Bronze Age Settlement and Land-Use in Thy, Northwest Denmark

Vol. I

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Vol. I

Edited by Jens-Henrik Bech, Berit Valentin Eriksen
& Kristian Kristiansen

Museum Thy

Jutland Archaeological Society

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Front cover: Bronze Age barrows at Elsted, central Thy. Photo: J.-H. Bech.

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Preface

Jens-Henrik Bech, Berit Valentin Eriksen & Kristian Kristiansen

The 'Thy Project' is the convenient shorthand term we have always employed for the Thy Archaeological Project, which is central to this book (for English speakers, Thy [tˢy:ˀ] is pronounced with a hard 'T' – the 'h' is silent' – rather like 'Tu', with stress on the T; our American friends never quite learned it). The Thy Archaeological Project began as a collaborative, interdisciplinary and international field project that ran from 1990 to 1997 (first synthesis published in 1998 by Earle *et al.*; further publications up to 2010 cf. Earle & Kristiansen 2010, appendices 2-3). In the early years, the excavation focus was mainly on Late Neolithic settlements in central Thy (published in 2008 by Martinez). But from 1993 onwards, it shifted to a number of Bronze Age settlements in central and northern Thy. The fieldwork was succeeded by a long post-excavation analysis phase – when new project members were added to fill gaps and address specific aspects – culminating, after 20 years, in this two-volume publication of the Bronze Age evidence. The project's three strands of collaboration, together with its philosophy and development, will be briefly outlined here. They reflect the circumstances and conditions that face all modern archaeological field projects, and it is hoped that future projects may benefit from our experience in the Thy Project (see also Preface to Earle & Kristiansen 2010).

The first collaborative strand involved ten years of cooperation (1983-1995) between the National Agency for Nature Conservation and Forestry, Division for Archaeological Heritage (now The Danish Agency for Culture and Palaces, the former institution headed until 1994 by Kristian Kristiansen), and the Geological Survey of Denmark, Division for Geo-botanical Research (now The Geological Survey of Denmark and Greenland, headed by Svend Thorkild Andersen† during the same period). This collaboration was aimed at producing regional pollen diagrams for areas of dense prehistoric settlement across Denmark. The Division for Archaeological Heritage (who financed the work), and the Division for Geo-botanical research (who undertook the analyses), set up a long-term plan to cover the entire country, which resulted in a series of modern pollen diagrams produced by Svend Thorkild Andersen, Bent Aaby, Bent Odgaard and later also Peter Rasmussen. These pollen diagrams revealed the impact of prehistoric settlements on the vegetation in south Jutland, Djursland, northern Jutland, central Zealand and, finally, in Thy. Subsequently, local pollen data from Bronze Age barrows in Thy (published in Andersen 1999) and from megalithic monuments were added, too (published in Andersen 1992). However, the Thy pollen diagrams (one from Hassing Huse Mose and one from Ove Sø, the latter identical to the former and therefore only published in an internal report) were remarkable in showing a major and sudden 'landnam' around 2700 BC. This was linked to the Single Grave culture, which created an open landscape for grazing animals over a period of less than a century. A second clearance episode was evident in the Bronze Age, beginning around 1500 BC, which eliminated most of the remaining forests. They represent one of the most dramatic regional pollen sequences in northern Europe, but they make perfect sense archaeologically. Thy is renowned for its thousands of large Bronze Age barrows, which still crown the landscape and make it one of the most authentic barrow landscapes in Europe. The region has also produced some of the richest Bronze Age burials, especially from period III. The obvious next step was therefore to undertake an archaeological survey within the 10 km catchment area for the pollen diagram to gain an overview of the settlements. The results of this work were supplemented by local pollen data from excavated barrows (Andersen 1999), and later by pollen analyses of sediments associated with the buried Bronze Age fields excavated at Bjerre Enge, northern Thy, in order to gain an understanding of the local subsistence and landscape development (Andersen vol. I, chap. 9). This environmental strand was later developed further by several other scientists, both during and after the excavations.

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The second collaborative strand involved the regional archaeological museum, Museum Thy, (formerly: Museet for Thy og Vester Hanherred) personified by Jens-Henrik Bech, who agreed to join the project, taking on responsibility for curation of finds and participating in the planning and implementation of the project, as well as the publication of its findings. Through the participation of Jens-Henrik Bech, and for long periods also his wife, Anne-Louise Haack Olsen, the museum thereby became engaged as a full project partner. This led on to the third strand of international collaboration. Jens-Henrik and Kristian Kristiansen soon realised that international partners were needed who could bring in students for field surveys and excavations. They invited Timothy Earle (UCLA, later Northwestern University, Chigaco), who fortunately for us had just been forced by local circumstances in Peru to terminate his field project there, to join the project team. He was therefore ready and prepared to bring his team of colleagues and students (e.g. John Steinberg and Peter Aperlo) to Thy, and to a completely different experience. However, he was the first to point out that we could not simply machine off the plough soil to gain access to the Bronze Age post holes, because the plough soil held what was left of Bronze Age cultural layers. Together with his graduate student John Steinberg, he designed a plough-soil research programme. Soon afterwards, we also invited Michael Rowlands from University College London to join us. He brought with him his graduate student Nick Thorpe, who would soon take over the field survey work with his team of students, when Michael had to leave for fieldwork in Africa. Between 1994 and 1997, the continuing survey work was led by Danish student Jørgen Westphal. Then, from 1994, when Kristian became Professor of Archaeology at the University of Gothenburg, student teams from Sweden were also brought to participate in the project.

It was inevitable that the project would benefit from involvement in the on-going rescue excavations of Bronze Age settlements undertaken by Museum Thy. The museum, in turn, would profit from the project's package of survey techniques, from plough-zone sampling to soil sieving and flotation. Collaboration with rescue archaeology led us first to the Aas ridge and Martin Mikkelsen, who soon after joined the project and was instrumental in excavating the Legaard site with Kristian Kristiansen and his team from 1996-1997. Then newly discovered Bronze Age sites with preservation of wood led us to Bjerre Enge in northern Thy, where rescue excavations on a former raised seabed had uncovered a rich Bronze Age cultural landscape that even included Bronze Age fields represented by ard marks. Anne-Louise Haack Olsen, from the museum, was part of the team as on-site director, together with Tim Earle at Bjerre 6 (1994-1995) and Bjerre 7 (1996-1997). As a result, we were finally able to cover the entire Bronze Age sequence of settlements by combining these three areas – Sønderhå and the Legaard settlement, the Aas Ridge, on the Limfjord coast, and the Bjerre Enge settlement, close to the North Sea. We officially terminated the fieldwork part of the project in 1997.

Berit Valentin Eriksen (now Centre for Baltic and Scandinavian Archaeology (ZBSA), Schleswig) and Inge Kjær Kristensen (now Museum Salling) joined the project at an early stage to analyse the large flint and pottery assemblages resulting from the excavations (Kristensen vol. II, chap. 18; Eriksen vol. II, chap. 21). During and after the Bjerre excavations a number of colleagues from a whole range of Danish and foreign institutions also contributed to the project with different kinds of supplementary analyses ranging from geological, archaeobotanical and archaeozoological subjects and much more. This involved Marianne Rasmussen from The Danish Agency for Culture and Palaces (vol. I, chap. 2), Jesper Olsen, Marie Kanstrup, Helle Juel Jensen, Kristian Dalsgaard & Mette Westergaard Nielsen from Aarhus University (vol. I, chap. 2; vol. II, chap. 23 and 26), Kristian Søgaard, Charlie Christensen, Morten Fischer Mortensen, Peter Steen Henriksen, David Earle Robinson, Jan Harild, Annine Moltsen, Kjeld Christensen, Aoife Daly, Orla Hylleberg Eriksen and Claus Malmros from The National Museum (vol. I, chap. 8, 10; vol. II, chap. 25), Georg Nyegaard from The National Museum of Greenland (vol. II, chap. 27), Kaj Strand Petersen† and Frants von Platen-Hallermund from The Geological Survey of Denmark and Greenland (vol. I, chap. 7), Kaare Lund Rasmussen from The University of Southern Denmark (vol. II, chap. 19), Hans Peter Stika from The University of Hohenheim, Stuttgart (vol. II, chap. 31) and Svend Isaksson from Stockholm University (chap. II, chap. 20). Finally, the archaeologist and architect Bente Draiby made reconstructional drawings of some Bronze Age houses from Thy (e.g. contribution in vol. II, chap. 29).

The Thy Project has a remarkable history of constructing new archaeological machines. Inspired by a 'home-built' prototype at Museum Thy, John Steinberg, who carried out an extensive and laborious programme of plough-soil sampling for his PhD research (see Earle & Kristiansen 2010, appendix 2), constructed a highly efficient sieving machine that freed labour to speed up the sampling process (published in his award-winning Antiquity article in 1996). Similarly, to support another of Tim Earle's students, Kristina Kelertas, who undertook archaeobotanical analyses for her PhD research (see Earle & Kristiansen 2010, appendix 2), he called upon his colleague Christine Hastorf, who came to Thy and had a flotation machine constructed based on her latest best experience.

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It is our basic philosophy that the social and academic lives of a project are intrinsically linked. When working in Thy, professors and students alike lived together and shared the sometimes primitive conditions encountered during the project. The small-talk around the dinner table, which often developed into interesting conversations, combined with regular weekly briefings and evaluations, which also included the airing of complaints, helped to keep the project team motivated. We established various traditions, such as a regular mini-conference, with presentations by members of the team and invited guests, and the annual eel dinner also became an institution (tragically eels are now nearing extinction). We also tested the Bronze Age cooking pits, with the most delicious results, when Jens-Henrik Bech, at his 50th birthday party, fed the team with meat cooked the Bronze Age way.

Once the fieldwork came to an end, the long, laborious process of post-excavation analyses began (articles were published along the way, especially pollen research and some archaeological syntheses, see below). Jens-Henrik Bech took over the leadership of this process, later aided by Berit Valentin Eriksen and Kristian Kristiansen, bringing in new members where required, organising regular meetings of the project team to present and discuss results, and applying for grants to allow participants to finalise their contributions. New results from on-going excavations were also added along the way.

The present publication is the result of these efforts to shed light on the Bronze Age in Thy from many different angles and involving as broad a spectrum of disciplines as possible and to place the archaeology of the area in both a regional and a broader supraregional, North Sea context. A total of 31 main and co-authors made this possible and contributed in the true spirit of the Thy Project to create this multi-author and multi-disciplinary work, which also includes two major 'hard core' artefact studies based on the challenging Bronze Age pottery from Bjerre and Legaard (Kristensen vol. II, chaps. 18 and 30) and the large flint assemblage from Bjerre (Eriksen vol. II, chap. 21).

On a final note, we wish to thank all those involved during the different stages of the project, from field research over post-excavation analyses to publication. Most notably the grant-supporting institutions, Museum Thy, the National Agency for Nature Conservation and Forestry, the Geological Survey of Denmark, the National Museum of Denmark, the National Science Foundation in the USA (DBS 9207082, DBS 9116921), the British Academy's Small Grants in Archaeology, the Swedish Riksbankens Jubileumsfond, who financed this publication, together with the Danish Farumgaard-Foundation, the Danish Research Council for the Humanities, the Danish Agency for Culture and Palaces, Queen Margrethe II's Archaeological Foundation, the Beckett-Foundation, the Elisabeth Munksgaard Foundation and the Centre for Baltic and Scandinavian Archaeology in Schleswig.

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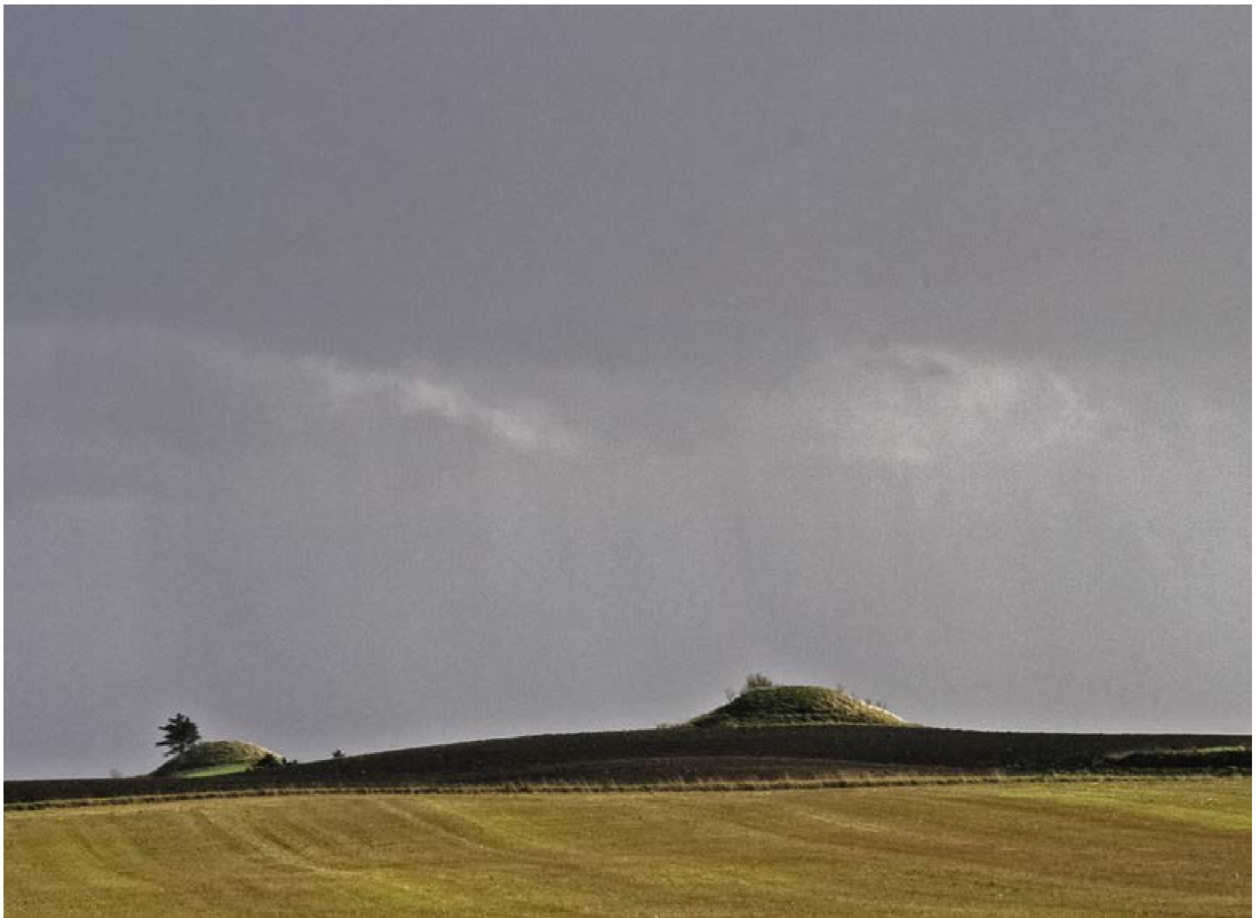

Burial mounds at Dollerup to the east of the Bronze Age site Klostergård in central Thy (cf. Olsen vol. II, chap. 32). Photo: J.-H. Bech.

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Chapter 1

The Thy Archaeological Project

Results and reflections from an international archaeological project[1]

Jens-Henrik Bech

Introduction

Thy, in northwest Jutland, is bordered to the west by the North Sea and to the east and south by the Limfjord. Thousands of barrows were constructed here, particularly during Early Bronze Age periods II and III (from 1500 to 1100 BC). Wherever one turns, one or more of these burial mounds meets the eye on the horizon.

With its rich legacy of burial sites, Thy was ideal for a diachronic settlement project aimed at testing interpretations of Bronze Age society against the evidence of settlement and environment, and this was the starting point for the Thy Archaeological Project (henceforth referred to as TAP).

TAP was an international venture bringing together archaeologists from Denmark, the United States, Great Britain and Sweden for fieldwork and surveys during the years 1990-1997. Main themes in the project were settlement studies, household archaeology, social organisation and the ecological background – all seen in a long-term perspective. The project was originally planned to cover developments through a very long chronological sequence, from the beginning of the Neolithic period (4000 BC) to AD 1800, but faced with reality the main focus was subsequently narrowed down to the Late Neolithic and Bronze Age (2350-500 BC).

The short presentation of the project given in this chapter will mainly deal with some of the results and data from surveys (for a more comprehensive presentation of the project and some of the main results see Earle *et al.* 1998; Earle & Kristiansen 2010; see also Thorpe 1997; Kelertas 1997; Steinberg 1996, 1997; Kristiansen 1998; Bech 1998, 2003; Bech & Mikkelsen 1999).

