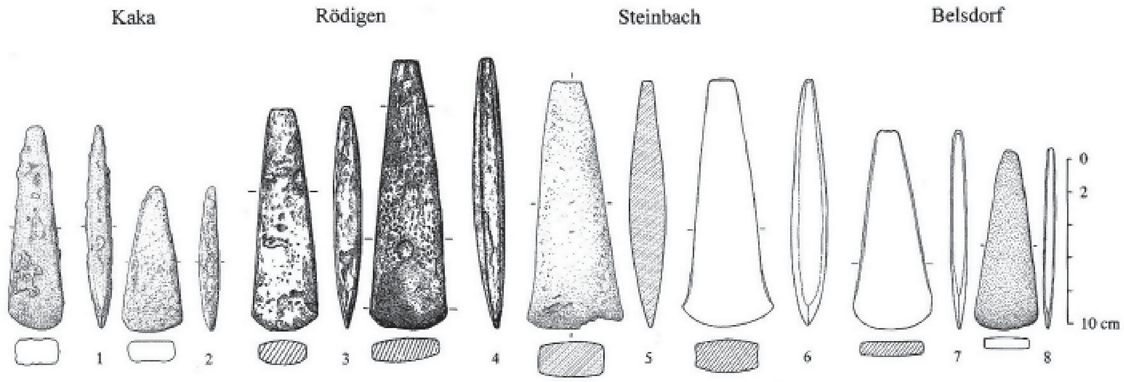

Fig. V. 99. Different types of pointed-butted copper axes (Kaka, Rödigen, Steinbach, Belsdorf) from the late 5th and early 4th millennium BC. 1. Vantore, 2. Schwabstedt, 3. Komořany, 4. Nechranice, 5. Rastenberg, 6. Steinbach, 7. Belsdorf and 8. Jedovnice. After Klassen et al. 2012, 1289.

Fig. V. 100. A possible fibrolite axe presumably from Hov parish in southern Jutland? Museum Sønderjylland.

be argued that the carriers of these jade axes were in fact the first pioneering farmers in South Scandinavia, as their appearance is contemporary with the introduction of domesticated animals and cereal cultivation during the period 4000-3700 cal BC. Particularly important to this line of argument, is the emergence of pointed-butted flint axes in South Scandinavia.

9.7. Pointed-butted flint axes

Jade axes were already being imitated in flint in the Michelsberg culture during the period from 4300 to 4000 cal BC, which is shown by the emergence of the Glis-Weisweil type (Gallay 1977; Pétrequin et al. 2006; 2010, 237ff) (Fig. V.101). Pointed-butted flint axes of the Glis-Weisweil type have their main distribution in Alsace, South Germany and Switzerland, which is similar to the concentrations of pointed-butted stone axes with a perforated butt of the Zug type (Klassen 2014a). The pointed-butted axes of the Glis-Weisweil type clearly show the same shape, sizes and proportions as the jade axes of the Durrington, Puymirol and Tumiac types. These types of jade axe belong to the mid- and second half of the 5th millennium, when the jadeite was obtained from the production centres at Piémont and Liguria (Pétrequin et al. 2012a). Their distribution is widespread and they have been found as far north as South Scandinavia and Scotland (Klassen 2004; Sheridan & Pailler 2012). However, the jade axes of the Durrington and Tumiac types are very rare in the area where the pointed-butted flint axes of type Glis-Weisweil are concentrated, as here local production imitating jade axes may have occurred. But the imitations so closely resemble the original jade axes, that there must have been some contact with regions where the jade axes were more densely distributed. Where the flint came from that was used to make the pointed-butted axes of the Glis-Weisweil type is still unclear. But flint mines have been reported at Kleinkems and Löwenburg, near Basel, in the region where many of these Glis-Weisweil axe types were found (Diethelm 1997, 63f; Engel & Siegmund 2005; Pétrequin et al. 2010, 247). ^{14}C dates of charcoal from the mine shafts at both Kleinkems and Löwenburg date the extraction of flint to between 4250 and 3800 cal BC, thus indicating that these mining activities were contemporary with the establishment of mines in other parts of Western Europe (Diethelm 1997; Engel & Siegmund 2005; Sørensen 2012a). Unfortunately, no roughouts or blanks were found in the mineshafts, which makes it difficult to determine exactly which axe types were produced in the mines (Fig. V.102). Around 50% of the 66 pointed-butted axes of the Glis-Weisweil type were stray finds from wetland areas or bogs, thus pointing towards a direct parallel with depositional behaviour associated with pointed-butted axes in South Scandinavia (Pétrequin et al. 2010, 239; Sørensen 2012a). In South Scandinavia it is clear that the depositional practices associated with pointed-butted axes found in hoards are linked with their use as symbolic offerings in an agrarian society (Sørensen 2012a). In Central Europe there are many examples of hoards containing jade axes during the late 5th millennium BC (Fig. V.103). However, such depositional practices would have created an increasing demand for jade axes, if several agrarian societies had participated in these networks. But if it was impossible to obtain the actual jade axes, then local production could have been stimulated, with jade axes imitated in other available materials, such as flint. A corresponding demand would arise if the production of jade axes decreased, as seems to have occurred in the early 4th millennium. Such a phenomenon may explain the emergence of flint mines and the systematic production of pointed-butted flint axes (Fig. V.104).

Unfortunately, only limited regional studies of the distribution of pointed-butted flint axes in Europe have been undertaken, thus making it difficult to investigate possible social relations between the agrarian societies (Åberg 1912; Brandt 1967; Schut 1991, 28ff; Watté 2007, 65). Such advanced networks have been documented and confirmed by the distribution pattern of pointed-butted axes in southern Scandinavia (Brøndsted 1938; Hinz 1954; Hingst 1959; Röschmann 1963; Østmo 1986; Hernek 1988; Blomqvist 1990; Hallgren 2008; Hirsch et al. 2008; Nielsen 2009; Sørensen 2012a; Vogt 2009) (Table 59). A huge production has been observed in regions rich in flint sources on Zealand and in Scania during the Early Funnel Beaker culture, which resulted in major exchanges of flint axes to areas lacking flint in Central Sweden and southern Norway (Fig. V.105). A similar contemporary phenomenon can be observed in England, where the areas rich in flint (South England and Yorkshire) were characterized by major production of flint axes, which supported neighbouring regions without flint (Åberg 1912; Manby 1979; Moore 1979; Bradley & Edmonds 1993; Edmonds 1995; Pitts 1996; Barber et al. 1999). Perhaps the abundance of and easy access to flint sources is one of the more important pull factors, which could explain why some of the

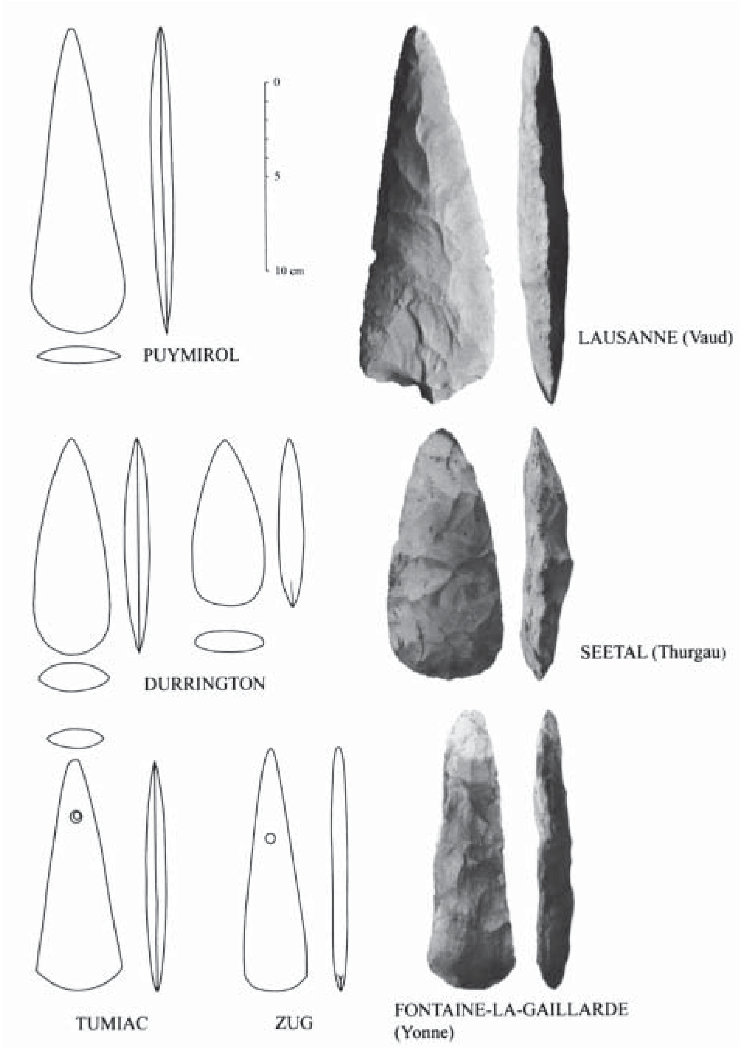

Fig. V. 101. Pointed-butted flint axes of type Glis-Weisweil imitating different types of jade axes. After Pétrequin et al. 2010.