Pollen analysis

In the planning of TAP as an interdisciplinary archaeological settlement project, great emphasis was placed on pollen-analytical and archaeobotanical studies in order to understand the vegetational history of the region and the agricultural exploitation of the area in prehistory. The pollen-analytical data came first of all from two regional pollen diagrams: one from a bog, Hassing Huse Mose, and the other from lake sediments in a lake, Ove Sø, both in central Thy (fig. 1.1) (Andersen 1995a-b). The distance between the two sites where the pollen cores were taken was only 3.8 km. The pollen diagrams demonstrated a major *landnam* during the early 3rd millennium BC, corresponding to the Bottom Grave period of the Single Grave culture (fig. 1.2). This is one of the most massive forest clearances seen in northern Europe (Kristiansen 1998), and the pollen spectra clearly show that woodland was removed and replaced by open land with fields and pastures during the Middle and Late Neolithic. Treeless areas increasingly expanded in the Early Bronze Age (1700-1100 BC), when trees became mainly restricted to wetlands. As will be demonstrated in the subsequent chapters, the archaeological data also indicate that as early as Early Bronze Age period II, problems of procuring good-quality building timber were a matter of concern to the Bronze Age people of Thy. Supplementary pollen spectra from soils sealed within or under Early Bronze Age mounds tell the same story of extensive land-use, perhaps mainly based on animal husbandry (Andersen 1999). In the Late Bronze Age (1100-500 BC), treeless areas continued to be widespread, although some recovery of secondary forest took place. This development continued into the Early Iron Age, when the extensive use in northwest Jutland of houses with turf walls during the period 500 BC to AD 200 no doubt reflects a lack of timber and the openness of this wind-exposed landscape facing the North Sea.

How are these pollen-analytical conclusions about land-use reflected in the archaeological material? The major decline in woodland, especially during the Early Bronze Age, is no doubt reflected indirectly in the number of burial mounds, which had to be seen in an open landscape – but what about settlements from the

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Figure 1.1. The location of Thy, Denmark.

same period? When TAP began, knowledge of Bronze Age sites in Thy was almost non-existent (Bertelsen *et al.* 1996), and there were also problems with the Neolithic period, although finds in museums and in private collections indicated a potential in this respect (Steinberg 1997). Various methods can be used to shed light on incongruities between the pollen-analytical evidence and the archaeological record: recording of private collections of artefacts, field surveys, shovel tests, plough-zone screening and ultimately excavation – both trial and full-scale. Each of these methods has various different limitations, but together they supplement each other. In the following, results mainly derived from field surveys will be used to show the archaeological evidence for human impact on the environment during the Neolithic and Bronze Age periods, especially with regard to the 'missing' Bronze Age settlements.

Field surveys

Regional pollen diagrams are now believed to reflect the general vegetational history of the landscape within a radius of 5 km of the sampling site (Odgaard & Rasmussen 2000). This is a reduction relative to earlier views (Andersen *et al.* 1983), which is the reason why a 10 km circle was originally chosen by TAP as the limit for the primary research area shown in figure 1.3. Two of the main areas for surveys were located within this 10 km circle: one inland (Sønderhå/Snedsted/Hørsted – area 1) and the other along the coast of the Limfjord (Heltborg – area 2). A further Limfjord area was chosen to the north, outside the circle (Sjørring/Tilsted – area 3), to reflect the broad landscape variation of Thy's moraine soils, which primarily consist of sandy till in inland areas and mainly clay-rich till along the Limfjord (Pedersen & Petersen 1989; see also Bech & Rasmussen vol. I, chap. 2, fig. 2.1).

Survey findings

A total area of 8.4 km^2 was surveyed using a standard procedure of line walking at 10 m intervals and detailed recording in 50 x 50 m blocks at the sites.[2] Of the collected artefacts dating from the Late Bronze Age and the Iron Age, more than 95% comprised pottery, while a very different situation characterised the material from earlier periods, with flint flakes and flint tools making up the bulk of the survey finds. Unfortunately, although 3684 surface finds are recorded in the TAP database, only an extremely small proportion of these is datable to one main period. As illustrated in figure 1.4, 16% of the datable stone artefacts belong to the Funnel Beaker culture (AYT,) while only 9% have a clear Late Neolithic (AYS) date. The majority of the stone artefacts can therefore only be dated in more general terms. One large group of finds consists of small fragments of polished flint axes and other artefacts that cannot be dated more precisely than to the Neolithic in general (AYX). This group includes 22% of the survey finds, while almost 40% are only datable to either the Late Neolithic or the Early Bronze Age (AYS/BÆX). The final group consists of artefacts such as daggers, sickles and arrowheads made in bifacial technique – a technique that was in use in the Late Neolithic and the Early Bronze Age. Since survey finds normally consist of fragments, it is only possible in some cases to narrow down the dating of these to one of the two periods. In order to use these latter finds in the calculations below, we therefore proposed the hypothesis that half of the total amount of the AYS/BÆX artefacts date from the Late Neolithic and the other half from the Early Bronze Age. In the same way it is presumed that

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half of the total artefacts dated to the Neolithic in general (AYX) belong to the Funnel Beaker or the Single Grave culture (AYT/AYE), while the other half is from the Late Neolithic (AYS). By doing this, it becomes clear that the number of estimated Late Neolithic artefacts is much greater than the number of artefacts from the earlier part of the Neolithic. This becomes even more evident when the length of the chronological periods in question is taken into account. Together, the Funnel Beaker culture and the Single Grave culture lasted about 1500 years, while the Late Neolithic had only about half this duration. The number of estimated artefacts per year in the Late Neolithic is therefore about three times as high as the corresponding figure for the earlier periods. This picture does not change significantly if the Neolithic artefacts in the AYX group are also divided up according to the length of the chronological periods, so that two thirds of the AYX finds go to the earlier chronological groups (instead of half the total amount to each of the groups as described above).

This difference between the number of survey finds from the early and late part of the Neolithic is important and corresponds very well with the number of sites from the two periods. The fact that survey finds from the Bronze Age are almost as unusual as finds from the Funnel Beaker and Single Grave cultures is primarily due to the exclusion of pottery from the calculations. As will become clear below, sites from the Late Bronze Age and Early Iron Age with ploughed-up potsherds were frequently encountered (see fig. 1.5A-B).

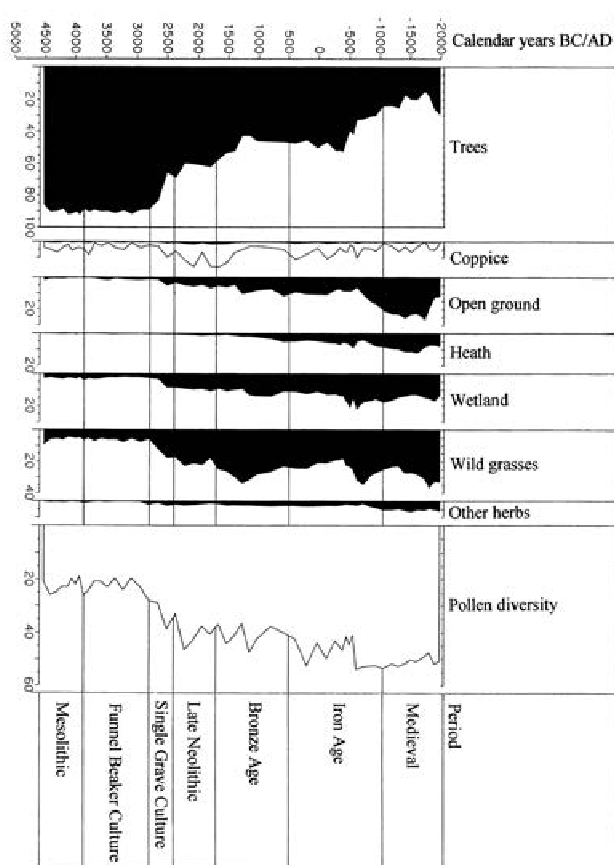

Figure 1.2. Ove Sø. Pollen spectra for the various plant groups and curve showing pollen diversity. After Andersen (1995b, fig. 10).

Sites

Using results from plough-zone screenings as site signatures, Steinberg (1996, 1997) has clearly demonstrated major differences in flint production between the sites. As a consequence, some sites are easy to locate during surveying, while others are difficult or impossible to find in this way. In spite of these obstacles, the number and dates of the survey sites do augment the above discussion.

During the TAP surveys the term 'site' was used as a rather broad term, not defined by for example a certain number of tools or artefacts per square metre. So whenever the survey crew found a concentration of flakes, stone tools, pottery, fire-cracked stones or dark charcoal-coloured patches on the ploughed field surface, this term was applied. With reference to formal discussions about how to use the term 'site', or whether 'sites' exist at all, we have been able to demonstrate by plough-zone screenings and shovel tests that our survey sites from the Neolithic and the Bronze Age really do exist as more or less clear concentrations of flakes in the plough soil (Steinberg 1996, 1997).

As a consequence of the problems in assigning specific dates to the survey finds, many sites cannot of course be dated precisely, and the TAP surveys have recorded 38 sites with such broad dates that they are useless in this respect. From figures 1.5A and 1.5B it is evident that, with regard to the datable survey sites, almost the same picture emerges as that for the survey finds as a whole. This is of course due to the fact that about 65% of all the survey artefacts were found on sites. The only difference relative to the calculations shown in figure 1.4 is that pottery is also included as dating evidence for the sites.

In order to obtain as clear a picture as possible of the overall situation, all sites with less than two datable objects from at least one of the periods have been omitted. In other words, a site is only dated to a specific period if it has yielded two or more datable objects from that period. By this definition, a single object from another period is regarded as a 'stray find' and does not count. On this basis only two survey sites have been dated to the Funnel Beaker culture, six to the Late Neolithic and eight to the Bronze Age, while 15 have been dated to the Early Iron Age (fig.

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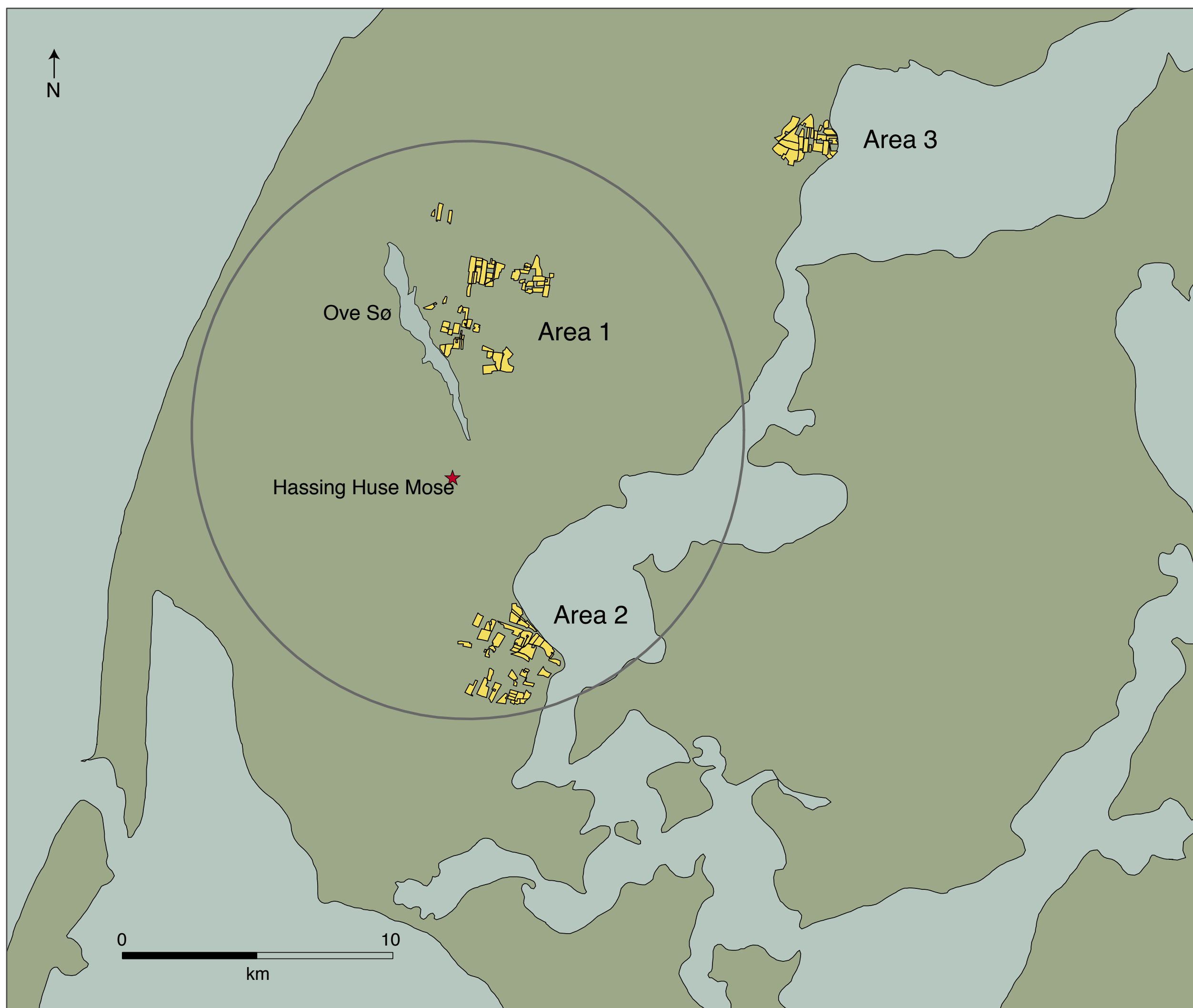

Figure 1.3. Survey areas for the Thy Archaeological Project (TAP) and the 10 km circle.

1.5A). The number of datable sites – few as they are – clearly shows the same situation for the Neolithic and the Bronze Age as that revealed by the datable survey finds, i.e. the largest number of sites are those broadly dated to the Late Neolithic/Early Bronze Age. If these sites are divided equally between the two periods, then some of the missing sites from the Early Bronze Age will no doubt be accounted for, but still they only constitute half the number of possible Late Neolithic sites (fig. 1.5B).

In order to expand the database of the survey sites (TAP in fig. 1.5B), it seems reasonable to add datable sites within the 10 km circle that are recorded in the Danish Agency for Culture's Sites and Monuments register (FF in fig. 1.5B). From these data, the increase in settlement activity within the study area is still clearly visible from the Late Neolithic onwards: If the number of sites per year is employed, this tendency becomes even more marked. As for the decrease in the number of sites from the Late Neolithic to the Early Bronze Age evident in figure 1.5B, this question will be addressed in the section below dealing with developments in population density.

On the basis of this evidence, we can conclude that the major increase in the exploitation of the Thy region took place in the Late Neolithic, between 2350 and 1700 BC. Judging from the pollen data, however, this major impact had already begun in the Single Grave culture a couple of hundred years earlier. The problem is that until now it has been impossible to date one single site in the TAP material securely to this period (though THY 3458 in the Sjørring/Tilsted area might be of this date). But as graves from the Single Grave period demonstrate the presence of this cultural group in the area (Glob 1944; Bech & Olsen 1985), the settlement sites are much more difficult to locate by survey than those of earlier and later periods. They are probably small, like

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<table>
<tr><th></th><th>AYT</th><th>AYE</th><th>AYS</th><th>BÆX</th><th>BYX</th><th></th></tr>
<tr><td>Years</td><td>1100</td><td>450</td><td>650</td><td>600</td><td>600</td><td>TOTAL</td></tr>
<tr><td>Artefacts</td><td>33 (16%)</td><td>4 (2%)</td><td>19 (9%)</td><td>9 (4%)</td><td>11 (5%)</td><td>76</td></tr>
<tr><td>AYX</td><td colspan="3">47 (22%)</td><td></td><td></td><td>47</td></tr>
<tr><td>AYE-AYS</td><td></td><td colspan="2">2 (1%)</td><td></td><td></td><td>2</td></tr>
<tr><td>AYS-BÆX</td><td></td><td></td><td colspan="2">83 (39%)</td><td></td><td>83</td></tr>
<tr><td>BXX</td><td></td><td></td><td></td><td colspan="2">4 (2%)</td><td>4</td></tr>
<tr><td>Estimated artefacts</td><td colspan="2">61.5 (29%)</td><td>85 (40%)</td><td colspan="2">65,5 (31%)</td><td>212</td></tr>
<tr><td>Estimated artefacts per year</td><td colspan="2">0.040</td><td>0.130</td><td colspan="2">0.055</td><td></td></tr>
</table>

Figure 1.4. Datable stone artefacts from TAP surveys. AYT: Funnel Beaker culture (3900-2800 BC), AYE: Single Grave culture (2800-2350 BC), AYS: Late Neolithic (2350-1700 BC), BÆX: Early Bronze Age (1700-1100 BC), BYX: Late Bronze Age (1100-500 BC), BXX: Bronze Age (1700-500 BC).