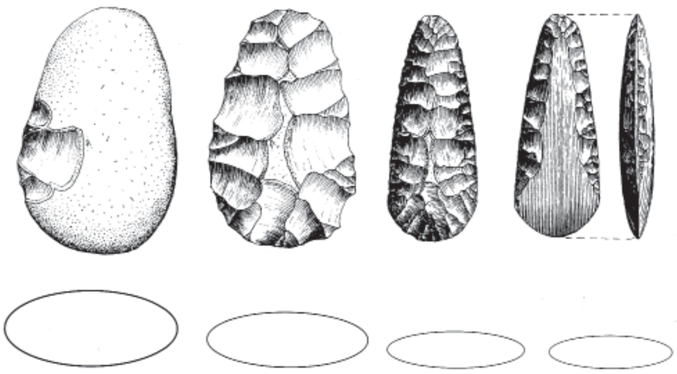

Fig. V. 102. Different production stages in making a pointed-butted flint axe. After Stafford 1999.

first immigrating farmers wanted to settle near places rich in flint sources in both South Scandinavia and Britain. This would be especially applicable if the axes were used by the pioneering farmers as agents to create and maintain larger agrarian networks in newly settled regions. The participants in these networks would have generated a constant demand, which is supported by the fact that at least 50% of the pointed-butted axes in South Scandinavia were deposited in an unused state in wetland areas (Fig. V.106). This is indicated by the yellow, blue, red or brown patina that is found on the flint axes (Fig. V.107). It is therefore clear that large-scale depositional practices continued in South Scandinavia after the arrival of the first agrarian societies. The demand for axes increased further, as flint axes were needed to clear the forest and open up the landscape, thus paving the way for agrarian subsistence.

Pointed-butted axes are associated with the first farmers in southern Scandinavia, as they have been found in contexts that have been ^{14}C dated to between 4000 and 3600 cal BC, which also contained short-necked funnel beakers and the first evidence of agrarian activities (Nielsen 1985; Andersen 2001; Rosenberg 2006; Hallgren 2008; Skousen 2008; Rudebeck 2010; Sørensen & Karg 2012) (Fig. V.108 and Table 24). The pointed-butted flint axes also go through a typological and technological development in southern Scandinavia, which is of some chronological importance. Type 1 is characterized by a two-sided cross section, whilst types 2 and 3 have respectively three- and four-sided cross sections (Nielsen 1977) (Fig. V.109). The typology is partly supported by ^{14}C dates of several contexts that contained different types of pointed-butted axes (Sørensen 2012a). However, there are considerable overlaps between pointed-butted axes of types 2 and 3, as well as the contextual ^{14}C dates of the thin-butted axes of types I, II, III and IV (Fig. V.135). Nevertheless, the original typology is confirmed when investigating the flint hoards, because type 1 is never found together with type 3 or any of the thin-butted axes. But types 2 and 3 have been found in hoards with thin-butted axes (Rydbeck 1918; Nielsen 1977; Karsten 1994) (Figs. V.110-111). It is therefore clear that pointed-butted axes of type 1 belong to the early EN I phase (4000-3800 cal BC), whereas types 2 and 3 have a wider use period covering most of the EN I phase (4000-3500 cal BC) (Salomonsson 1970; Liversage 1992; Stafford 1999; Hallgren 2008; Hirsch et al. 2008; Rudebeck 2010). The thin-butted axes of types I, II, III and IV confirm the overlapping chronology, as their contexts have been ^{14}C dated from 3800 to 3400 cal BC (Kristensen 1991; Andersen & Johansen 1992; Nilsson 1996; Nielsen 2000; Skousen 2008; Mischka 2011b; Beck 2013).

The distribution of the stray finds of pointed-butted axes in southern Scandinavia clearly demonstrates the limit of the Early Funnel Beaker expansion, which corresponds to the boundary between the boreonemoral and southern/middle boreal vegetation zones (Figs. V.112-113). The distribution of the short-necked funnel beakers and other agrarian evidence reached the same boundary, as discussed in section 8.7. Nevertheless, a few pointed-butted flint axes have been found as far north as Nordland in Norway, thus showing the wide distribution of these axes to hunter-gatherers in North Scandinavia (Valen 2007; 2012). The distribution of these axes also reveals trends of continuity and significant changes in settlement patterns in the period 4000-3600 cal BC in South Scandinavia. Continuity can be observed through the pointed-butted axes which have been found in the coastal and lake shore areas. Changes are shown by the concentrations of pointed-butted flint axes in the interiors of regions, such as Falbygden in Västergötland, Östergötland, Närke, Södermanland, Scania, Bornholm, North Funen and Vendsyssel. Small concentrations of pointed-butted axes in the inland zone can especially be identified in regions which were characterized by very limited and scattered habitation during the Late Mesolithic, such as Vendsyssel, Bornholm, Gotland and Central Sweden (see section 12). In some of these regions, the excavated Early Funnel Beaker inland sites are often located on light sandy soils, which are optimal for initiating cultivation practices. However, in other regions, like Vendsyssel, Västergötland and Götland, almost no Early Funnel Beaker inland sites have been excavated or recognized, as these can be extremely difficult to find. Mostly these sites have only been revealed by individual pits or small cultural layers of a limited depth (Salomonsson 1970; Larsson 1984; Rosenberg 2006; Hallgren 2008; Skousen 2008; Hadevik & Steinke 2009; Nielsen 2009; Rudebeck 2010, 85ff). A few of the inland sites that have produced pointed-butted flint axes have been found stratigraphically below long barrows, such as at Tolstrup and Barkær (Madsen 1975, 124ff; Liversage 1992, 59). The tendency of placing a long barrow on top of an Early Funnel Beaker site has also been confirmed at other localities, which have pro-