<table>
<tr><th></th><th>AYT</th><th>AYE</th><th>AYS</th><th>BÆX</th><th>BYX</th><th>CÆX</th><th></th></tr>
<tr><td>Years</td><td>1100</td><td>450</td><td>650</td><td>600</td><td>600</td><td>900</td><td>TOTAL</td></tr>
<tr><td>Sites</td><td>2</td><td>0</td><td>6</td><td>1</td><td>7</td><td>15</td><td>31</td></tr>
<tr><td>AYX</td><td colspan="3">2</td><td></td><td></td><td></td><td>2</td></tr>
<tr><td>AYS-BÆX</td><td></td><td></td><td colspan="2">11</td><td></td><td></td><td>11</td></tr>
<tr><td>BXX-CXX</td><td></td><td></td><td></td><td colspan="3">1</td><td>1</td></tr>
<tr><td>BYX-CXX</td><td></td><td></td><td></td><td></td><td colspan="2">3</td><td>3</td></tr>
<tr><td>Estimated sites</td><td colspan="2">3</td><td>12.5</td><td>6.5</td><td>9</td><td>17</td><td>48</td></tr>
</table>

Figure 1.5A. Datable sites from TAP surveys. AYT: Funnel Beaker culture (3900-2800 BC), AYE: Single Grave culture (2800-2350 BC), AYS: Late Neolithic (2350-1700 BC), BÆX: Early Bronze Age (1700-1100 BC), BYX: Late Bronze Age (1100-500 BC), CÆX: Pre-Roman and Roman Iron Age (500 BC-AD 400), CXX: Iron Age (500 BC-AD 800).

<table>
<tr><th>Time</th><th colspan="2">AYT</th><th colspan="2">AYE</th><th colspan="2">AYS</th><th colspan="2">BÆX</th><th colspan="2">BYX</th><th colspan="2">CÆX</th></tr>
<tr><td></td><td>TAP</td><td>FF</td><td>TAP</td><td>FF</td><td>TAP</td><td>FF</td><td>TAP</td><td>FF</td><td>TAP</td><td>FF</td><td>TAP</td><td>FF</td></tr>
<tr><td>NUMBER (%)</td><td>3
(3%)</td><td>3
(3%)</td><td>0</td><td>2
(2%)</td><td>12.5
(11%)</td><td>11
(10%)</td><td>6.5
(6%)</td><td>2
(2%)</td><td>9
(8%)</td><td>8
(7%)</td><td>17
(15%)</td><td>38
(34%)</td></tr>
<tr><td>TOTAL</td><td colspan="2">6 (5%)</td><td colspan="2">2 (2%)</td><td colspan="2">23.5 (21%)</td><td colspan="2">8.5 (8%)</td><td colspan="2">17 (15%)</td><td colspan="2">55 (49%)</td></tr>
<tr><td>YEARS</td><td colspan="2">1100</td><td colspan="2">450</td><td colspan="2">650</td><td colspan="2">600</td><td colspan="2">600</td><td colspan="2">900</td></tr>
<tr><td>SITES PER YEAR</td><td colspan="2">0.005</td><td colspan="2">0.004</td><td colspan="2">0.036</td><td colspan="2">0.014</td><td colspan="2">0.028</td><td colspan="2">0.061</td></tr>
</table>

Figure 1.5B. Estimated number of datable sites from TAP surveys augmented with other datable sites recorded (status in 2000) in the Danish Agency for Culture's Sites and Monuments register (FF) within the 10 km circle (sites along the North Sea coast included). Abbreviations for time periods – see figure 1.5A.

	Inland (3.216km^2)	**Limfjord coast (5.182km^2)**	**Total**
AYT + AYE	8 (0.0025 pr. km^2)	29 (0.0056 pr. km^2)	37
AYX	15 (0.0047 pr. km^2)	32 (0.0061 pr. km^2)	47
AYS + BÆX + AYS-BÆX	67 (0.0208 pr. km^2)	44 (0.0085 pr. km^2)	111

Figure 1.6. Datable stone artefacts from TAP surveys. Distribution inland (fig. 1.3, area 1) and on the Limfjord coast (fig. 1.3, areas 2-3). Abbreviations for time periods – see figure 1.5A.

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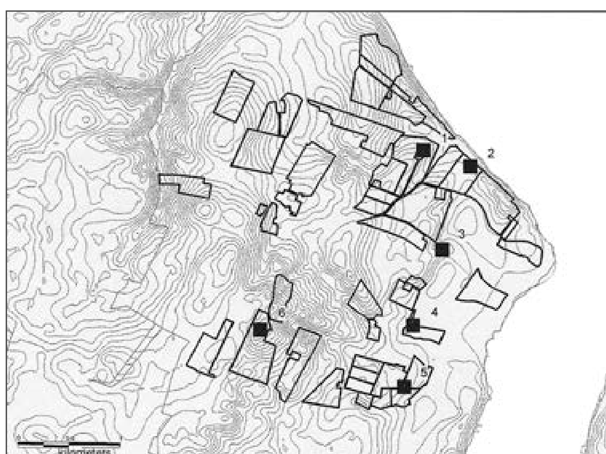

Figure 1.7A. Datable sites from the Neolithic and the Early Bronze Age in Heltborg parish (fig. 1.3, area 2). Surveyed fields marked. 1-6: Sites.

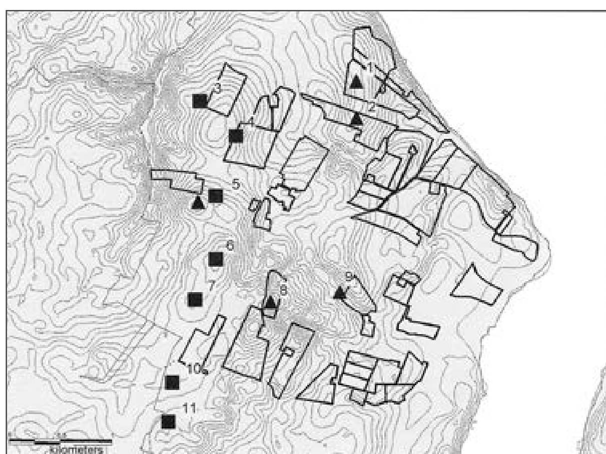

Figure 1.7B. Datable sites from the Late Bronze Age (triangles) and the Early Iron Age (squares) in Heltborg parish (fig. 1.3, area 2). Surveyed fields marked. 1-11: Sites.

the Mortens Sande site in the Lodbjerg area (Bech vol. II, chap. 11; Liversage 1988; see also Mathiassen 1948; Hvass 1986; Rostholm 1986). In the Heltborg and Sønderhå/Hørsted areas, a number of flint axes in private collections are important to a discussion of the presence of the Single Grave culture here. Of the 120 axes recorded, two thirds are of the thick-butted type, and of these the majority are typical of the way axes were made in the Single Grave culture. We can therefore say that these axes were very probably used in the first extensive clearances of the woodland in Thy.

In conclusion, it can be stated that the combined archaeological data from Thy confirm the picture obtained from the pollen data with respect to the Neolithic.

Developments in population density

When dealing with the numbers of sites, the fact that the sizes of the sites from the different periods are clearly not the same must be taken into account. In our count, large Iron Age sites that could accommodate a large number of people have the same weight as small sites from for example the Funnel Beaker culture. However, there is no doubt that the increasing number of sites from the Neolithic to the Iron Age indicates a rise in the population density, but still we have no evidence that permits us to go into detail. The hypothesis that there was stabilisation of, or perhaps even a decline in, the population size from the Late Neolithic to the Early Bronze Age in Thy, as suggested by Timothy Earle (Earle 1997; see also Earle *et al.* 2010), may find some support in the survey data. However, it seems much more likely that we are dealing with a question of the different visibility of sites of the Late Neolithic and those of the Early Bronze Age. It is evident that Bronze Age sites can be difficult to detect during surveys (Mikkelsen 1991). A decline in the number of diagnostic tools from the Stone Age to the Bronze Age could also have an influence. Furthermore, it seems rather unlikely that a decline in population density took place, taking into consideration the number of burials from the two periods: The Early Bronze Age burials vastly outnumber those from the previous centuries. The results of the investigations carried out by Museum Thy and Martin Mikkelsen in the Aas area (fig. 1.1), facing out towards the Limfjord just south of the survey area in Tilsted/Sjørring parishes, also clearly demonstrate that, with regard to this micro-region, the Bronze Age sites and houses excavated here do not demonstrate any decrease whatever in the level of activity and the size of the population between the Late Neolithic and the Early Bronze Age. As the Bronze Age impact is much more clearly evident than that of the Late Neolithic, the opposite is more likely to be true (Mikkelsen 2003, vol. II, chap. 28). This conclusion is further supported by subsequent excavations across the whole of Thy (Bech & Rasmussen vol. I, chap. 2; Bech vol. II, chap. 11).

Site distribution

Given the restricted number of dated sites, diachronic changes in the settlement pattern can only be tentatively demonstrated and in very broad outline. The main difference between the three surveyed areas is to be found in the Neolithic period, as the Funnel Beaker culture preferred the Limfjord coast to the

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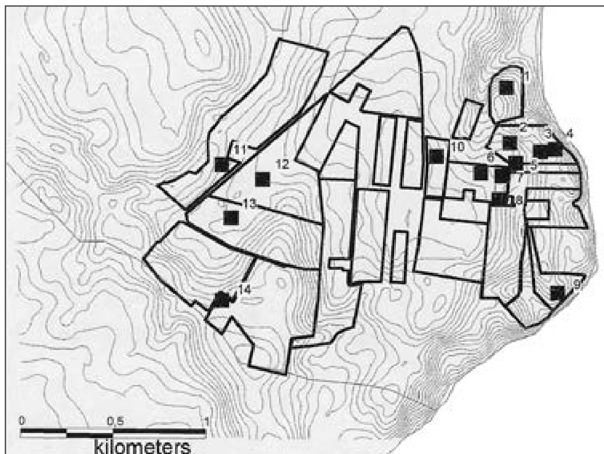

Figure 1.8A. Datable sites from the Neolithic and the Early Bronze Age in Tilsted and Sjørring parishes (fig. 1.3, area 3). Surveyed fields marked. 1-14: Sites.

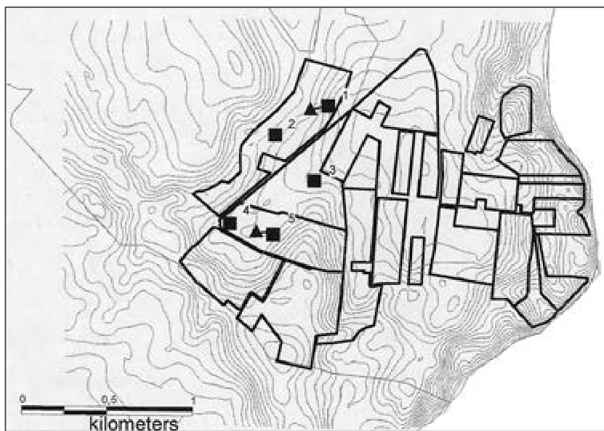

Figure 1.8B. Datable sites from the Late Bronze Age (triangles) and the Early Iron Age (squares) in Tilsted and Sjørring parishes (fig. 1.3, area 3). Surveyed fields marked. 1-5: Sites.

inland region of Sønderhå,[3] while the Late Neolithic (and Early Bronze Age) impact is much more clearly seen at Sønderhå (fig. 1.6). This change no doubt mirrors the major opening up of the inland areas and the development from woodland to grassland that was reflected in the pollen samples. Regarding the Late Bronze Age and Early Iron Age, the situation seems to be more or less the same in the three areas. Meanwhile, an interesting pattern can be observed along the Limfjord coast. Both at Heltborg (fig. 1.7A-B)[4] and in the Silstrup area to the north (fig. 1.8A-B),[5] sites from the Neolithic and the Early Bronze Age are much closer to the coast than those of the Late Bronze Age and Early Iron Age. As the soils are the same, both near the coast and further inland, the reason for this difference cannot be explained solely in terms of a decrease in the importance of the resources from the fjord, but has perhaps also some strategic implication. Evidence of raiding by boat in southern Jutland during the Pre-Roman Iron Age is provided by the Hjortspring boat – a warrior vessel (Rosenberg 1937). So if any external forces threatened the village communities of the Early Iron Age in Thy, they no doubt came from the fjord. The observed change in the preferred position of the sites can therefore tentatively be explained as the introduction of a kind of buffer zone to the coast, for security or other reasons. In a study of the prehistoric settlement of eastern Jutland, B. Ejstrud is able to demonstrate a similar shift away from watercourses – even small ones with no obvious security importance – in the Late Bronze Age and Early Iron Age (B. Ejstrud personal communication). This indicates that other, more general patterns of site relocation could also be a reason for the observed change in the Limfjord region.

The need for transport of goods and better communication between sites could similarly have played a role in the location of Early Iron Age sites, favouring the higher lying areas away from the fjord. Perhaps it is no coincidence that the main road along the Limfjord in the Heltborg region is situated in the same area as the north-south row of Iron Age sites shown on figure 1.7B.

Early Bronze Age sites at Sønderhå

While the Late Neolithic presence in the inland region of Thy is very clear, it is, on the other hand, impossible to see what happened in the Early Bronze Age using the TAP survey data alone. As demonstrated above, one of the disadvantages of the survey method is that it does not produce many clearly datable objects. To overcome this problem, recording of private collections was undertaken, as has been done by many others previously in studies of settlement patterns (Mathiassen 1948; Vedsted 1986), and in doing so we more than doubled the number of datable finds. However, what was gained in the number of finds was to some degree lost in precision, as the actual find spot could sometimes not be remembered exactly by the collectors. Nevertheless, looking through three private collections in Sønderhå, comprising a total of 359 artefacts, we actually found evidence showing that the distribution of Late Neolithic daggers (or fragments of daggers) in the northeastern part of Sønderhå clearly overlaps with the distribution of a special type of Early Bronze Age bifacially worked flint sickle, the asymmetrical sickle (fig. 1.9) (Bech

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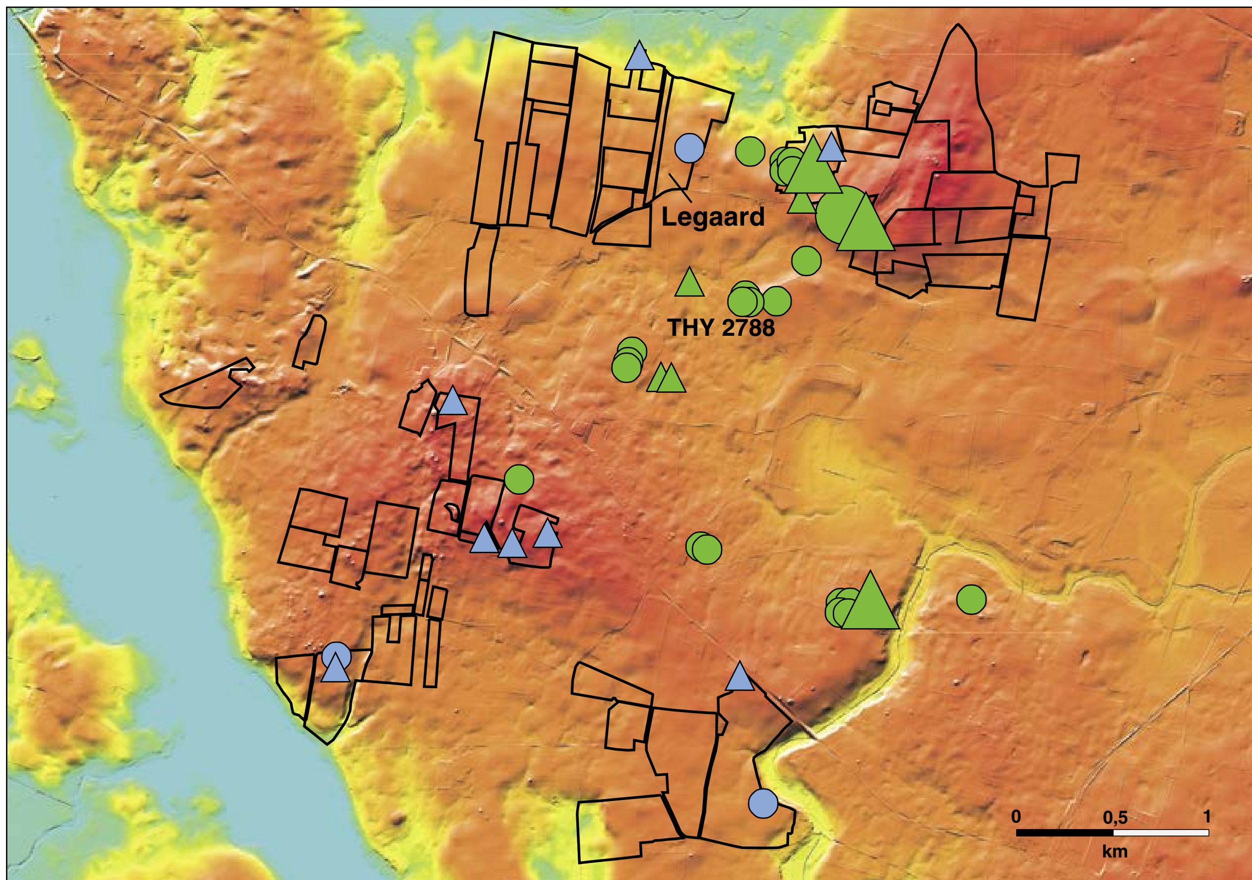

Figure 1.9. LIDAR scan showing the distribution of Late Neolithic daggers (triangles) and Early Bronze Age asymmetrical sickles (circles) found during TAP surveys (blue) or by private collectors (green) in Sønderhå. Large symbols: 5 or more than five examples. Copyright: The Danish Geodata Agency.

1997, vol. I, chap. 2; Eriksen vol. II, chap. 21). The conclusion was easy to reach: The Bronze Age sites are not absent, but are found within the same general topography as those of the Late Neolithic (see also Kristiansen 1998). Based on the survey data, it can be added that with only one field-walking exercise, the Late Neolithic sites are perhaps easier to locate than those of the Early Bronze Age. This could very well be due to increasing specialisation from the Late Neolithic to the Bronze Age, with sites from the latter period appearing to have had a more varied degree of flint production than those of the previous period (Steinberg 1996, 1997). The Legaard site at Sønderhå illustrates this point. Despite its size and the number of houses represented, this site did not have much worked flint on the surface (Earle *et al.* 1998; Mikkelsen & Kristiansen vol. II, chap. 29). On the other hand, a nearby Bronze Age site (THY 2788) was very easy to track both in shovel and plough-zone tests (Steinberg 1996, 1997). This site also yielded a number of Early Bronze Age flint sickles that came to light in a private collection (fig. 1.9) but, in contrast to Legaard, only a few structures from one phase of a single farmstead were revealed by excavation (Earle *et al.* 1998; Earle vol. II, contribution in chap. 29).

When the results of the TAP surveys were published more than 10 years ago (Bech 2003), it was evident that sites from the Bronze Age were under-represented to some extent. They clearly did not match the large number of burials from this period and the magnitude of the human impact deduced from the pollen studies. Not until the results of systematic trial excavations and full-scale excavations of Bronze Age houses, conducted by TAP and as normal rescue excavations by the Museum Thy, were combined with a large number of radiocarbon dates, did we realise how well the settlement data in Thy in fact match the results of the pollen analyses. Given this realisation, the survey data are actually overruled by other evidence and we can conclude that, although a large increase in the level of exploitation of Thy took place in the Late Neolithic, this was continued with a consequent even greater impact during the Early and Middle Bronze Age. The Bronze Age part of this story will be told in the subsequent chapters of this book.

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Notes

1. Parts of this chapter were originally included in an article published by the author in 2003 in H. Thrane (ed.), *Diachronic Settlement Studies in the Metal Ages. Report on the ESF workshop Moesgård, Denmark, 14-18 October 2000*, pp. 13-44. To correspond with the absolute chronology in the present volume, minor changes have been made in the dates used in figure 1.4-5B for the beginning of the Late Neolithic and the Late Bronze Age, respectively.

2. In 1991-1993, TAP surveys were led by N. Thorpe, University College London (now King Alfred's College, Winchester) and in 1994-1997 by J. Westphal, University of Aarhus, Institute of Prehistoric Archaeology, Denmark (now Danish Agency for Culture).

3. Although the western coastline of Thy in the Atlantic and early Sub-Boreal periods was about 5 km inland compared to that of the present day (Jessen 1920), the inland character of the Sønderhå area during the Neolithic and Early Bronze Age is based on the fact that already in the middle of the Atlantic period coastal barriers blocked the connection between the lake Ove Sø and the North Sea (Andersen 1994).

4. Sites on figure 1.7A: 1: Ny Nørregård I, THY 2983 (site no. 110605-142); 2: Bjerregård I, THY 2981 (site no. 110605-141); 3: Heltborg (site nos. 11605-17-18); 4: Toftum II, THY 2978 (site no. 110605-140); 5: Toftum, THY 3425 (site no. 110605-114); 6: Skårhøj, THY 2965 (site no. 110605-26).
   Sites on figure 1.7B: 1: Ullerup II, THY 2982 (site no. 110605-143); 2: Gøggård I, THY 2985 (site no. 110605-144); 3: Ullerup (site nos. 11605-2-3); 4: Ullerup, THY 3460 (site no. 110605-117); 5: Heltborg, THY 1690 (site no. 11605-105); 6: Heltborg (site no. 11605-101); 7: Søndergård, THY 2001 (site no. 11605-107); 8: Heltborg SØ, THY 3855 (site no. 11605-118); 9: Østerdal, THY 2918 (site no. 11605-111); 10: Ginnerup, THY 2004 (site no. 11605-37); 11: Ginnerup Vestergård + Slyngborg (site nos. 11605-88 + 93).

5. Sites on figure 1.8A: 1: Akkedal I, THY 3493 (site no. 110310-84); 2: Silstrup Nord VIII, THY 3500 (site no. 110310-85); 3: Silstrup Nord IX, THY 3701 (site no. 110310-86); 4: Silstrup Nord X, THY 3702 (site no. 110310-87); 5: Silstrup Nord VII, THY 3495 (site no. 110310-88); 6: Silstrup Nord II, THY 3488 (site no. 110310-89); 7: Silstrup Nord III, THY 3489 (site no. 110310-90); 8: Silstrup Nord IV, THY 3490 (site no. 110310-91); 9: Silstrup Hoved VIII, THY 3499 (site no. 110310-93); 10: Silstrup Nord V, THY 3491 (site no. 110310-92); 11: Nr. Nordentoft III, THY 3451 (site no. 110305-266); 12: Sdr. Nordentoft II, THY 3453 (site no. 110305-268); 13: Sdr. Nordentoft IV, THY 3455 (site no. 110305-270); 14: Sdr. Nordentoft VII, THY 3458 (site no. 110305-272); 15: Nr. Nordentoft, THY 2456 (site no. 110305-263).
   Sites on figure 1.8B: 1: Nr. Nordentoft, THY 2456 (site no. 110305- 263); 2: Nr. Nordentoft II, THY 3450 (site no. 110305- 265); 3: Sdr. Nordentoft, THY 3452 (site no. 110305- 267); 4: Sdr. Nordentoft III, THY 3454 (site no. 110305- 269); 5: Sdr. Nordentoft V, THY 3456 (site no. 110305-270).

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Chapter 2

Thy and the outside world in the Bronze Age

Regional variations in a North Sea perspective

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The setting

Introduction

The large number of Bronze Age houses found during rescue excavations in Jutland over the last 40 years provides a good example of how new legislation and new excavation techniques have led to expansion of the archaeological record on a scale that would have been almost inconceivable a few decades ago (Jensen 1988; Rasmussen & Adamsen 1993). As in many other parts of Denmark and neighbouring areas of southern Scandinavia, these developments also took place in Thy, and the results presented in this book, in addition to being the outcome of the Thy Archaeological Project, are also a consequence of this major change in archaeological fieldwork.

Due to its location in the northwestern part of the Jutland peninsula, bordering the North Sea, Thy's contacts with other regions along the North Sea coast were of great importance in both prehistoric and historical times. In this introductory chapter we will therefore examine some of the themes of subsequent chapters in a North Sea perspective and draw comparisons between Thy and selected regions along the North Sea coast.[2]

One major theme is the development of the Bronze Age farmhouse in Thy, in southern Jutland and in Rogaland, Norway, and the large numbers of well-dated settlement sites now available provide a new foundation for analysis and comparison. A second theme, the introduction of byres in the Bronze Age around 1500 BC, is then examined using present evidence from Jutland. This is followed by a section on the contemporary economy that explores common traits in land-use and the subsistence strategy in various regions along the North Sea coast. There is then a section on regional interaction that also explores the introduction of cremation and other related phenomena. In conclusion, we speculate on the nature of the travels and trade that linked North Sea regions together during most of the Bronze Age.

This chapter begins, however, with Jutland's landscape and the results of various pollen studies that, with some regional variation, show increasingly intensive exploitation from the Late Neolithic up through the Bronze Age.

The landscape and its exploitation

The geological map of Jutland reflects the complex history of the landscape (fig. 2.1). The main stationary line of the Weichselian glacial ice sheet runs north-south and marks the primary division between east and west in the central part of Jutland. To the east and north is a gently undulating landscape of clay-rich moraine deposits. To the west, sandy diluvial plains of lateglacial date surround older moraine hill formations from the Saale glaciation. Several small rivers flow east-west, running from the terminal moraine through the diluvial plains and into the North Sea. To the north, the Limfjord cuts across from east to west through a landscape once covered by the Weichselian ice sheet. In northern Jutland, areas of former seabed from lateglacial and postglacial transgressions add to the diversity of the landscape and now occur above sea level due to postglacial uplift. It is here that Thy, together with the large island of Mors and the neighbouring peninsula of Salling to the east, constitutes a fertile island. This is bordered by the sandier landscape of western Jutland to the south and by less fertile and more complex landscapes to the north. As a consequence, Thy, Mors and Salling have a greater productive potential than any other region in western and northwestern Jutland.

In the previous chapter, we explained how pollen analysis was integrated into the Thy Archaeological Project in order to reveal the vegetation history of the region and human exploitation of the landscape through prehistory. Two regional pollen diagrams were produced, based on cores obtained from Hassing Huse Mose and Ove Sø (Andersen 1995a-b). One of the most important findings was the detection of a

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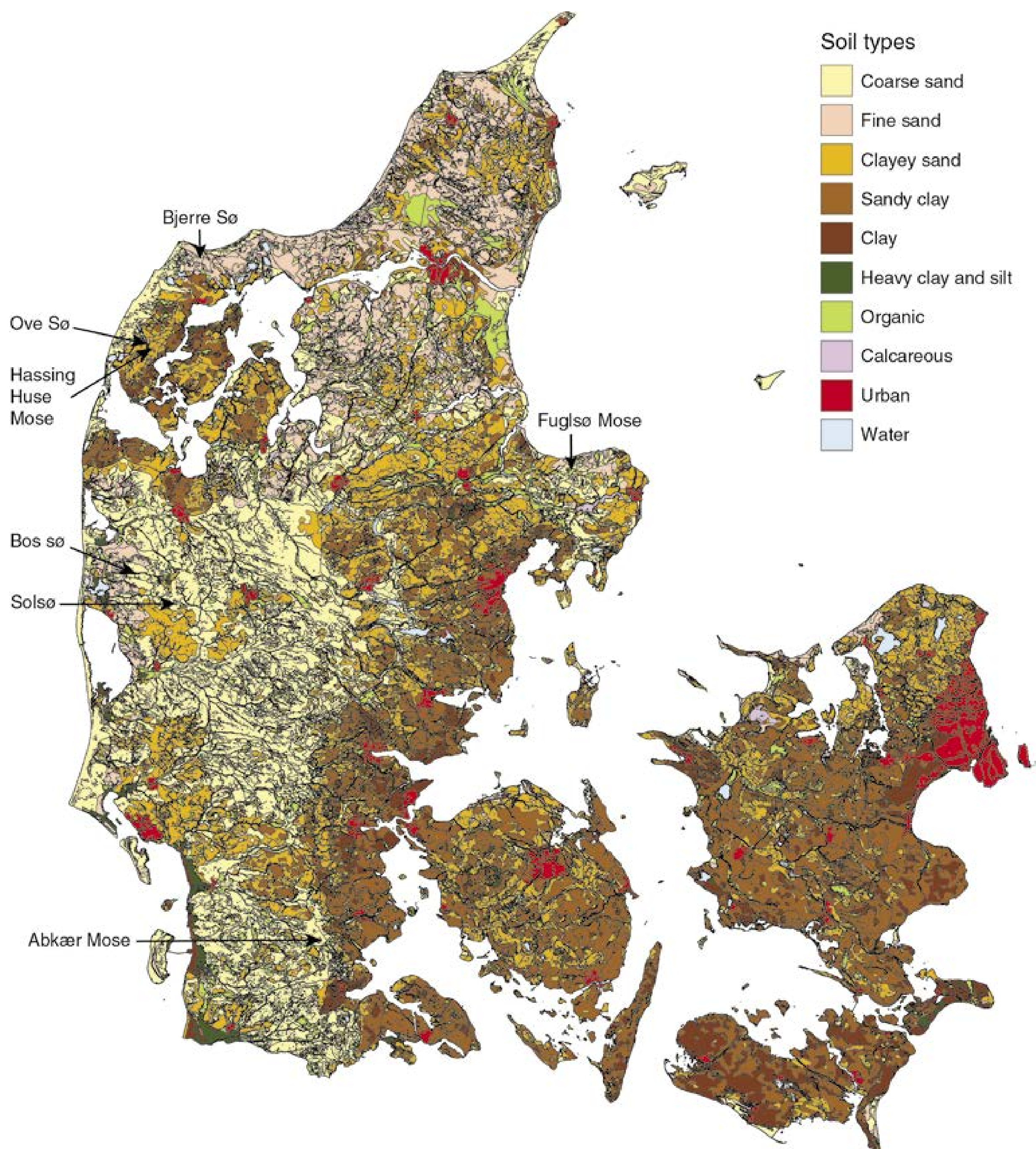

Figure 2.1. Geological map of Denmark showing the main features of the Quaternary landscape. Geological Survey of Denmark and Greenland. The locations of regional pollen diagrams mentioned in the text are marked.

major and very distinct *landnam* phase during the early 3rd millennium BC. This has been described as one of the most extensive prehistoric forest clearances seen in northern Europe (Kristiansen 1998a), and it resulted in the first real opening up of the landscape during the Single Grave culture and the Late Neolithic in Thy. Subsequently, treeless areas expanded during the Early Bronze Age, followed by some regeneration of secondary woodland in the Late Bronze Age (Andersen 1995a-b; Søgaard *et al.* vol. I, chap. 8). The pollen data set the ecological scene for Bronze Age Thy – an open cultural landscape with no continuous woodland in which trees were mainly restricted to wetland areas. As a consequence, fuel resources and building materials were already scarce in the Bronze Age (Holst *et al.* 2013). From period III onwards, there is evidence for peat cutting (Olsen *et al.* 1996; Henriksen *et al.* vol. II, chap. 25) and even the

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use of dung for fuel has been demonstrated at Late Bronze Age Bjerre (Henriksen *et al.* vol. II, chap. 25). No wonder the wood found preserved at Bjerre clearly reflects the difficulty in obtaining proper building materials: even driftwood and ancient timber recovered from peat bogs was put to use (Malmros vol. I, chap. 10). A similar resource scenario is seen at the same time in the Hebrides (Taylor 1999; Branigan *et al.* 2002; Walker & McGregor 1996, 21) and Orkney (Alldritt 2007, 14).

Interestingly, a somewhat similar development also occurred in the coastal areas of Rogaland, southwest Norway (Prøsch-Danielsen & Simonsen 2000). Following some deforestation at the Mesolithic/Early Neolithic transition, extensive changes to the vegetation took place around 2500 BC, at the end of late MN II and the beginning of LN I, when the landscape was opened up for pastoral agriculture. There was then considerable impact on the remaining forest vegetation in 1900-1400 BC, resulting in an open landscape, as in Thy, with virtually no woodland remaining. After a while, complete deforestation was followed by the formation of permanent heath across much of Rogaland's coastal area. This transformation was complete before the end of Late Bronze Age period V (Prøsch-Danielsen & Simonsen 2000, 35f; Høgestøl & Prøsch-Danielsen 2006; see further below).

As in Thy, the opening up of the landscape in western Jutland took place during the Single Grave culture and with almost the same dramatic effects (Odgaard 1994, 2006, 346 ff). Due to the lower clay content of the soil, heath vegetation is more prominent in the regional pollen diagrams from this area than in those from Thy. The importance of the heather (*Calluna*) heath in western Jutland is shown by evidence of regular burning in order to maintain the heathland vegetation. As in Thy, the areas around Solsø and another lake in the northern part of western Jutland, Bos Sø (fig. 2.1) were subject to increased human impact during the Early Bronze Age (Odgaard 2000, 30ff).

Other areas of Jutland supported denser woodland and the formation of a fully open landscape was delayed here. A pollen diagram from a raised bog, Fuglsø Mose, in the northern part of Djursland, only about 10 km west of Hemmed and Glesborg where there are numerous Late Neolithic and Bronze Age settlements (Boas 1991, 1993), reveals a radically different landscape with more woodland than in Thy and western Jutland (Aaby 1985). Not until the beginning of the Late Neolithic, around 2350 BC, i.e. contemporary with developments in southwest Norway, is a marked rise seen in grass and plantain, indicating increasing human activity. This impact extended into the Early Bronze Age, when a decline in lime pollen indicates decimation of the high forest (Aaby 1985, 71f; Robinson 2003, 161). At the beginning of the Late Bronze Age, a major change occurs in the pollen diagram, revealing the arrival of beech on Djursland, and the woodland acquired a character that was maintained for over a millennium. The first heath areas could also have been created at this time, when grassland also expanded somewhat (Aaby 1985, 74; Robinson 2003, 161).