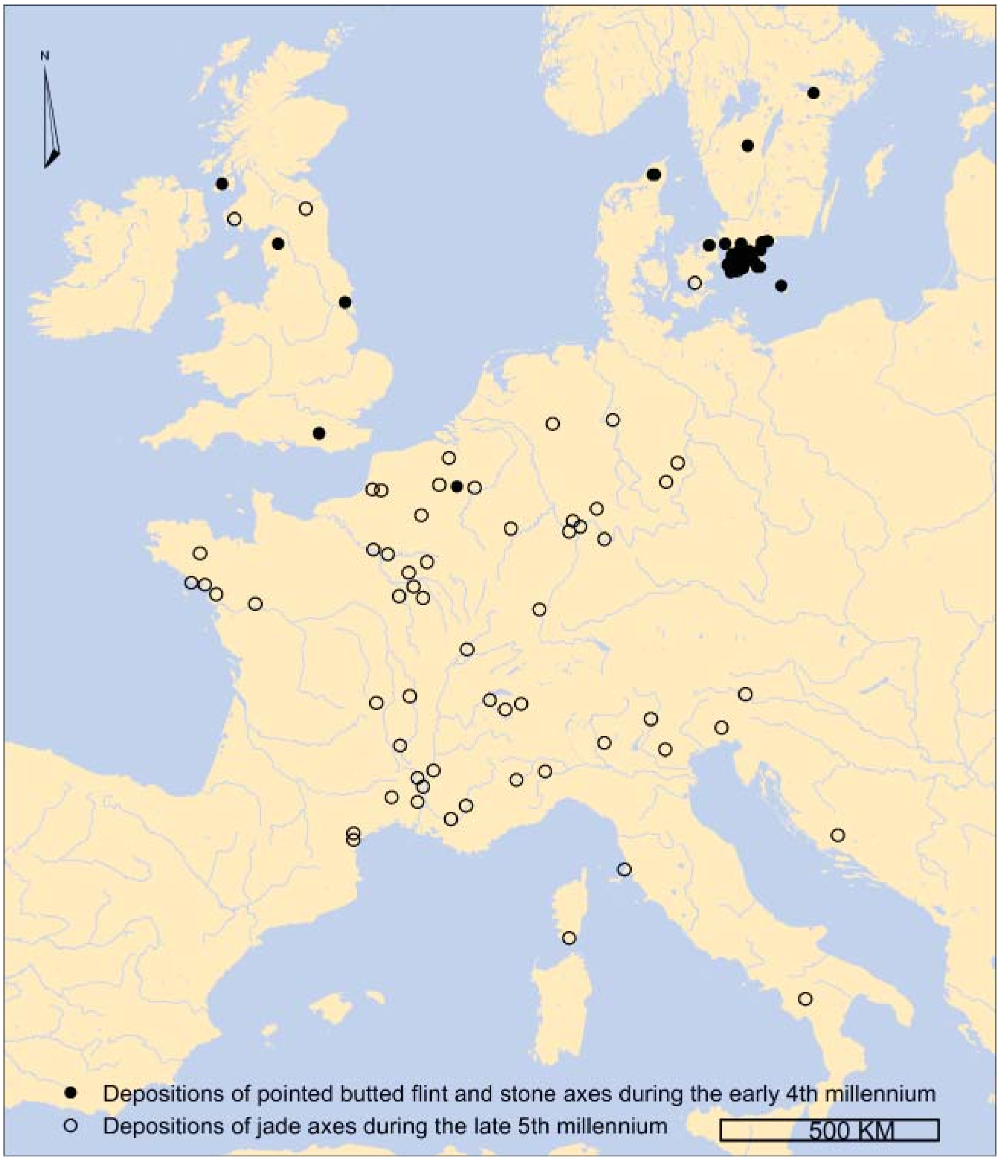

Fig. V. 103. Distribution of pointed-butted flint and stone axe hoards in Northern Europe from the early 4th mellinium shown together with hoards of jade axes from mid 5th to the early 4th mellinium BC. After Rydbeck 1918; Nielsen 1977; Manby 1979, 81; Bradley & Edmonds 1993, 147; Karsten 1994; Edmonds 1995, 57; Barber et al. 1999, 15; Klassen 2004; Gustafsson 2005; Rosenberg 2006; Collet et al. 2008, 60; Rudebeck 2010; Pétrequin et al. 2012e, 1390; Sørensen 2013c.

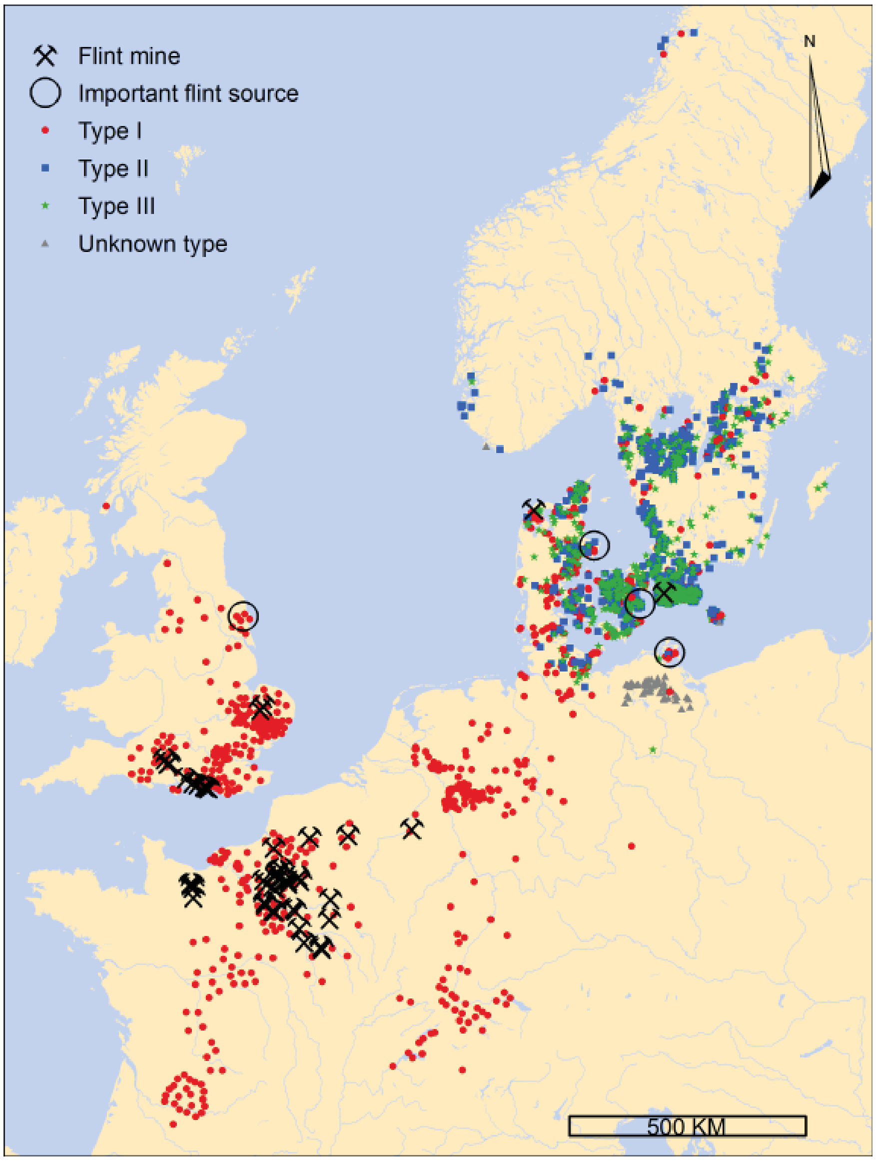

Fig. V. 104. Distribution of pointed-butted flint axes, flint mines and important flint ressources in western Europe. After Åberg 1912; Brøndsted 1938; Sprockhoff 1938; Kersten 1939; 1951; Hinz 1954; Schindler 1955; Kersten & La Baume 1958; Hingst 1959; Röschmann 1963; Brandt 1967; Lüning 1968, 74; Wilhelmi 1971, 33; Boelicke 1978, 111; Manby 1979; Moore 1979; Willms 1982; Østmo 1986; Hernek 1988; Blomqvist 1990; Schut 1991; Bostyn & Lanchon 1992; Bradley & Edmonds 1993, 147; Edmonds 1995, 57; Barber et al. 1999; Brauer 1999; Wallbrecht 2000, 92; Richter 2002; Collet et al. 2004: 151ff; Collet et al. 2008; Ungerath & Cziesla 2006; Hirsch et al. 2008; Watté 2007; Hallgren 2008; Nielsen 2009; Pétrequin et al. 2010; Bergsvik & Østmo 2011; Grooth et al. 2011: 77ff; Giligny et al. 2012: 1167; Sørensen 2012a; Valen 2012.

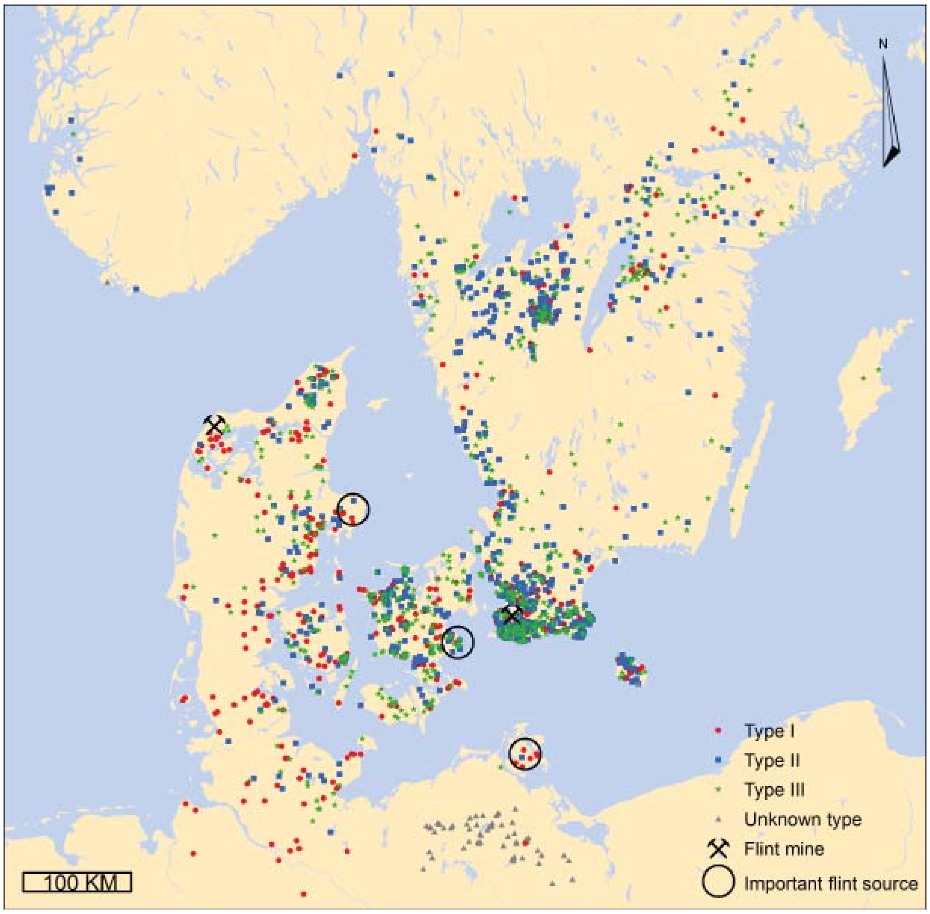

Fig. V. 105. Distribution of pointed-butted flint axes, flint mines and important flint ressources in southern Scandinavia and northern Germany. After Westerby 1920; Sprockhoff 1938; Kersten 1939; 1951; Mathiassen et al. 1942; Hinz 1954; Schindler 1955; Troels-Smith 1957; Kersten & La Baume 1958; S. Florin 1958; Hingst 1959; Röschmann 1963; Salomonsson 1970; Madsen 1975; Thomsen 1977; Larsson 1984; Skaarup 1985; Østmo 1986; Hernek 1988; Blomqvist 1990; Andersen 1991; Liversage 1992; Loewe 1998; Brauer 1999; Ravn 2004; 2012; Staal 2005; Kveiborg 2006; Rosenberg 2006; Hallgren 2008; Hirsch et al. 2008; Skousen 2008; Nielsen 2009; Vogt 2009; Rudebeck 2010; Bergsvik & Østmo 2011; Sørensen 2012a; Valen 2012; Anne Rosenberg pers. comm; Poul Erik Lindelof pers. comm; Poul Otto Nielsen pers. comm; Robert Hernek pers. comm; Søren H. Andersen pers. comm; Torsten Madsen pers. comm. Data after Table 59.