Similarities in developments during the Late Neolithic and the Bronze Age link Djursland with northern Jutland even if these changes did not result in complete deforestation. However, a regional pollen diagram from Abkær Mose, about 10 km southwest of Haderslev in southern Jutland, reveals further differences from Thy and western Jutland. Abkær Mose is situated on the border between the fertile undulating moraine landscape of the eastern part of southern Jutland and the less fertile diluvial plain towards the west. First of all, the impact of the Single Grave culture and the Late Neolithic was not as prominent here as further north, but an opening up of the landscape around 2600 BC, with a concurrent increase in the amount of grassland, can be observed. Although woodland still dominated, it now became interspersed with grassland and arable fields (Aaby 1986, 1990; Meier 2000; Robinson 2003, 159).

In a Bronze Age context, the most striking feature of the regional pollen diagram from Abkær Mose relates to an early part of the period. The distance from Abkær Mose to one of the area's rich Early Bronze Age sites with large timber-built houses, Brødrene Gram at Vojens (see below), is only about 7 km. Furthermore, there are numerous Early Bronze Age barrows within a 10 km radius, which would normally indicate the existence of open areas (see for example the distribution of burial sites in Johansen *et al.* (2004) and Poulsen (1993, fig. 1)). A regional pollen diagram like that from Abkær Mose normally reflects the vegetation within a 5-10 km radius of the sampling site (Aaby 1993, 24). Nevertheless, Early Bronze Age barrow building and the construction of large wooden houses do not appear to have had a major impact in the pollen record from Abkær Mose. The only important change evident during the Early Bronze Age is a decline in the amount of hazel pollen (Aaby 1986, 282, fig. 3). This was quite a different landscape to that documented in Thy and, with its forest character, it was more closely related to what we see in eastern Denmark (Odgaard 2006, 346ff) and further to the south and southeast in pollen diagrams from Schleswig-Holstein (Dörfler *et al.* 2012) and Brandenburg (Jahns & Kirleis 2013). However, it should be noted that the copious pollen production of forest trees creates a distorted picture, even when traditional correction factors are applied. This is confirmed by recent research involving 'absolute' pollen diagrams (Hellman *et al.* 2009). The implica-

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tion is that open land was probably more widespread in the vicinity of Abkær Mose than suggested by the pollen data.

However, beginning around 1000 BC, the situation became 'normalised' at Abkær, falling into line with the evidence of other pollen diagrams from Jutland. The effects of human impact are clearly evident, as this resulted in the creation of open areas with commons and grassland, interspersed with smaller and larger and areas of woodland. Interestingly, the increased human impact evident in the Late Bronze Age and in the Early Iron Age around Abkær Mose is also reflected in elevated amounts of mineral dust in the peat that originated from exposed soils that lay bare following ploughing or during cultivation (Aaby 1990, 137ff). For some unknown reason, however, this development is not reflected in the archaeological record of the Late Bronze Age (see further below).

Through the above-mentioned regional pollen studies, it has become clear that, despite the difference in the extent of the human impact in the various landscapes, there are also many common features. The most prominent of these is the common development across northwest Jutland, beginning as early as the Single Grave culture and continuing through the Late Neolithic and Early Bronze Age. During the latter periods, there were also parallel developments in Rogaland and, in part, on Djursland.

Woodland was forced back everywhere to make way for grazed common or heath and thereby facilitate larger numbers of livestock. Arable agriculture, on the other hand, is less visible in the pollen diagrams. However, as shown by the elevated dust deposition over Abkær Mose, crop cultivation appears to have become of greater significance in the Late Bronze Age than in previous periods.

After this brief account of the most important features of landscape development during the second half of the Neolithic and the Bronze Age, we now return to one of the main themes of this chapter: Habitation as reflected in the numerous burial sites and the many newly discovered settlements.

Bronze Age settlement in Jutland: Burials and houses

A breakthrough occurred in Danish archaeological fieldwork back in the 1960s when C.J. Becker, in his large excavations in western Jutland, introduced machinery for the removal of topsoil from large excavation areas (Becker 1972, 6). This immediately resulted in the discovery of an almost overwhelming number of Pre-Roman Iron Age houses at Grøntoft. These were soon followed by Bronze Age houses, not only at Grøntoft but also at several other sites (Becker 1968, 1972). In a review of Bronze Age settlements in Denmark published in 1985, H. Thrane concludes that the findings from Becker's campaigns in western Jutland have shown that the distribution of Bronze Age burial sites is not a reliable indication of the distribution of Bronze Age settlements (Thrane 1985, 144, 1999, 129). C.J. Becker made this observation himself as early as 1975 (1976, 74) and repeated it in 1980 (1980, 129) as a sceptical comment on K. Kristiansen's first article about Bronze Age settlement and land-use (Kristiansen 1978). In short, there appeared to be too many Bronze Age houses in western Jutland compared to the number of contemporaneous burial sites recorded from the same area.

There are of course many well-known caveats and pitfalls to be taken into consideration when dealing with matters of representativity. As mentioned above, Jutland comprises a great variety of landscape types and the different geological conditions have influenced the ways in which the landscape was used, thereby creating varying conditions for the preservation of prehistoric monuments. Combined with uneven levels of antiquarian activity, this has resulted in an archaeological record displaying numerous local and regional variations. Nevertheless, we believe that the many newly discovered Bronze Age houses, and the strikingly similar distribution of Bronze Age burial sites and of settlements containing houses of Bronze Age date that can now be demonstrated across large parts of Jutland, demonstrate, as in Thy, a prehistoric reality that the many source-related problems cannot fully obscure or negate.

This conclusion is also supported by the findings of an investigation into the relationship between pollen data and the archaeological record (Søsted & Meistrup-Larsen 2003). In an unfortunately unpublished study at the University of Copenhagen, the authors have examined pollen data from lakes in various parts of Denmark and compared them with the number of archaeological sites within a radius of 5 km. For both the Early and Late Bronze Age and the Pre-Roman Iron Age, the archaeological record can, according to K.H. Søsted and L. Meistrup-Larsen, explain a significant proportion of the variation seen in the pollen data. Similarly, it could be demonstrated that a series of pollen types, which are anthropogenic indicators, show a positive correlation with the archaeological data from the three periods (Søsted & Meistrup-Larsen 2003, 137; for the Late Bronze Age see also Odgaard 2006, 349). This correlation was found both when all sites were included and when compared solely with the number of burial sites. Unfortunately, the investigation does not cover southern Jutland, but in all the investigated areas for which there are regional pollen diagrams from lake deposits – northern

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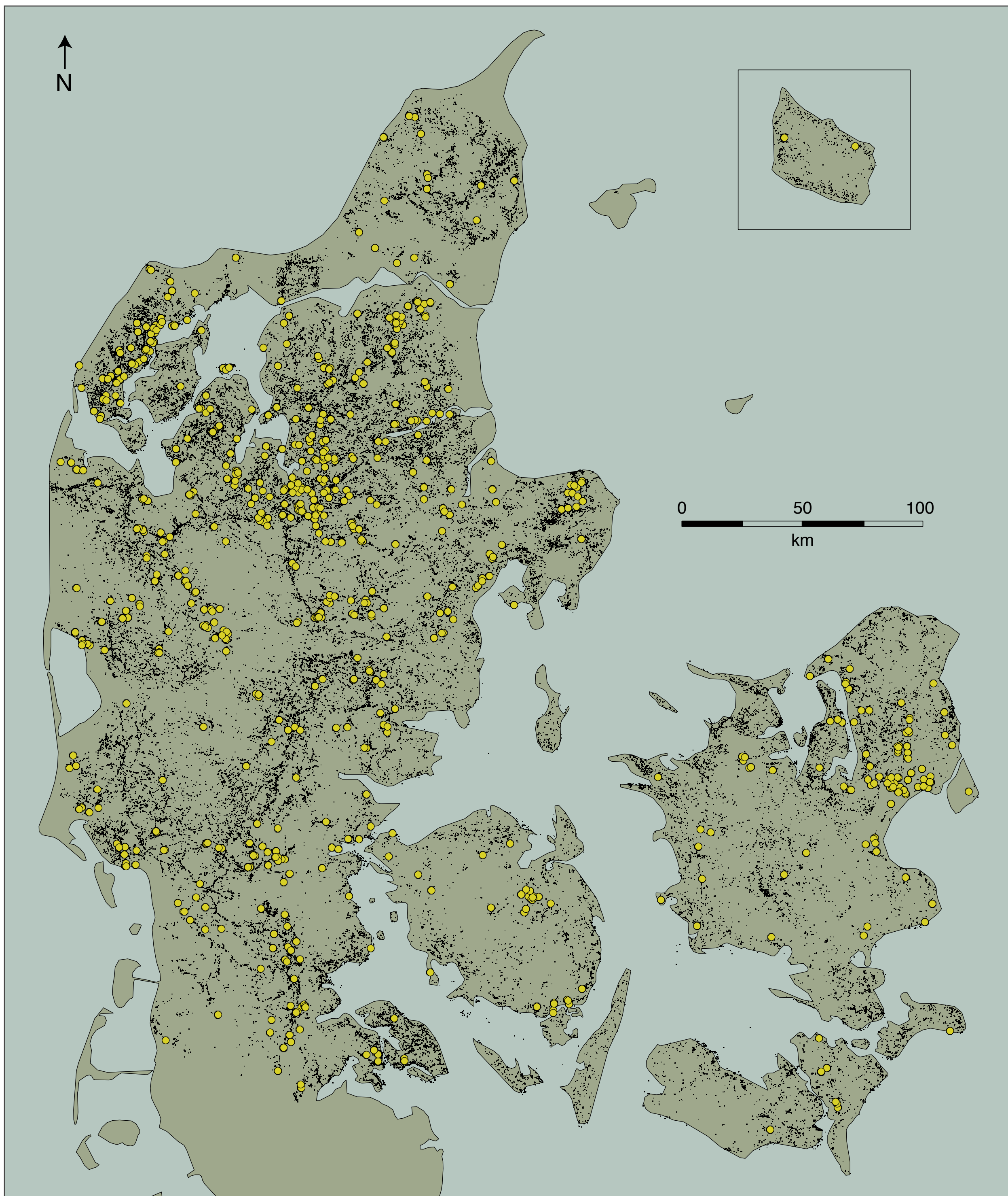

Figure 2.2. The distribution of all Bronze Age sites with houses (yellow dots, FF code BXXX) against the background of the distribution of all prehistoric barrows in Denmark based on the records from the Danish Agency for Culture's Sites and Monuments register (February 2016)(https://www.kulturarv.dk/ffreg).

Zealand, southeast Funen, western Jutland, eastern Jutland, northern Jutland south of the Limfjord and Thy – the Bronze Age burial sites constitute a significant measure of human presence.

This confirms S. Müller's early theory about a close connection between barrows and habitation (Müller 1904, 56) that can now be demonstrated through a direct comparison of the distribution of burial finds

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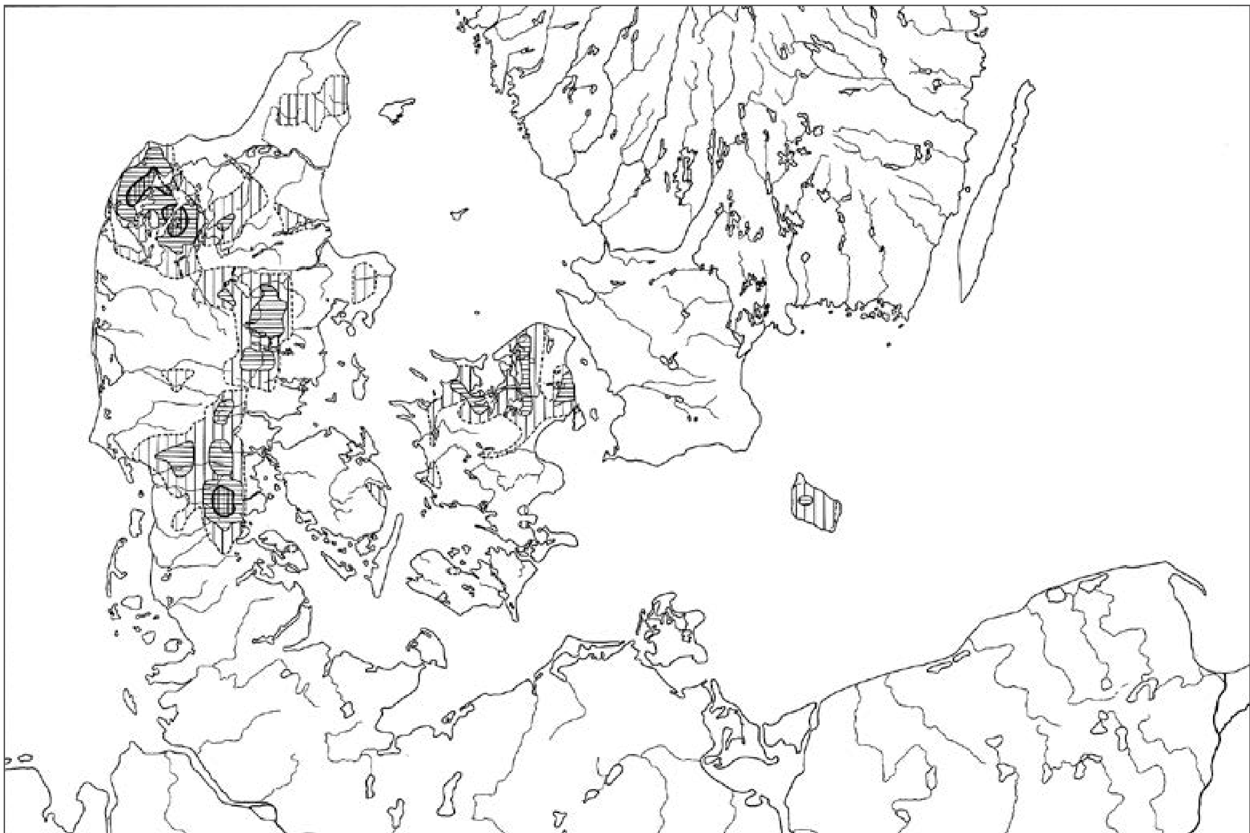

Figure 2.3A. Isometric map showing the relative number of Early Bronze Age burials in Denmark. After Baudou (1985). The burial density is shown according to calculations based on the mean number (M) of Early Bronze Age burials pr. 109 km² in Denmark. The thin line delimits areas with M = 18 burials. The thick line delimits 2M = 36 burial finds. The broken line delimits M/2 = 9 burials. Areas with burials of less than M/2 pr. 109 km² are not shown.

and of excavated Bronze Age houses (fig. 2.2). Many settlements with houses are yet to be found, but it is evident that almost all excavated Bronze Age houses are located in areas with barrows, as predicted by Müller. However, as the barrows include monuments from the Neolithic, especially the Single Grave culture (Holst *et al.* 2013), we need also to look specifically at the distribution of Bronze Age houses compared to that of sites with finds from Bronze Age burials (almost 100% found in barrows).

The isometric maps published by E. Baudou in 1985 are still useful for demonstrating the areas with the largest number of known burial sites in Denmark (Baudou 1985, 76ff). For Jutland, the Early Bronze Age sites (fig. 2.3A) are concentrated within a broad band extending southeast from Thy and the Limfjord area to central Jutland, where it then follows the north-south watershed to the eastern part of southern Jutland and the area around the river Kongeå. In the Late Bronze Age (fig. 2.3B), the number of burial sites in Thy and Salling declines somewhat but, at the same time, a marked concentration is apparent to the southeast, in Himmerland and Fjends. However, in general the distribution remains the same as in the Early Bronze Age (Baudou 1985, 76).

Using the records from the Danish Agency for Culture's Sites and Monuments register, the distribution of settlement sites with houses from the Early and Late Bronze Age in Jutland (fig. 2.4A-B) can now be compared with the distribution of burial finds from the same periods (fig. 2.3A-B). Both sets of maps show the same major trends, and it is evident that the main distribution areas for house sites in the Early Bronze Age (fig. 2.4A), fall, to a very large extent, within the isometrically-marked areas for the main distribution of burial sites (fig. 2.3A). With minor variations, the same is also true for settlement sites from the Late Bronze Age (fig. 2.4B compared with fig. 2.3B), where especially the concentrations of house sites in western Himmerland and the area around Viborg match the many burial sites.