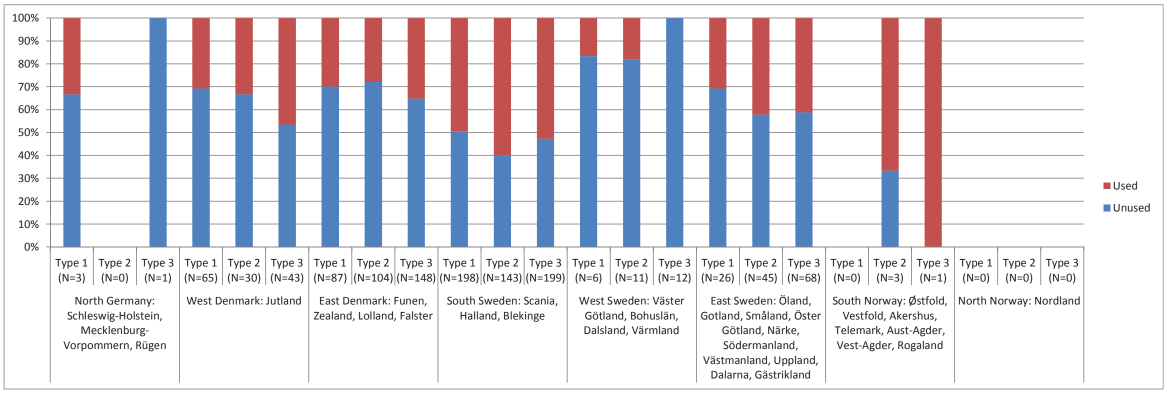

Fig. V. 106. The amount of used and unused pointed-butted axes of type 1, 2 and 3 from the early Funnel Beaker culture in South Scandinavia. Data after Table 59.

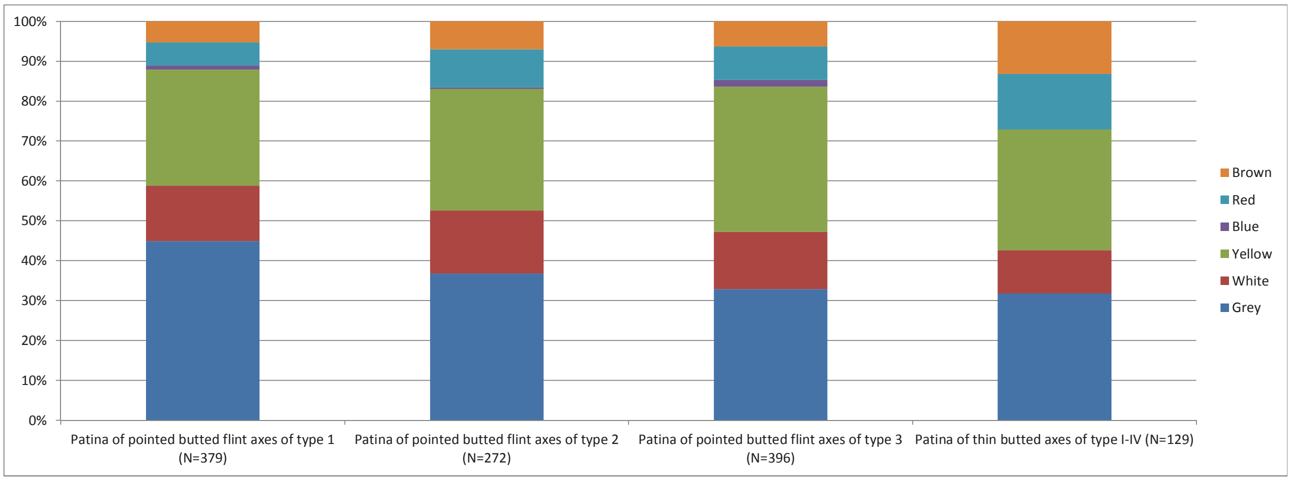

Fig. V. 107. Patina on pointed and thin-butted axes from the early Funnel Beaker culture in South Scandinavia. Data after Table 59.

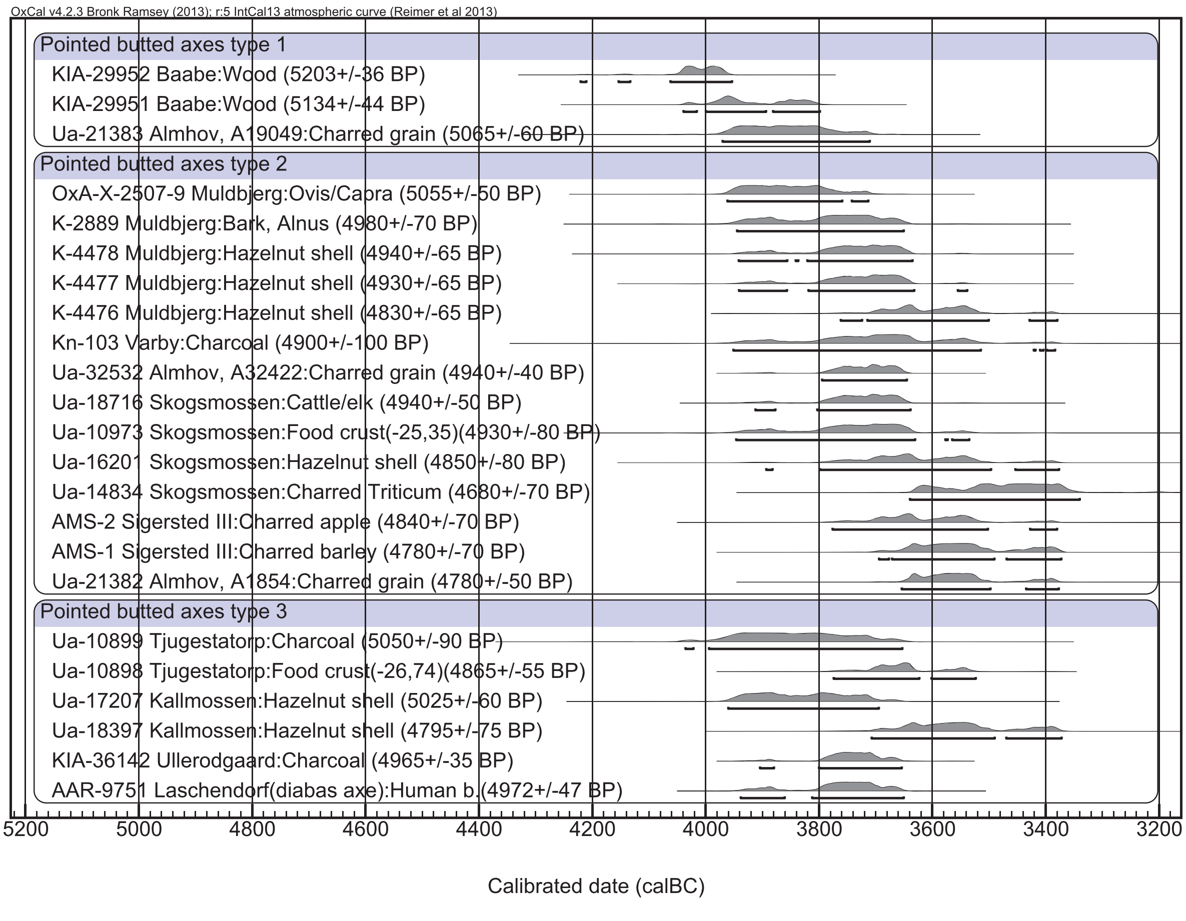

Fig. V. 108. [14]C dates of contexts containing pointed-butted axes from the early Funnel Beaker culture in South Scandinavia. Data after Table 23.