Apart from some minor variations, the main distribution of sites with Early Bronze Age houses (fig. 2.4A) is also very similar to that of sites with houses from the Late Bronze Age (fig. 2.4B). There are, however, differences in the relative density of sites in the

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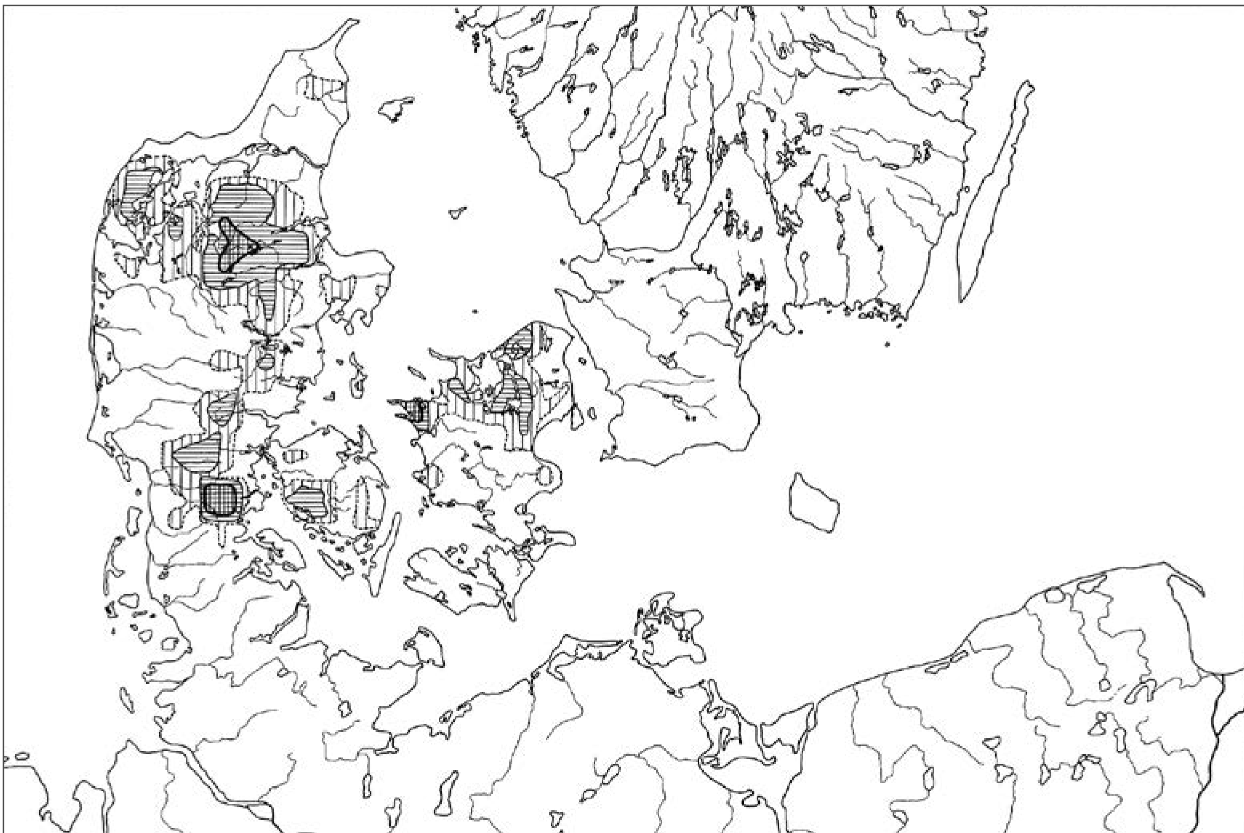

Figure 2.3B. Isometric map showing the relative number of Late Bronze Age burial sites in Denmark. After Baudou (1985).

various regions over time. As mentioned above, the number of house sites in Himmerland and around Viborg is markedly greater in the Late Bronze Age than the Early Bronze Age (cf. Christiansen 2012). The opposite trend is seen in southern Jutland, where the number of sites with houses declines in the Late Bronze Age. This is explained by P. Ethelberg as being the result of a recession and a decrease in population density (Ethelberg 2000, 247; see also Holst *et al.* 2013).

In order to obtain better chronological resolution relative to some of these general variations, the focus will now be shifted to records of radiocarbon-dated Bronze Age houses, beginning with the evidence from Thy.

Radiocarbon-dated Late Neolithic and Bronze Age houses

As a result of ongoing research in the years following the publication of *Bronzealderens bopladser i Midt- og Nordvestjylland* (Bronze Age settlements in central and northwest Jutland) (Bertelsen *et al.* 1996),[3] an extensive series of radiocarbon dates for prehistoric houses is now available from Thy. Consequently, it has been possible to make systematic comparisons with radiocarbon-dated house sites along other parts of the North Sea coast, from Rogaland in the north, through southern Jutland to the Netherlands in the southwest. As developments during the Early Bronze Age cannot be seen in isolation from events in preceding centuries, radiocarbon dates for Late Neolithic houses were also included in this analysis.

To date, about 200 houses in Thy have been dated to the Late Neolithic or Early Bronze Age by standard archaeological methods: artefact diagnostics and house typology.[4] More than a fifth of these have also been radiocarbon dated and will, as a starting point, be regarded as a representative sample of the house remains from the periods in question (fig. 2.5 and vol. I, appendix B).

As a hypothesis, the same is assumed to be true for the radiocarbon-dated houses in other areas included in the following comparisons. However, as already pointed out by Bourgeois and Arnoldussen (2006),

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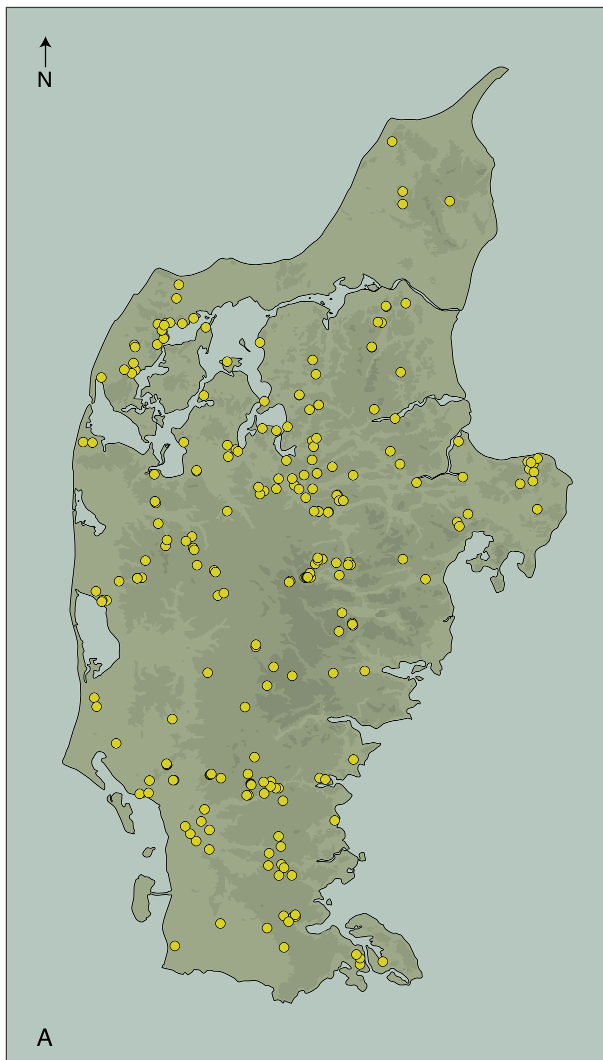

Figure 2.4A. Sites with houses from the Early Bronze Age in Jutland (FF code BÆXX) according to data from the Danish Agency for Culture's Sites and Monuments register (February 2016). Unlike figure 2.2, which shows all sites with houses dated to the Bronze Age, figure 2.4A-B only deals with sites in the database that are specifically dated to the Early and/or Late Bronze Age, respectively.

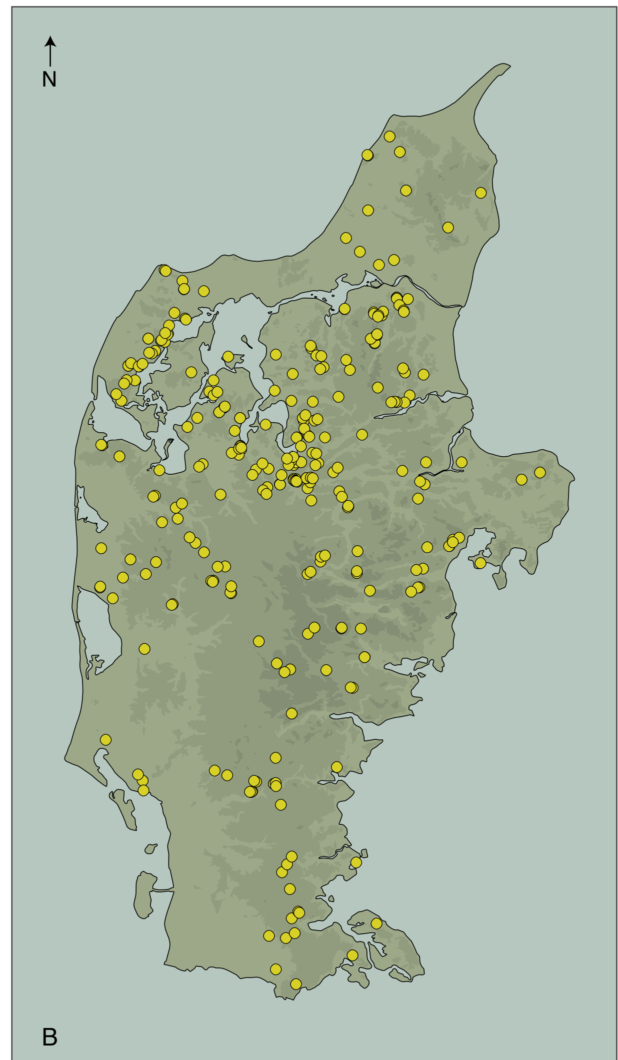

Figure 2.4B. Sites with houses from the Late Bronze Age in Jutland (FF code BYXX) according to data from the Danish Agency for Culture's Sites and Monuments register (February 2016).

before attempting to interpret variations in the radiocarbon dates from the different regions, it is important to bear in mind that the number of radiocarbon dates available is a result of the choices made by archaeologists with respect to which houses (and which material) should be dated. Less well-preserved houses, or houses that for some reason have a low archaeological visibility, are therefore likely to be underrepresented. Despite such relevant source-related considerations, we find it pertinent to examine these radiocarbon dates in order to investigate whether anything other than merely variation in archaeological visibility could be behind the observed regional differences.

For comparison with the situation in Thy, houses in southern Jutland with radiocarbon dates from the Late Neolithic and the Bronze Age were selected: a total of 72 (fig. 2.6 and vol. I, appendix C). These have primarily been published by P. Ethelberg (2000), but are augmented by recently investigated but unpublished sites mainly within the working area of the Museum of Southern Jutland and the Museum on Sønderskov. This dataset makes it possible to compare these two areas which, during the entire Early Bronze Age, belonged to two distinct cultural areas or regions. In the 16th century BC, northern Jutland and Thy were part of the Valsømagle region,

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THY	LN-EBA I (2350-1500 BC)	BA II-VI (1500-500 BC)
Number of habitation areas with houses	9	34
Number of houses	At least 27	At least 198
Number of radiocarbon-dated houses	5 (18.5%)	47 (23.7%)

Figure 2.5. Late Neolithic and Bronze Age house sites and habitation areas in Thy with a minimum number of houses and radiocarbon dates.

while southern Jutland belonged to the Sögel-Wohlde region; there were marked regional variations in material culture and burial rites between these two regions (Vandkilde 1996, 289ff; Bergerbrandt 2007, 38ff). This geographical distinction continued during Early Bronze Age periods II-III (Kersten 1935).

From a North Sea perspective, Rogaland, located to the north of Thy, across the Kattegat in southern Norway, is an obvious region to include in our comparisons. A large number of Late Neolithic and Bronze Age houses have been radiocarbon dated in the region (fig. 2.12 and vol. I, appendix D) and, furthermore, the existence of links between southwest Norway and northern Jutland has previously been proposed on the basis of similarities in the actual graves and grave furnishing (Lund 1938; Møllerop 1963; Marstrander 1977; Løken 1989; Myhre 1998; but see also Hornstrup 2011). Even Norwegian archaeologists admit that southwest Norway could actually be termed a Danish province in the Bronze Age (Magnus & Myhre 1976, 146).

Finally, in order to compare southern Scandinavia with the southernmost region along the North Sea coast possessing a shared house-building tradition, a number of dates from Bronze Age houses in the Netherlands augment the dataset. The resulting database includes a total of 453 radiocarbon dates from about 200 Late Neolithic and Bronze Age houses in Jutland and southwest Norway,[5] supplemented by 87 dates from Dutch Bronze Age houses (Arnoldussen & Fontijn 2006, appendix 1).

In order to obtain an initial overview, four cumulative probability density functions (cPDFs) for dates from 1) Rogaland, 2) Thy, 3) southern Jutland and 4) the Netherlands have been calculated (Olsen & Kanstrup this chap., fig. 2.C). Even taking into account the problems involved in using cPDFs (Olsen & Kanstrup this chap.), it is evident that the dates from these different regions display temporal differences that, at least with regard to Rogaland, are so marked that it can hardly be a coincidence. Southern Jutland and the Netherlands generally correspond fairly closely in their development, while the cPDF from Thy reveals a greater number of dates from around 1000 BC than in the two other areas. This difference will be discussed further below when comparing Thy with southern Jutland. In order to provide some cultural-historical background for these comparisons, we will now discuss the emergence of the three-aisled house at the transition between the Late Neolithic and the Bronze Age in the regions in question.

The Bronze Age farmstead

The introduction of the three-aisled house

The introduction of the three-aisled house to southern Scandinavia has been discussed by several scholars over the last 25 years (Becker 1968; Rasmussen & Adamsen 1993; Nielsen 1997; Ethelberg 1993, 2000; Artursson 2005). A new chronological element has been introduced into this discussion by the publication of a very early example of a three-aisled house at Kvåle in Jæren, Rogaland (Soltvedt *et al.* 2007).

Three almost identical radiocarbon dates from the three-aisled house 3 at Kvåle demonstrate, without any doubt, the introduction of this house type around 1700 BC (cf. vol. I, appendix D). This makes it the oldest house of its type in Norway and it may even be contemporaneous with the very early house II of the same type at Højgård in southern Jutland (fig. 2.7) (Soltvedt *et al.* 2007, 75; Ethelberg 2000, 174ff; Bech & Olsen 2013, 14ff). There was previously some doubt surrounding the early date of the Højgård house (Nielsen 1997, 9). However, in the light of the new data from Kvåle, there is probably now no reason to question this as it clearly demonstrates that southwest Norway was intimately connected with the development of house-building traditions in Jutland in the Early Bronze Age.

As indicated by the Norwegian and Danish dates for late two-aisled and early three-aisled houses, there appears to have been a transitional phase during which both house types – or hybrids between them – occurred at the same time (see also Artursson 2005, 53; Soltvedt *et al.* 2007, 93; Fokkens & Arnoldussen 2008, 12). This is illustrated by several Danish and Norwegian examples.[6]

Two rare examples of a hybrid between two- and three-aisled houses are the buildings at Ginnerup, Thy, and Fjordglimt, close to the Limfjord near Skive. They have both been radiocarbon dated to period

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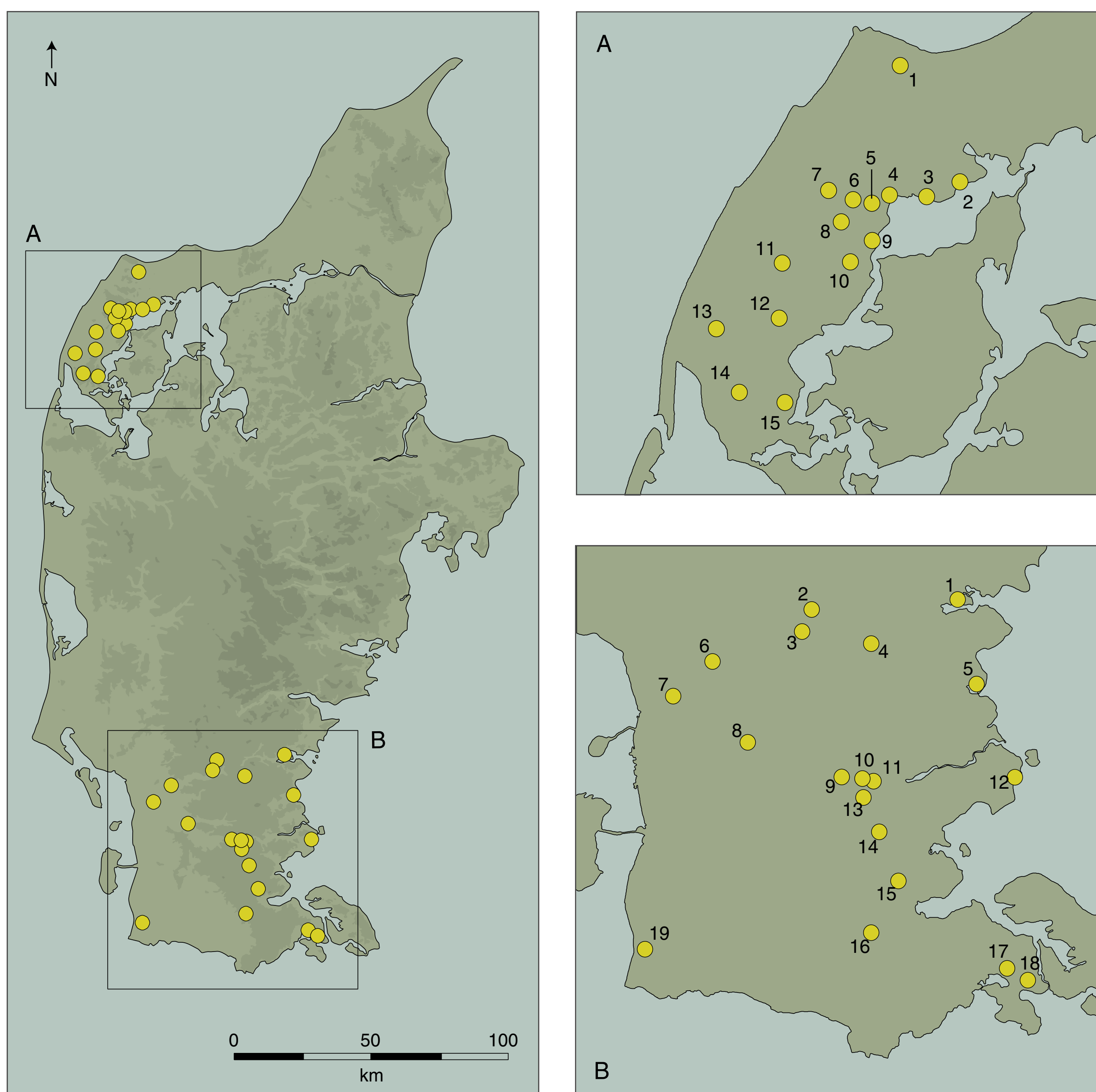

Figure 2.6. Map of sites in Thy and southern Jutland with radiocarbon-dated Late Neolithic and Bronze Age houses.