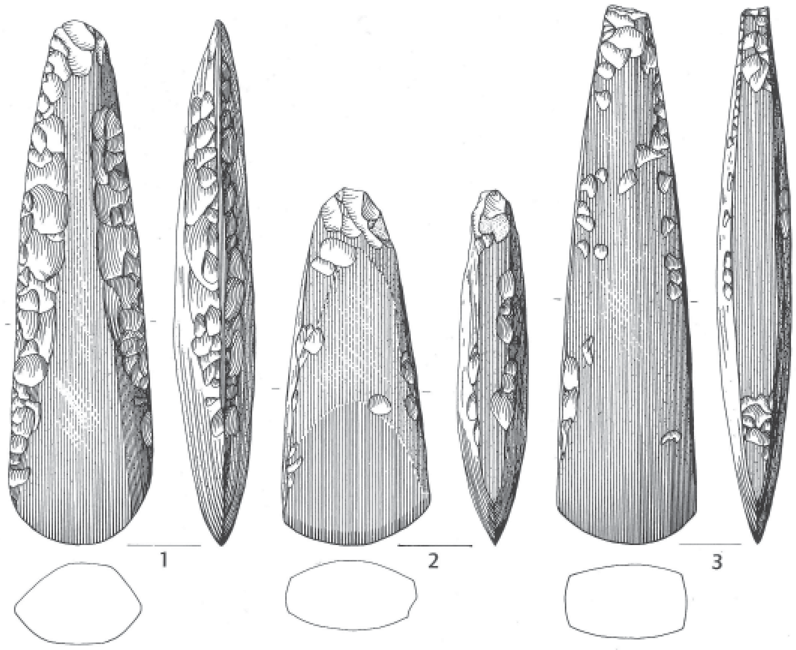

Fig. V. 109. Drawing of pointed-butted flint axes of type 1, 2 and 3. Type 1 has an oval cross section. Type 2 has a three-sided cross-section. Type 3 has a four-sided cross section. After Nielsen 1977, 66.

duced finds of short-necked funnel beakers (Skaarup 1975; Madsen & Petersen 1984; Liversage 1981; Rudebeck 2002) (Table 29). These sites were inhabited by the first pioneering farmers in South Scandinavia and were better protected than those not partly covered by long barrows. The construction of long barrows on top of earlier settlements from the early EN I phase is not accidental, but instead represents a repeated pattern of symbolic significance, as these monumental burial structures should be interpreted as visible markers of territories, as discussed in section 10.3. Despite the rare occurrence of inland sites located on easily worked arable soils, it is obvious that the stray finds of pointed-butted axes highlight areas where we should be able to find more of these sites.

9.8. Flint mines in Western Europe and southern Scandinavia during the 5th and early 4th millennium BC

Regions rich in flint sources may have been some of the specific areas where the first farmers settled in colonies, in order to control the production and distribution of pointed-butted flint axes. One of the reasons why it was important to gain control of the flint sources, may have been connected to the continuous depositional practices, often involving unused axes, that were carried out in these Early Neolithic agrarian societies. These offerings or sacrifices seem to have been of vital importance to these agrarian societies in relation to a possible symbolic negotiation with nature or other powerful forces. It is therefore not surprising that people were willing to compromise by using axes made from local materials rather than genuine jade axes. Jadeite may have been difficult to gain access to, as it is only found in a few places in the Italian Alps and because the supply of this raw material decreased during the late 5th and early 4th millennium BC (Pétrequin et al. 2012c). The result would have been an increased focus upon the exploitation of more abundant raw materials, like flint sources. This may be one of the reasons why several flint mines were established at almost the same time, around 4200 to 3800 cal BC, in northern France, Belgium and the Netherlands (Bostyn & Lanchon 1992; Becker 1993; Collet et al., 2004, 151ff; Grooth et al. 2011, 77ff, Giligny et al. 2012, 1167; Marcigny 2010; Baczkowski 2014) (Fig. V.114). If certain territorial rights were connected with the exploitation of flint, then this could, in association with other cultural or social factors, have generated a migration of people to other areas rich in flint sources. Such a scenario may explain why some of the earliest agrarian sites in both Britain and South Scandinavia have been found near contemporary flint mines, which have been ^{14}C dated to the beginning of the 4th millennium BC (Olausson et al. 1980; Rudebeck 1986; Becker 1993; Barber et al. 1999; Stevens & Fuller 2012; Sørensen 2012a; Sørensen & Karg 2012) (Fig. V.115 and Table 25). The interpretation is supported by the fact that around 90% of the pointed-butted flint axes are made of high-quality Senon flint, which sometimes displays traces of cortex with a white chalk surface, thus indicating that the flint was quarried from a primary source (Figs. V.116-117). Furthermore, the clustering of pointed-butted axes of type 1 near important flint sources located at Sallerup in Scania, Stevns on Zealand, Forsnæs in Djursland, Thy in North Jutland and Rügen in Mecklenburg-Vorpommern also supports the theory of a connection to these quarrying areas (Fig. V.105). Currently, Early Neolithic mineshafts have been excavated at Hov (Figs. V.119-121) and Bjerre in North Jutland and Sallerup in Scania (Figs. V.122-123). Charcoal pieces and small mammals from Sallerup and Hov have been been ^{14}C dated to the beginning of the 4th millennium BC, and Volling ceramics have been found at Bjerre in shaft D, thus indicating that they are contemporary with the other Western European flint mines (Rudebeck 1986; Sørensen 2012a) (Fig. V.118). There were probably several other flint mining sites in the Stevns area during the Early Neolithic period, but these have probably been eroded away by the sea in later prehistoric times. However, several pointed-butted flint blanks found in the area document that production did take place during the Early Neolithic (Mathiassen 1934, 18ff). The potential for finding further mining sites in Denmark is present in areas where the chalk is located high up in the terrain. It is, for instance, still unknown where the long thin-butted axes from the late EN I and EN II phases were produced (Nielsen 1977).

At Hov the early ^{14}C dates from shafts V, 7 and 51 were supported by Volling ceramics, which was found in a redeposited layer in the upper part of shaft 52 (Plate 7). Arguably the earliest ^{14}C date of a Water vole (*Arvicola amphibiusfrom*) from Hov V could be problematic and exposed to a reservoir effect, as these rodents live in a semi-aquatic environment. Nonetheless, the majority of the roughouts and planks found in all the excavated shafts at Hov had a two- or three-sided cross section and a triangular or teardrop shape, which indicates that they are preforms for pointed-butted axes, thus supporting a typological date to the Early Neolithic (Figs. V.124-126). Comparative studies of the lengths of blanks from Hov and Petit-Spiennes in Belgium also show similarities (Fig. V.127 and Table 26). The typical length for the blanks at both mining sites is 10-25 cm, thus corresponding to the general length of the pointed-butted flint axes (Fig. V.128). However, some of the other ^{14}C dates from the shafts at Hov (V and 51) are clustered around 3000 cal BC, which could indicate prolonged usage of the mines and that some of the blanks may be preforms for pointed-butted axes with a hollow-edge, thin- or thick-butted axes. But this interpretation can be refuted for the excavated mines, as a detailed investigation of the flakes from the upper layers in the shafts reveals a white patina, whilst the lower layers contained flakes with no patina, thus suggesting that some of the mineshafts were left open in prehistoric times, which could explain the later ^{14}C dates (Figs. V.129-130). Nevertheless, it is possible that other as yet unexcavated shafts could provide evidence of flint mines during later periods of the Neolithic.

Currently, no major Early Funnel Beaker sites have been found near the flint mines at Hov, which is surprising, as the blanks found in the mines are all roughouts. It is therefore clear that the fine production must have taken place at other locations, which are yet to be identified. Examples of such contemporary sites have, however, been found at the site of Almhov, near the flint mines at Sallerup in Scania (Rudebeck 2010). The site consisted of several pits, which besides short-necked funnel beakers, charred cereals grains and domesticated animals, also contained a large assemblage of several hundred kg of flakes from the various manufacturing stages involved in the production of pointed-butted axes (Table 15). Many can be categorized as classic wing-shaped flakes, which proves that large-scale axe production was taking place at this site. Moreover, up to 40 polished and unpolished pointed-butted axes have been found at the site, making it the largest assemblage of its kind in southern Scandinavia. The scale of the production suggests a systematic manufacturing process, in which many axes could have been intended for further distribution to other neighbouring regions lacking flint resources (Fig. V.105). However, other researchers have argued that Early Neolithic mining represents small-scale exploitation concentrated in certain seasons, based upon the lack of any large settlements near the mines. Furthermore, it has been suggested that the mining shafts were only in use for a very short period

Fig. V. 110. Table showing the depositions of pointed-butted flint and stone axes and their combinatios also with other types of axes. After Rydbeck 1918; Nielsen 1977; Karsten 1994; Klassen 2004; Gustafsson 2005; Rosenberg 2006; Rudebeck 2010; Sørensen 2013c.

Nr. on map (Fig. V.111)	Site	Region	Number of axes	Polished or unpolished	Pointed butted flint axes type 1	Pointed butted flint axes type 2	Pointed butted flint axes type 3	Thin butted flint axes type I-IV	Axes with neck perforation	Pointed butted stone axes	Thin butted stone axes	Remarks	Reference
1	Almhov (A15849)	Scania	3	polished	X							Pointed butted plank, axe and reused pointed butted axe as a hammerstone	Rudebeck 2010, 156
2	Järavallen	Scania	11	unpolished	X							some planks	Rydbeck 1918, 9
3	Hammelen	Scania	2	unpolished	X								Rydbeck 1918, 9
4	Stora Råby	Scania	2	unpolished	X								Lunds Historiska Museum (LUHM 12728)
5	Lackalänga	Scania	1	unpolished	X							Together with a grindstone	Karsten 1994, 226
6	Svedala	Scania	1	polished	X							Together with a grindstone	Rydbeck 1918, 9
7	Grönby	Scania	8	unpolished	X								Nielsen 1977, 121
8	Arrie	Scania	4	unpolished	X	X						Located in a bog	Rydbeck 1918, 9ff
9	Ravnekær	Bornholm	5	polished and unpolished		X				X		Together with a foursided stone axe	Nielsen 1988
10	Karaby	Scania	2	unpolished		X							Rydbeck 1918, 9
11	Dalby	Scania	2	polished		X							Rydbeck 1918, 12ff
12	Borgeby	Scania	2	polished		X							Rydbeck 1918, 12ff
13	Eslöv	Scania	2	unpolished		X						Bog	Nielsen 1977, 121
14	Fränninge	Scania	1	polished		X						Together with a grindstone	Karsten 1994, 309
15	V. Ågården	Vendsyssel	3	unpolished		X	X						Nielsen 1977, 121
16	Li Markie nr. 7	Scania	3	unpolished		X	X						Rydbeck 1918, 11ff
17	Vid Lundavä-gen	Scania	7	polished		X	X						Malmö Museum (MM 32165)
18	Gualöv	Scania	3	polished		X	X	X				Axes has been reworked	Karsten 1994, 348
19	Vanstad	Scania	2	polished			X						Rydbeck 1918, 16ff
20	Bolshög, Ö. Broby	Scania	3	polished			X						Stockholms Historiska Mus. (SHM 2791:244-247)
21	Torup, Bara	Scania	4	polished and unpolished			X						Robert Hernek personal comment
22	Smeby Slöta	Västergöta-land	5	polished			X					Bog	Nielsen 1977, 121
23	Ullerødgård	Zealand	1	polished			X					Found in a pit together with several scrapers	Rosenberg 2006

Nr. on map (Fig. V.111)	Site	Region	Number of axes	Polished or unpolished	Pointed butted flint axes type 1	Pointed butted flint axes type 2	Pointed butted flint axes type 3	Thin butted flint axes type I-IV	Axes with neck perforation	Pointed butted stone axes	Thin butted stone axes	Remarks	Reference
24	V. Ågården	Vendsyssel	2	unpolished			X	X					Nielsen 1977, 121
25	Kvistofta	Scania	3	polished			X	X					Karsten 1994, 215
26	Skegrie	Scania	2	unpolished			X	X				With burned flint	Karsten 1994, 294
27	Skurup	Scania	10	polished and unpolished			X	X					Karsten 1994, 303
28	Svedala	Scania	11	polished and unpolished			X	X					Karsten 1994, 274
29	Södra Åsum	Scania	2	polished			X	X					Karsten 1994, 310
30	Fjälkinge	Scania	2	polished and unpolished			X	X					Karsten 1994, 343
31	Kverrestad	Scania	3	polished			X	X					Karsten 1994, 328
32	Öster Sön-narslöv	Scania	2	unpolished			X	X					Karsten 1994, 347
33	Hörby	Scania	6	polished			X	X				Together with thin butted thin blade axes	Karsten 1994, 238
34	Bodarp	Scania	6	unpolished			X	X					Karsten 1994, 282
35	Lemmeströ, Börringe	Scania	7	unpolished			X	X				3 pointed butted axes and 4 thin butted axes	Stockholms Historiska Mus. (SHM 3765)
36	Limhamn, Kolsyrefabrik-ken	Scania	7	unpolished								Pointed butted planks	Lunds Historiska Museum (LUHM 29138)
37	Amalielunds Gård	Scania	2	polished			X		X			Found together in a cleft in connec. with removal of stones	Lunds Historiska Museum (LUHM 25491:1 & 2)
38	Brebol, Lerbo	Söderman-land	5	polished and unpolished						X	X	1 pointed butted and 4 thin butted axe. Found together in a cleft	Gustafsson 2005, 241ff
39	Hyll-ested Mark (14.02.07)	Jutland	2	polished				X	X			Type 3 pointed butted stone axe and one with perforated neck	Klassen 2004, 430

of time, corresponding with the more mobile lifestyle in the settlement systems of the Early Neolithic (Edmonds 1995; Barber et al. 1999). It has also been argued that mining was related to other socially important processes, which did not necessarily include the extraction of high-quality flint nodules in some of the British mines, as flint of a lower quality located in deeper flint seams was preferred to higher quality flint at or near the surface (Baczkowski 2014). Nevertheless, some of the flint mines at Spiennes were surrounded by a causewayed enclosure, thus indicating that the control of the resource must have been of some importance (Hubert 1969; 1980; Collet et al. 2004, 152; Manolakakis & Giligny 2011).

A connection between causewayed enclosures and flint mines is also suggested in the county of Sussex in southern England (Oswald et al. 2001, 117). The probable causewayed enclosure on Halnaker Hill in West Sussex overlooks the flint mining complex at Long Down. In South Scandinavia one of the largest causewayed enclosures covering 14.5 ha has been identified at Liselund, near Thisted, which is located around five km from the flint mines at Hov. The enclosure at Liselund is also one of the earliest causewayed enclosures in South Scandinavia, as Volling ceramics have been found at the bottom of one of the ditches (Nielsen 2004, 32). On the island of Møn, near Møns Klint, some of the best flint in South Scandinavia can be collected. Here a possible causewayed enclosure from the Early Neolithic may have been located at the site of Timmesø Bjerg, which includes a well preserved structure with visible ditches, as the locality is located in a protected area. The enclosure was previously dated to the Iron Age, but recently several flakes were found in the structure, together with a small copper disc, which also contained tin. The high proportion of tin (4%) may indicate that the disc was in fact made of bronze and thus can be dated to the Bronze Age. But recently tin pieces and bronze artefacts have been found in Serbia, which have been dated to the mid-5th millennium **(**Radivojević et al. 2013**)**. It is therefore possible that the copper disc from Timmesø Bjerg may be from the early 4th millennium BC, which is further supported by finds of similar copper discs in the long barrows at Salten and Rude in Jutland (Klassen 2000). All these examples of causewayed enclosures located near flint mines indicate that the exploitation of flint during the Early Neolithic could have been under the management and control of local tribes. Furthermore, the identification of mines, manufacturing sites and the widespread distribution of the flint axes demonstrates that a major production and exchange of pointed-butted flint axes was initiated, and was contemporary with appearance of the first agrarian societies in South Scandinavia. It is also clear that the unlimited access to flint sources could have had a pull effect on the first pioneering farmers migrating to both Britain and South Scandinavia. Furthermore, the control of this particular resource may also have been important in creating a widespread network with more distant agrarian societies lacking flint sources in Central Sweden, Bornholm and Gotland.

The tribes controlling these flint resources must have had a great deal of practice in this area and had an understanding of the landscape, in order to find suitable mining sites in areas where the chalk was located high in the terrain. Mining for flint was a time-consuming activity, which required a significant amount of organization, as it sometimes did not produce the expected yields. Such disappointing results can be revealed when the numbers of discarded blanks are limited and the flint quality is poor. Shaft V at Hov contained a water vole (*Arvicola amphibious*), found at a depth of 5.5 metres, which was ^{14}C dated to 5130±40 BP (4037-3800 cal BC, Poz-7675). The total depth of the shaft was 6.5 metres and the finds from the mine indicated that it had not produced a high yield, as only a few flint nodules of poor quality were recovered. As a result, the mining of shaft V was abandoned after the opening of the first gallery. Nevertheless, it appears that the organization behind the mining process was capable of overcoming such mistakes. Sometimes, as in the case of shaft 2 at Hov, a layer of flint was found and exploited at a depth of five metres. Afterwards, the shaft was dug around 3 metres deeper to another layer of flint, which was of better quality, thus showing a detailed knowledge of where the best flint could be found (Becker 1993). Such a task would have been easier for a group of people from the Michelsberg culture, where mining for flint first began around 4300 cal BC. Perhaps the search for suitable places to exploit flint sources in South Scandinavia may have been undertaken by several scouting expeditions. Here the objective could have been to find suitable arable land near to abundant flint sources.