A. Thy: 1) Bjerre (site no. 110211-32), 2) Sennels (site no. 110208-105), 3) Storodde (site no. 110308-16) + Fårtoft (site nos. 110309-71, -83, -84, -85), 4) Drengshøj (site no. 110309-82) + Landlyst (site no. 110309-80), 5) Vestermark (site no. 110310-74), 6) Tinggård (site no. 110305-264), 7) Klostergård (site no. 110313-125), 8) Kallerup (site no. 110303-99), 9) Vilhøj (site no. 110307-124), 10) Sundby (site no. 110111-117), 11) Legaard (site no. 110112-279) + Sønderhå 5 (site no. 110112-313), 12) Ingersminde (site no. 110104-98), 13) Ørum (site no. 110115-32), 14) Ulsted (site no. 110612-429), 15) Ginnerup (site no. 110605-128).

B. Southern Jutland: 1) Drejens Boligby (site no. 170206-81 + Drejens Boligby II (site no. 170206-72), 2) Vestervang V (site no. 190103-67), 3) Mannehøjgård I (site no. 190307-192) + Kongehøj II (site no. 190307-208), 4) Bønstrup Industripark (site no. 190109-79), 5) Trappendal (site no. 170702-27), 6) Skelhøj (site no. 190303-95), 7) Nygårdstoft (site no. 190401-45), 8) Højgård (site no. 200201-170), 9) Valsbækvej (site no. 200208-101), 10) Brødrene Gram (site no. 200208-18), 11) Over Jernhyt (site no. 200202-147), 12) Flovt Strand (site no. 200311-274), 13) Kesmajgård (site no. 200210-361), 14) Sortpot (site no. 220304-283), 15) Egelund I (site no. 220204-208) + Egelund 2 (site no. 220204-195) + Brunde (site no. 220204-161), 16) Bolderslevskovvej (site no. 220201-26), 17) Bøgegård Vest I (site no. 230304-205), 18) Dybbøl Vesten (site no. 230302-209), 19) Marskhallen (site no. 210204-3).

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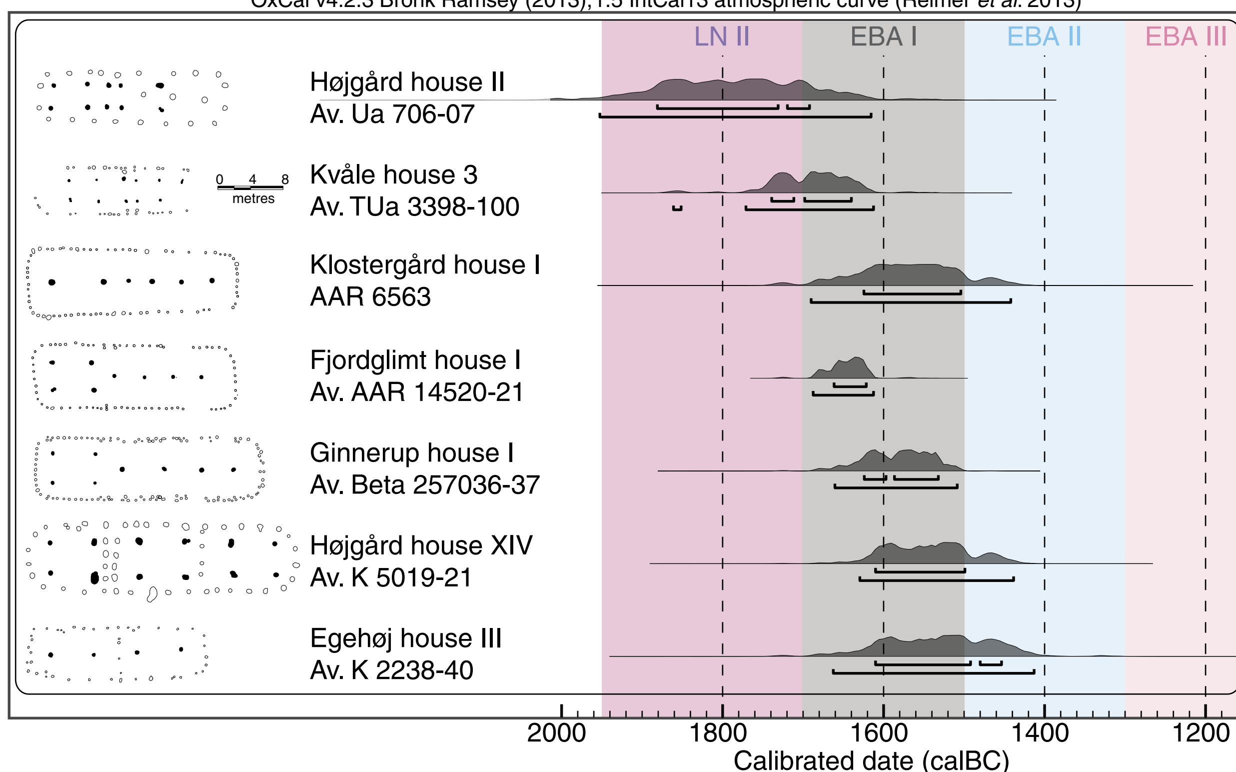

Figure 2.7. Late two-aisled and early three-aisled Bronze Age houses in Rogaland, southwest Norway and in Jutland.

I (figs. 2.7) (Bech & Olsen 2013, 15). A new hybrid between a two- and a three-aisled house has recently been found at Tjora, Rogaland, (house 10) and likewise dated to period I (Fyllingen & Armstrong 2012, 36ff, 75f). The two-aisled Klostergård house in Thy (fig. 2.7) belongs to the same period. The late dates for the two-aisled Egehøj houses on the Djursland peninsula have been discussed previously on several occasions (Ethelberg 1993, 154; Rasmussen 1993b) as these appear to post-date the first three-aisled houses (see also Boas 1983, 99ff). However, on present evidence, they fit well into the transitional phase that preceded the general introduction of a three-aisled construction (fig. 2.7).

As for the Dutch three-aisled houses, S. Arnoldussen argues that the rather early radiocarbon dates previously published are not to be trusted and that this house type most likely did not come into use until near the end of the 16th century BC (2008, 185ff). This conclusion is based upon direct dating of preserved construction timber from five houses. However, even though the early dates are indirect and may not match present standards, several of them are identical with the early dates from southern Scandinavia (Arnoldussen 2008, tab. 5.2; Fokkens 1999, 36) which means that a somewhat similar introduction in the Netherlands of this house type must be considered.

Based on the early dates for the Danish Højgård houses (illustrated in this chap., figs. 2.7, 2.9 and in Bech & Olsen 2013, fig. 3), P. Ethelberg proposes that the three-aisled house type was invented in southern Jutland and South Schleswig (south of the present Danish-German border) and from here spread to other areas of northwest Europe and southern Scandinavia (2000, 174). An argument in favour of Ethelberg's hypothesis is the significant house construction activity, as demonstrated by the cumulative probability distributions (above), that began before the end of Bronze Age period I in southern Jutland, i.e. earlier than in Thy. Innovations in house construction are perhaps more likely to take place in a phase of expansion like this, rather than in periods of regression. However, it is wise to exercise caution and to remember that, to date, Højgård house II is the only example from southern Jutland that possibly predates other early three-aisled Bronze Age houses found elsewhere. Ethelberg's case seems likely to be impossible to prove and other houses of a comparable early date (to that of Højgård house II) may turn up in the future anywhere within the traditional area for three-aisled houses in southern Scandinavia or, for that sake, down along the North Sea coast as far as the Low Countries.

But what was the reason for this change from two-aisled to three-aisled house construction? Over the years, many authors have cited indoor housing of

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cattle as being one explanation (e.g. Rasmussen & Adamsen 1993, 138; Ethelberg 2000, 203; Mikkelsen & Kristiansen vol. II, chap. 29). However, we will argue below that the change had nothing to do with the introduction of byres as these first appeared around 1500 BC and by this time three-aisled construction had already been in evidence for at least a hundred years or more (Fokkens 1999, 36).[7] There is perhaps no better explanation than that this construction principle made it easier to build houses that were both wider and higher, thereby enabling the construction of more impressive buildings such as the very large Early Bronze Age houses seen at for example Højgård and Brødrene Gram in southern Jutland that then constituted models for the appearance of more normal-sized houses (Nielsen 1997, 26). The reason for the long-term success of the new type of house construction that became the standard across large parts of the North European lowlands until the beginning of the Middle Ages was its great practicality: It made it easy to divide the house into sections for different functions and to construct a loft for the storage of supplies and provisions.

Bronze Age three-aisled houses in southern Jutland and Thy

Through comparison of the three-aisled houses in southern Jutland with those in Thy, the advantages of a regional approach become evident. In addition to numerous common traits, several clear differences also emerge, not only in relation to house construction and the size of the buildings but, perhaps more unexpectedly, also in their chronological distribution.

Of the presently 46 radiocarbon-dated three-aisled houses in Thy, most lie within an area of about 30 km in diameter situated in the northern part of the region near the town of Thisted (fig. 2.6, vol. I, appendix A-B). The houses in southern Jutland employed in the comparison (presently 55 radiocarbon-dated three-aisled buildings) are located primarily between Ribe and Haderslev (in areas around the rivers Ribe Å and Kongeå) – maximum extent 50 km NW-SE (fig. 2.6, vol. I, appendix C).

Within both areas, the nature of the material used for the radiocarbon dates varies. Materials of limited biological age, such as cereal grains, are of course preferable. Among the least suitable is oak charcoal, where the considerable biological age of the sample may influence the precision of the date. Information about the nature of the dated materials, and their origin, should therefore ideally be cited in order to make it possible to evaluate the credibility of the dating results (cf. K.L. Rasmussen 1993). Regrettably, this is not the case for the dates from southern Jutland published in Ethelberg (2000). However, as in Thy, most of these are AMS (Accelerator Mass Spectrometry) dates, for which mainly material of limited biological age, such as grain, was used (Bech & Hornstrup 2013, fig. 5; see also appendices B-C).

Ideally, more than one radiocarbon date per house is required to provide a reasonable degree of certainty with respect to the accuracy of the overall dating. The average number for Thy and southern Jutland together is 2.11 dates per house, whereas 26% of the Thy houses have only one date, and the proportion with only one date in southern Jutland is somewhat greater (38%).

Comparing the summed probability functions from Thy and southern Jutland (Olsen & Kanstrup this chap., fig. 2.C:c-f), the main difference is the rather abrupt decline in the number of dates at the beginning of period III, c. 1300 BC, apparent at many sites in southern Jutland, while in Thy there are still numerous dates from period III and, for the site of Fårtoft/Storodde, even well into period IV, c. 1000 BC.

As changes in building construction took place during the Bronze Age, with wall posts becoming less deeply founded (Ethelberg 2000, 186; Guldager 2007, 45; Christiansen 2012, 75), a greater percentage of the later houses do not have remains of walls, but only traces of roof-bearing posts preserved. This clearly effects the representativity of the dated Late Bronze Age houses in Thy and very probably also in southern Jutland. It is therefore fair to ask whether this is the reason for the decrease in the number of dated houses from period III in southern Jutland. However, as many houses of the same date in Thy have preserved wall lines, it is worth considering whether the difference seen in the dates between the two areas may result from some kind of economic regression in southern Jutland during period III, i.e. at a time when activity in Thy was high and apparently even on the increase (Bech & Hornstrup 2013). Before looking at differences of this kind, we shall now probe more deeply into the regional variations in construction principles between Thy and southern Jutland.

Construction principles in Thy and southern Jutland compared

With very few exceptions (Bjerre 3, house II (Bech vol. II, chap. 13) and perhaps Legaard house I (Mikkelsen & Kristiansen vol. II, chap. 29)), all Thy buildings included in this overview are interpreted as dwelling houses, normally with room for storage and perhaps also a byre. The same is also true of the houses in southern Jutland, with the exception of the smaller frame-built buildings from the Early Bronze Age (Ethelberg 2000, 209ff). The question of byres in Bronze Age houses in Jutland is discussed below.

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The date, size and construction of a selected number of radiocarbon-dated houses in Thy and southern Jutland are illustrated in figures 2.8-9. The chronology is according to H. Vandkilde *et al.* (1996). Although the length of the individual Bronze Age periods may require minor correction (Lanting & van der Plicht 2003; Olsen *et al.* 2011; Hornstrup *et al.* 2012), this is not crucial for the following interpretation.

First of all, despite obvious common traits, it is evident that there are also clear differences in size and outer wall construction between houses in Thy and those in southern Jutland. In the open Bronze Age landscape of Thy, timber resources for solid house construction were apparently already scarce during period II of the Early Bronze Age, and this is reflected in the widespread use of wattle-and-daub technique in wall constructions with closely-spaced postholes (fig. 2.8) (see also Bech & Olsen vol. I, chap. 4). This contrasts with the houses in southern Jutland (fig. 2.9), where another type of wall construction, with a greater distance between the postholes (1.5-2 m) was standard during the Early Bronze Age and is generally interpreted as being a consequence of the use of bole walls (Ethelberg 2000, 186ff).

The large bole-walled houses of southern Jutland, with floor areas of up to 500 m^2, are particularly worthy of note. Although large houses are known from the Late Neolithic in other parts of southern Scandinavia (Poulsen 2009), some even with bole walls (Boas 1991, 96), this type of house, with rounded gables and a three-aisled construction, was new. Buildings of this type were first recognised in western Jutland as one of the many results emerging from C.J. Becker's excavations. Due to their size, they were initially not even termed houses, but 'halls', and, according to Becker (1972, 14f), they were dated to the Late Bronze Age. Based on results from the first excavations at Højgård, southern Jutland, P. Ethelberg (1987, 1993) was later able to demonstrate that Becker was wrong on this point and that this type of house belonged to the Early Bronze Age and was typical of the period in the western and southern parts of Jutland. Since then, numerous radiocarbon dates from southern Jutland have repeatedly confirmed this conclusion. The very early Højgård house II was of this type (fig. 2.9), but with a floor area of only c. 130 m^2 it was still of modest size. Not until late period I or early period II do we see the really large, almost monumental, examples of this house type in southern Jutland, as for example Højgård house XXXI (fig. 2.9).

The number of occupants in Bronze Age houses no doubt varied from single-family households, with perhaps six to ten members, to an extended family of 10-15 individuals or perhaps even two families (Sørensen 2010; see also Bech & Olsen below chap. 4). However, house size reflected not only the number of occupants and the functions of the house (whether a byre or barn was included), but also status and economic power (P.O. Nielsen 1997, 26, 1999, 159; Earle 2002, 2004; Artursson 2005, 2007, 80ff; Holst *et al.* 2013). In other words, the very large bole houses doubtless became a model for the way in which power and influence should be demonstrated (Nielsen 1997, 26; Kristiansen 1998a, 287). Probably few would question the high, even chiefly, status of the households occupying these large buildings with a floor area of almost 500 m^2 as seen at Brødrene Gram and Højgård.