Obtaining flint by mining several metres down is a very difficult activity. A central shaft area is often connected to radiating galleries, the entrances of which are supported by chalk pillars (Baczkowski 2014). Such mining features have been observed associated with the Michelsberg culture at Jablines (Bostyn & Lanchon 1992), Spiennes (Collet et al. 2004), Rijckholt (Grooth et al. 2011) and Cissbury (Barber et al. 1999). The same mining features have also been observed in the larger Early Neolithic mines at Hov in shaft 7 and Bjerre in shaft E (Becker 1993). These characteristic galleries radiating out from a central shaft area can only be produced when the exploitation of flint in areas of primary deposits is undertaken (Plate 8). This is the reason why deep mining with galleries did not take place in the mines at Sallerup, as the flint sources in southern Scania were secondarily deposited during the last ice age (Rudebeck 1986). However, based on the overall similarities in the mining features, it is likely that the practice of deep flint mining came to South Scandinavia during the Early Neolithic period due to the immigration of farmers from the Michelsberg culture. Perhaps some of the first founding pioneer farmers in South Scandinavia were specialists in both agrarian and mining practices.

Flint mining is actually not a very logical activity in southern Scandinavia, because excellent nodules of flint of the right length, shape and quality for producing pointed-butted axes can be found on beaches. Throughout the Mesolithic period the beach had been the preferred place to obtain flint, which means that the procurement pattern changed with the emergence of the first agrarian societies in South Scandinavia. However, pointed-butted blanks have been found along the west coast of Scania and in Djursland at Fornæs, thus indicating a continuation of this strategy during the Neolithic (Glob 1951; Högberg 2006, 203f). However, this may have been a different product, which was not of the quality of the axes produced in the mines. Pointed- and thin-butted axes from the mines display a characteristic trait, in that many of them have cortex on the butt, which is a visible feature for future owners of the axes (Rudebeck 1998) (Fig. V.117). The cortex could be interpreted as an indication that these axes had the right origin and had been produced according to certain conventions and rituals. Such information is not only associated with axes, but a wide range of artefacts recorded in various ethnographic records (Hughes 1977; Højlund 1979; Hodder 1982; Pétrequin & Pétrequin 1993a).

The functional aspects of the flint mining sites have played a dominant role in their interpretation, but it can also be argued that the mines were important symbolic places for these Early Neolithic societies in the late 5th and early 4th millennium BC. The fills of the mineshafts sometimes contain human remains, like, for instance, at Spiennes in shaft 11, which was ^{14}C dated to 4500±50 BP (3362-3027 cal BC, Beta-110683). In mine 11 at Hov, the remains of an undated individual were found, who had been placed in the hocker position. Other human burials found in mineshafts have been recorded at Sallerup in pit A2408, which was ^{14}C dated to 4990±80 BP (3954-3650 cal BC, Ua-18757), and at Cissbury in shaft VI, where an undated individual was placed in the hocker position. These human burials may indicate that the shafts played a part in ritual activities after the extraction of flint had ceased (Becker 1964; Rudebeck 1994; Barber et al. 1999; Collet et al. 2008, 71). Furthermore, deposits of pottery, antler picks and animal bones that have also been found in many of the mineshafts could be interpreted as symbolic offerings made after the flint extraction. Ritual activities have also been connected with the actual extraction phase, especially in the British mines. Here unusual markings on the chalk walls of the mineshafts have been interpreted as animals or vertical lines (Teather 2011) (Fig. V.131). Normally such "decoration" has mostly been interpreted as functional markings made using antler or flint picks when the miners dug through the thick layers of chalk (Bostyn & Lanchon 1992, 115). When Carl Johan Becker excavated the mines at Hov, he retrieved some samples of chalk, which for the most part were interpreted as displaying functional markings made with stone or antler picks. But some of the chalk pieces from shaft 7 at Hov, which was ^{14}C dated to 4835±35 BP (3698-3527 cal BC, Poz-7670), display long grooved lines (Fig. V.132). The lines are very similar to those interpreted as art depicting phalluses or a deer from shaft 27 at Cissbury, which has been ^{14}C dated to 4710±60 BP (3635-3370 cal BC, BM-3086) (Teather 2011, 243). These possible pieces of art may indicate that the extraction of flint was much more than just a simple process of acquiring raw materials, but also involved ritualized behaviour.

Based on the presented evidence, it is likely that the procurement of flint using mining was introduced in both southern Scandinavia and Britain by groups of pioneer farmers from the Western European Michelsberg culture (Tresset 2003; Sheridan 2010, 89ff; Sørensen 2012a; Sørensen & Karg 2012). Perhaps the digging of mines was linked with the need to control and maintain continuous access to flint, in order to produce axes, which were of both functional and symbolic importance to these agrarian societies. Furthermore, the pointed-butted axes can also be interpreted as significant agents in preserving an agrarian network in South Scandinavia during the Early Neolithic, thus connecting regions that were rich and poor in flint sources with one another. In addition, many new types of prestigious axes appeared during the Early Neolithic, suggesting that the first farmers in South Scandinavia were part of a larger European network.

9.9. Ceremonial axes, battle axes, copper axes and other interesting objects from the Early Neolithic

In many areas that lacked flint sources in Sweden (Vastergotland, Östergötland, Dalsland, Narke, Södermanland, Västmanland and Uppland) the exchange of flint axes continued during the later part of the Early Neolithic, as these regions received a large number of thin-butted flint axes (Oldeberg 1952; Sundström 2003) (Table 60). The typological separation of the four thin-butted axe types (I, II, III and IV) of the Early Funnel Beaker culture is based on measurements of the axes, although there are some overlaps in the proposed typology (Nielsen 1977) (Figs. V.133-134). The typological overlaps are also confirmed by the ^{14}C dated contexts containing thin-butted axes, with types I, II, IIIa and IV dating from 3800 to 3500 cal BC, whereas type IIIb, V and VI date from 3500 to 3300 cal BC (Sørensen 2012a) (Fig. V.135). The thin-butted axes of types I, II, III and IV of the Early Funnel Beaker culture can also be said to be imitations of thin-butted copper axes of the Gumelniţa type (Todorova 1981, Plate 2: 26-37). The Gumelniţa copper axes were distributed throughout the north-eastern part of Bulgaria and were imitated in flint from the mid-5th millennium BC on (Klimscha 2007) (Fig. V.136). Impulses from Eastern Europe had already reached South Scandinavia during the EN I phase, as pointed-butted copper axes have been found at several places in Denmark (Klassen 2000). Nevertheless, the impulses continue during the late EN I and EN II, as some of the thin-butted copper axes found in Denmark and Scania (Maglebrænde, Hesbjerg Skov, Horsens Mark, Nørreskoven and Sjösvalpet) show similarities with thin-butted and thin-bladed flint axes from the Early Funnel Beaker culture (Nielsen 1977; Klassen 2000) (Figs. V.137-138). Furthermore, thin-butted copper axes with splayed edges have also been found in South Scandinavia, which are also imitated using local diabase (Figs. V.139-140). One of these thin-butted axes with splayed edges made of diabase was found, along with a Volling beaker, in the stone-built burial of the long barrow at Bjørnsholm, thus placing the type within the later EN I phase (Andersen & Johansen 1992, 43ff). Therefore, the imitations of axes demonstrate that the symbolic value of such objects was maintained: they were used in both burials and depositional practices, as almost all of them are unused (Table 61).

The first thin-butted copper axes with splayed edges are long and slender axes, which have been found in North-East Bulgaria, dating to the late 5th and early 4th mellenium BC (Todorova 1981). A shorter and wider variant of copper axes with splayed edges of the Altheim type was then produced on a larger scale in the Mondsee region of Austria during the early 4th millennium BC (Mayer 1977) (Fig. V.141). Several of the shorter copper axes with splayed edges have been found in Denmark and Scania, where the most well known find is the Bygholm hoard (Fig. V.142). The hoard belongs to the EN II phase, dated by a funnel beaker with vertical stripes on its belly (Klassen 2000). It is still uncertain whether the Early Neolithic farmers melted and casted their own copper axes, as crucibles for melting copper have not yet been found in South Scandinavia. However, Lutz Klassen (2000) has observed that some of the copper axes from South Scandinavia are very crudely made compared to similar axes from the Mondsee region. It is therefore probable that some South Scandinavian farmers may have experimented with the production of copper axes in the Early Neolithic. Currently, metallurgical investigations suggest that the majority of copper axes from the Early Neolithic in South Scandinavia are made of copper from Mondsee, near Salzburg in Austria (Klassen 2000). But similarities with the copper axes from Bulgaria could indicate that at least some of the axes are made of copper from mines in the Balkans or Bulgaria, which may be confirmed by future metallurgical analysis. The Mondsee region may have been an area interconnecting South Scandinavia with the southeastern part of Eastern Europe, in a larger exchange system of copper artefacts. Transportation routes via the major European rivers might have made such exchanges possible. Such a scenario is possibly supported by the distribution of thin-butted copper axes with splayed edges, which are concentrated in Bulgaria, the Mondsee region in Austria and in South Scandinavia, thus showing how copper axes could have been exchanged in an interconnected network. The continued practice of imitating various types of axes from Western and Eastern Europe demonstrates that the farmers in South Scandinavia were integrated partners in this larger European network, in which ideas and prestigious objects of jade and copper were exchanged and imitated to suit local preferences. Sometimes the imitations, through a process of hybridisation, could result in the production of new and more local axe types.

In South Scandinavia, the distribution of thin-butted flint axes differs from that of pointed-butted axes. Both types of axes are concentrated in the same regions, but the thin-butted axes show a much broader distribution, thus demonstrating that the agrarian societies expanded during the later phases of the Early Neolithic (Mathiassen 1948; 1959; Hinsch 1955; Malmer 2002; Lüth 2011). The unified material culture observed during the early EN I phase is still present in the late EN I and EN II. But boundaries seem to emerge, reflected by differences in ceramic styles, which are further supported by the distribution of hoards containing thin-butted axes. Types I, II and III of the thin-butted axes are observed on Zealand and in Scania, whereas type IV is mainly concentrated in Jutland (Nielsen 1977) (Fig. V.143). A few thin-butted axe hoards have also been found in Central Sweden, thus suggesting that the depositional practice of sacrificing unused flint axes continues all over South Scandinavia. However, some researchers have argued that the thin-butted axes found in Central Sweden should be interpreted as being associated with a down the line exchange, thus indicating a more indirect connection between agrarian societies in Denmark and Scania with central parts of Sweden (Sundström 2003). However, some of these thin-butted flint axes from Central Sweden are over 30 cm in length, thus indicating that they had no functional value (Fig. V.144). Instead, based on ethnographic parallels, it can be suggested that these were ceremonial axes (Højlund 1979; Pétrequin & Pétrequin 1993a; 1993b). Such ceremonial axes may have been associated with important symbolic practices, which is supported by the fact that over 95% of these thin-butted axes that are over 30 cm in length were unused when they were deposited in wetland areas, at sites or in burials all over South Scandinavia (Nielsen 1977; Karsten 1994; Ebbesen 1994; Rudebeck 2002; Hansen 2009) (Fig. V.73). As at least 60% of these thin-butted axes display a brown, red, blue or yellow patina, most of them must have been deposited in wetland areas (Fig. V.107). Exchanges of ceremonial axes were probably important for maintaining direct social relations, through marriage alliances with neighbouring or more distant agrarian societies, located in the boundary areas of the Funnel Beaker culture in Central Sweden.

In boundary areas of the Funnel Beaker culture the acceptance of certain trends and the rejection of others may have occurred. The agrarian region of East Central Sweden received impulses from the hunter-gatherer societies of Central and northern Scandinavia, as slate knives have been found at Early Funnel Beaker sites (Bakka 1976; Taffinder 1998; Hallgren 2008) (Fig. V.145). There does not seem to have been any production of slate at the Early Neolithic sites, which means that the knives must have been imported through direct or indirect social contact with hunter-gatherers. Direct contact may have occurred, which is supported by the appearance of double-edged battle axes in Central and North Scandinavia (Fig. VI.6). These hunter-gatherers in northern Scandinavia were probably interested in the symbols of power associated with the agrarian Funnel Beaker culture, but did not adopt any of its agrarian practices (Kaul & Sørensen 2012). One of these slate knives has been found as far away as Denmark, at the kitchen midden site of Vaalse Vig on Falster, thus showing how extensive the networks were in the Early Neolithic period, these also involving objects from Central and northern Scandinavia (Bahnson 1892, 166ff; Müller 1896, 313; Taffinder 1998) (Fig. V.146 and Table 71). Another important object associated with the first agrarian societies in South Scandinavia is the polygonal battle axe.

9.10. Polygonal battle axes

Polygonal battle axes have been interpreted as symbolic objects associated with rituals. They could not have been used for any practical purposes, as they are small and do not have sharp edges (Jażdżewski 1936; Zápotocký 1992). However, their elaborate and unsharpened edges could have been utilised as striking weapons. A number of rare finds suggest that the polygonal battle axes had a shaft measuring 50-60 cm, thus making them impressive weapons that expressed individuality and power, therefore reflecting a more hierarchical agrarian society in Central Europe (Zápotocký 1992, 158ff; Christensen 2004, 140). The polygonal battle axes were initially produced in Eastern Europe during the late 5th millennium BC, and were made from copper and stone (Fig. V.147

and Table 62). The axe type swiftly spread further north to Central Europe during the early 4th millennium BC, where it was primarily imitated in stone (Todorova 1981; Zápotocký 1992; Ebbesen 1998; Hallgren 2008; Sørensen 2012b). The distribution of the Early Neolithic battle axes shows some rather dense concentrations in Central Europe connected to both the Michelsberg and Baalberg cultures (Lüning 1968). Polygonal battle axes have also been found in significant numbers in South Scandinavia, of the same types as those found in Central Europe, once again indicating contact with Central European agrarian societies during the Early Funnel Beaker culture from the start of the early EN I phase (Tables 27 and 63). A few polygonal battle axes of copper have also been found in South Scandinavia, at Oxie and Steinhagen, which suggest possible contacts with either the Mondsee region in Austria or North-East Bulgaria (Todorova 1981; Klassen 2000). Most of the polygonal battle axes found in South Scandinavia are made from diabase or basalt, therefore suggesting that they were produced locally. The interpretation is further supported by finds of rough-outs for making polygonal battle axes. But the detailed knowledge and imitations of the shape of these axes indicates that South Scandinavian farmers were interconnected in a large agrarian network, in which new trends relating to the shape of these battle axes could spread rapidly between the different societies.

The earliest battle axes are types I-II in Klaus Ebbesens typology (1998, 77ff) or types F-I, II and III in Zápotockýs typology (1992), which are characterized by a flat neck, while the other types K-I, II, III, IV and V (Ebbesen types III, IV and V) have a knob-shaped neck (Fig. V.148). The F-I type battle axe was found in the Dragsholm burial. An antler pick from the burial was ^{14}C dated to 5090±65BP (4036-3712 cal BC, AAR- 7418-2), while a human bone was ^{14}C dated to 5102±37BP (3973-3797 cal BC, AAR-7416-2), thus dating this battle axe type to the beginning of the 4th millennium BC (Brinch Petersen 2008: 33ff). Another polygonal battle axe of type F-IV was found in the long barrow at Rustrup, where three radiocarbon dates of charcoal from the ditches clustered around 3800 to 3600 cal BC, thus indicating that this type belongs to the late EN I. Polygonal battle axes of type K III or V have also been found in radiocarbon dated contexts from the Early Funnel Beaker sites at Anneberg, Alby, Hyllie and Skumpaberget in Sweden (Hallgren 2008). The majority of the ^{14}C dates are concentrated around 3800 to 3600 cal BC, thus placing the types K III and V within the late EN I phase of the Early Funnel Beaker culture (Fig. V.149). The distribution of the earliest types F I-III in South Scandinavia also reaches its limit between the boreonemoral and southern/middle boreal vegetation zone, as is the case with the distribution of all the other artefact groups and agrarian evidence associated with the Early Funnel Beaker culture (Fig. V.150). The distribution of types K I and K II shows concentrations in Zealand, Scania and the Mondsee region in Austria, thus indicating a connection to this region during the early EN I and EN II phases. The connection to the Mondsee region is further supported by the distribution of thin-butted copper axes with splayed edges (Fig. V.151). The distribution of the polygonal battle axes of type K IV, on the other hand, shows concentrations in Zealand, Scania and Mecklenburg-Vorpommern, which suggests that there may have been a number of connections to different regions at different times in these agrarian networks (Fig. V.152). There are also some examples of more local South Scandinavian polygonal battle axe of types K-III and K-V, which are concentrated in Central Sweden and southern Norway (Fig. V.153). The quantities of locally produced preforms indicate that it was important for these agrarian societies in Central Sweden to create their own imitations, and perhaps their own meanings for the objects, in a process of hybridisation. The necessity of creating a more regional material culture seems to have been a growing tendency during the latter part of the Early Neolithic in certain regions of South Scandinavia, which took place at the same time as the adoption of selected trends and ideas from the larger agrarian network.

10. BECOMING PART OF A LARGE AGRARIAN NETWORK DURING THE EARLY 4TH MILLENNIUM BC

The establishment of an agrarian society in South Scandinavia during the early 4th millennium BC also involved the construction of visible structures and monuments, which demonstrated that the region was an integrated part of a larger European agrarian network. The introduction of two-aisled houses, paired pits, long barrows and causewayed enclosures, together with their European connections, will therefore be investigated and discussed in the following section.