Comparing figures 2.8 and 2.9, it is evident, as P. Ethelberg (1993, 154) has also pointed out, that the larger houses in southern Jutland tend to be concentrated in the first half of the Early Bronze Age (periods I and II). These very large houses, with floor areas of between 400 and 500 m^2, also appear to be somewhat earlier than the largest houses of this type seen at Legaard and Vestermark in Thy (fig. 2.8). The latter are dated to the second half of period II and the transition to period III and have floor areas not exceeding c. 260 m^2. They can be compared with a number of similarly sized houses in southern Jutland, such as Højgård house I and Brødrene Gram houses I and III (fig. 2.9). They do not correspond to the highest social stratum here, but may represent a lower but still powerful and influential element in society. As already mentioned above, the small number of these very large, timber-consuming buildings in Thy no doubt reflects the open, almost treeless landscape of the region (Andersen 1995a-b; Søgaard *et al.* vol. I, chap. 8, Andersen vol. I, chap. 9). In our opinion, it is therefore fair to say that the large Legaard and Vestermark houses represent the highest level of Bronze Age society in Thy, not least due to their great consumption of solid timber (Bech & Olsen vol. I, chap. 4; but see also Mikkelsen & Kristiansen vol. II, chap. 29). A comparable elite level may be represented in the burial sites by the two rich male and female burials at Egshvile (Olsen 1992; Hornstrup 1998, 27ff).

During period III, houses were scaled down: In southern Jutland they quickly declined to a level where buildings with a floor area greater than 200 m^2 are rarely found. The only exception is a house at Sortpot, dated to periods IV/V, which does not fit the picture and most probably is incorrectly dated (based only on a single radiocarbon date; see below Bech & Olsen vol. I, chap. 4).[8]

In contrast to the rapidly declining house sizes seen in southern Jutland after period II, a group of period III and period III/IV houses in Thy stand out, with floor areas ranging from c. 125-200 m^2. New factors appear to be at work here, resulting in the continued construction of moderately large houses at a time when similar houses were rare in southern Jutland.

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Tinggård, house XXI
Ginnerup, house I
Bjerre 6, house IB
Landlyst, house IV
Fårtoft 4, house III
Landlyst, house I
Landlyst, house V
Storodde, house I
Landlyst, house II
Bjerre 2, house II
Sennels, house II
Drengshøj, house I
Bjerre 2, house IIIB
Bjerre 6, house IA
Fårtoft 4, house IB
Bjerre 2, house I
Fårtoft 3, house I
Vilhøj, house IX
Legaard, house I
Bjerre 4A, house I
Bjerre 2, house IIIA
Bjerre 3, house I
Fårtoft 4, house IA
Bjerre 7, house I
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Sønderhå 5, house I
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◄ *Figure 2.8. Selected radiocarbon-dated Bronze Age houses in Thy arranged according to size and calibrated radiocarbon dates. The dating of each house is shown as a horizontal bar (black: 1 σ, white: 2 σ). Where more than one radiocarbon date is available, an average of the dates is given (see list of dates in vol. I, appendix B). Calibration of dates is according to oxCal ver. 4.2. Red arrows: Enlargements of houses (cf. Bech & Olsen vol. I, chap. 4).*

This may be due to a greater frequency of houses with two habitation units in Thy than in southern Jutland (see Bech & Olsen below, chap. 4).

There are evidently also more houses in Thy dated to period III and periods III/IV than is the case further south in Jutland where, judging from the radiocarbon dates, houses from this time appear to be rare. It is always problematic to argue on the basis of absence. Nevertheless, it is tempting to see this phenomenon as being related to the observed decrease in the number of houses and settlement sites between the Early and Late Bronze Age in southern Jutland (Ethelberg 2000, 247). However, some questions still remain to be answered as the regional pollen diagram from Abkær Mose in southern Jutland shows no decline in activity from the Early to the Late Bronze Age – quite the opposite (Aaby 1986).

Large houses and large barrows: A link

As pointed out by several authors, the dating of the large bole-walled houses coincides precisely with the very widespread construction of barrows within the realm of the Nordic Bronze Age. By virtue of their sturdiness and size, these large houses are often seen as a direct parallel to the monumentality of the barrows (Björhem & Säfvestad 1993, 356; Nielsen 1997, 26; Earle 2004, 120). In this respect, it is thought-provoking that the construction in Jutland of large bole-walled houses with a floor area exceeding 200 m^2 – apart from possible exceptions like the above-mentioned house at Sortpot – appears to have stopped at almost the same time as the upper stratum of Bronze Age society, especially in southern and western Jutland, stopped building large barrows containing oak coffins around 1300 BC (Christensen 1998; Bech & Olsen 2013). Hypothetically, this development can be seen in relation to the same series of events that seemingly led to a decrease in settlement and house construction in southern Jutland.

Employing a long-term model, the *Rise and Decline of the Bronze Age Farm* by K. Kristiansen (2006) illustrates the reduction in size of southern Scandinavian farms through the Bronze Age, following a gradually decreasing curve from a maximum between 1900 and 1400 BC (fig. 2.10). From 1400-1300 BC in particular, Kristiansen's diagram shows a steep decline in building size. Seen against the background of the regional evidence, the same fall is clearly visible in southern Jutland. Here, the decline is even steeper than that proposed by Kristiansen and takes place slightly later, between 1300 and 1200 BC. A similar development also took place in Thy, but over a longer period of time, from c. 1300-1000 BC, i.e. during periods III and IV (Bech & Olsen vol. I, chap. 4, fig. 4.3).

For a long time, period III in Thy, with its many burial finds – especially male graves containing swords, has attracted attention as being something special relative to other regions and periods (Randsborg 1975; Kristiansen 1978; Bech & Hornstrup 2013). The great wealth of metal evident during period III signals a boom in the economy, apparently also reflected in the both numerous and moderately large houses, radiocarbon dated to the period 1350-1100 BC. Recent findings from Thy, with a majority of newly discovered houses being dated to periods III and IV, bring the settlement evidence even more closely into line with the burials than was the case previously (Bech & Hornstrup 2013).

According to Kristiansen (1978, 1981, vol. I, chap. 3), settlement in Thy during period III led to a regional ecological crisis due to overexploitation of the landscape. Now, more than 35 years after Kristiansen first presented his crisis theory, the dense settlement of Thy at the end of the Early Bronze Age and the beginning of the Late Bronze Age is a documented fact and is also clearly reflected in the pollen data (Andersen 1995a-b, Bech & Hornstrup 2013, fig. 7). The reason why we are convinced that the many radiocarbon-dated Bronze Age houses from Thy reflect a prehistoric reality is the perfect fit between open-land/grassland indicators and the radiocarbon dates (fig. 2.11) as evidence of dense habitation and massive human impact on the environment, especially during Early Bronze Age period III and part of period IV.

However, the question of whether this habitation was of such a character that it exceeded the carrying capacity of the area and created a crisis remains open. The apparently scant settlement during periods V and VI could perhaps be an indication of problems of this kind. Answering this question is though beyond the scope of this chapter, but it is thought-provoking that similar 'boom-like' developments, followed by apparent reduced activity, can be observed during the Bronze Age not only in Thy, southern Jutland and the Netherlands, but also in Rogaland, as we will see below. The timing of these developments varies somewhat from region to region, but the mechanisms behind them were perhaps the same, including demographic oscillations as also demonstrated by recent use of cPDF-data from the British Isles (Stevens & Fuller 2012).

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Højgård, house XIV
Højgård, house I
Brdr. Gram, house III
Sortpot
Brdr. Gram, house I
Mannehøjgård I, house K13
Trappendal
Mannehøjgård I, house K5
Mannehøjgård I, house K21
Højgård, house XXVII
Nygårdstoft, house II
Højgård, house IV
Højgård, house XXVI
Mannehøjgård I, house K14
Mannehøjgård I, house K6
Brunde, house II
Brunde, house I
Mannehøjgård, house K4
Højgård, house II
Højgård, house XXXII
Kesmajgård
Mannehøjgård I, house K11
Mannehøjgård I, house K12
Mannehøjgård I, house K20

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◀ *Figure 2.9. Selected radiocarbon-dated Bronze Age houses in southern Jutland arranged according to size and calibrated dates. The dating of each house is shown as a horizontal bar (black: 1 σ, white: 2 σ). Where more than one radiocarbon date is available, an average of the dates is given (see list of dates in vol. I, appendix C). Calibration of dates is according to oxCal ver. 4.2. House plans after Ethelberg (2000) and Laursen (2005).*

Two-aisled houses in Rogaland

As mentioned above, a very high percentage of the radiocarbon dates from Rogaland in our database relate to two-aisled houses, whereas the opposite is true of the three other regions, where dates from three-aisled buildings dominate. The difference is clearly indicated by the cPDF for Rogaland, with a marked peak prior to 1500 BC – very different from the cPDFs from Thy, southern Jutland and the Netherlands (Olsen & Kanstrup this chap., fig. 2.C).

According to H. Vandkilde (2005), the beginning of the Late Neolithic in southern Scandinavia can firmly be dated to c. 2350 BC, with LN I ending about 1950 BC. This means that the majority of the dates from two-aisled houses in Rogaland fall within LN II and Early Bronze Age period I, with a clear peak around 1700 BC (Olsen & Kanstrup this chap., fig. 2.C:g-h).

In the Norwegian evidence, it is clear that the extensive use of radiocarbon dating, initiated with the excavations at Forsandmoen through the 1980s, has led to a broad range of houses, including minor structures, being radiocarbon dated in a much more comprehensive way than was generally the case in Danish research until recently. It is therefore pertinent to ask whether the many radiocarbon dates from Rogaland alone can be the reason for the difference in the number of dated two-aisled houses? The fact that this is not the case is demonstrated by the large number of radiocarbon-dated three-aisled houses in Jutland after 1500 BC (from Early Bronze Age periods II and III), which far exceeds the number of houses from the same period of time in southwest Norway. If there simply were a difference in the number of radiocarbon dates, this distribution would be difficult to explain. Neither is it likely that differences in excavation practices and techniques lie behind the observed differences, as excavation methods employed in southwest Norway were, to a great extent, inspired by Danish archaeology (Løken *et al.* 1996). In other words, everything suggests that the differences in the dating of the houses has a basis in actual archaeological conditions.

At present (February 2013), there are records of 26 two-aisled radiocarbon-dated houses at 13 different sites in Rogaland (fig. 2.12), e.g. Talgje,

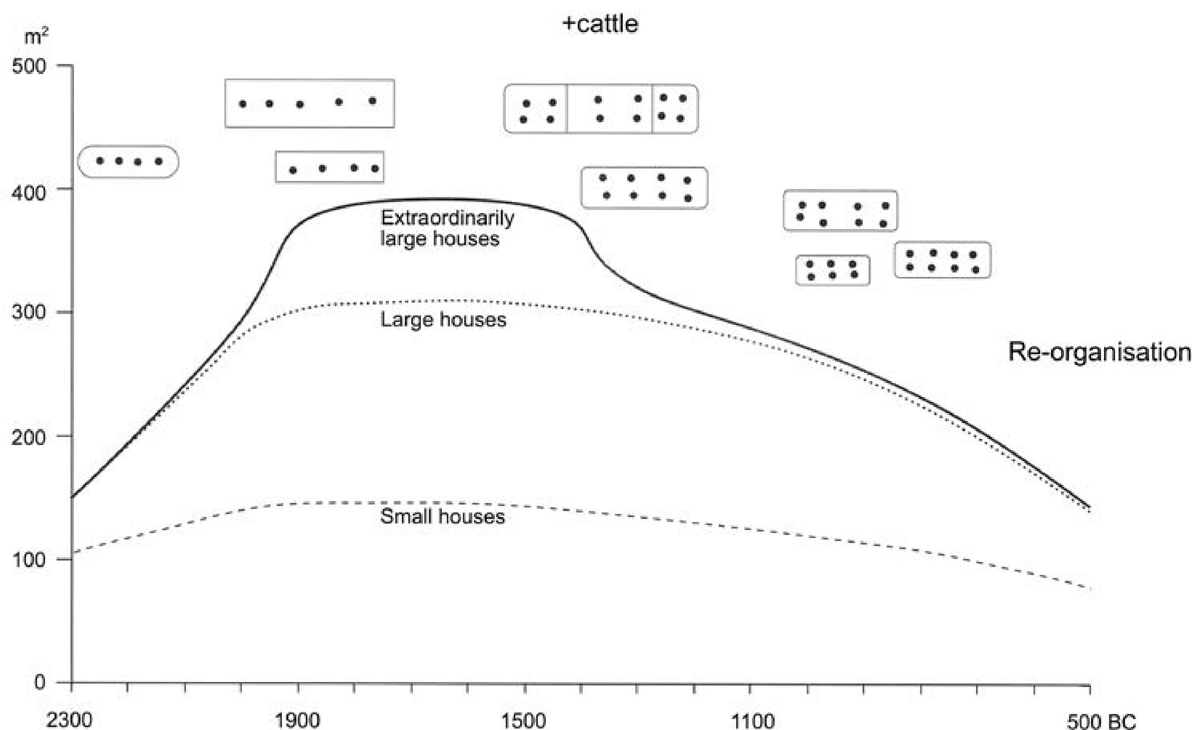

Figure 2.10. Long-term model of the rise and decline of the Bronze Age farm. After Kristiansen (2006).

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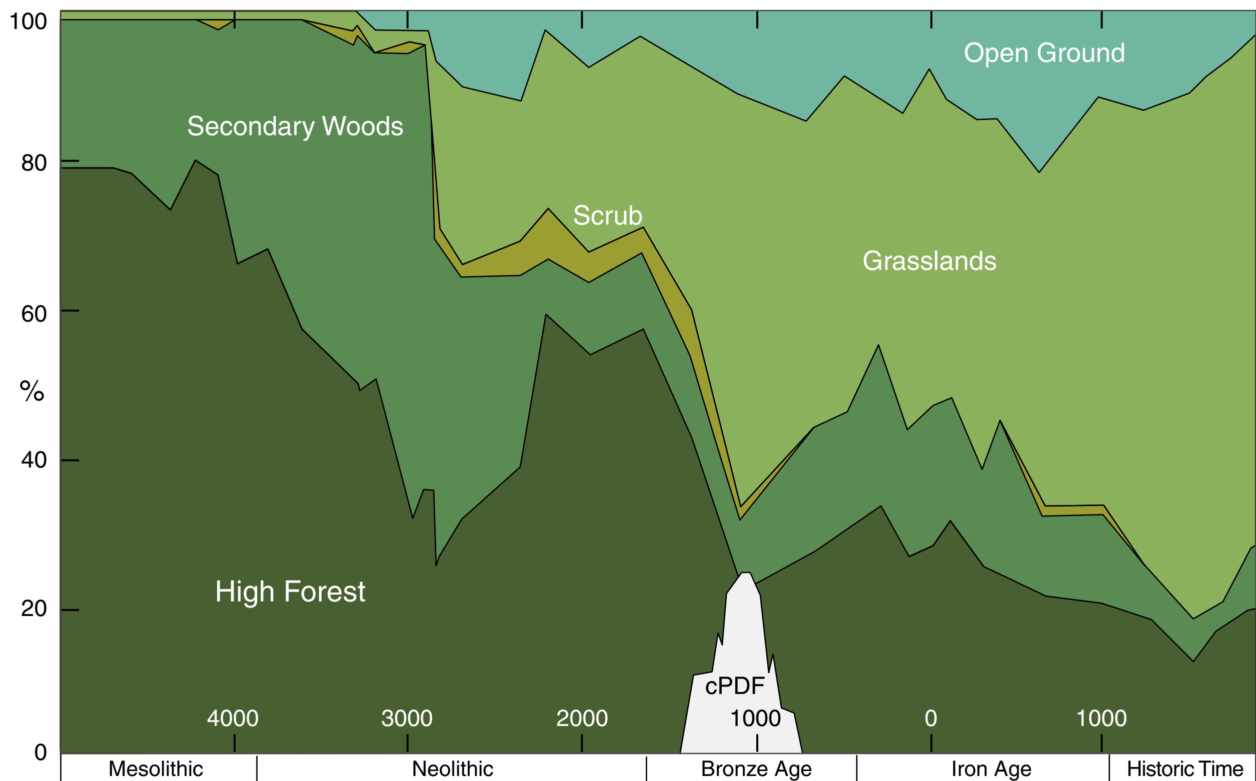

Figure 2.11. Combination of cumulative probability density function (cPDF) of radiocarbon dates for Late Neolithic and Bronze Age houses from Thy (Olsen & Kanstrup this chap., fig. 2.C:f) with the regional pollen diagram from Hassing Huse Mose in central Thy (after Steinberg 1997). The peak in the cPDF curve precisely matches the peak in grassland pollen during the Bronze Age.

Finnøy (fig. 2.12:3) (Hemdorff 1993), Frøyland, Time (fig. 2.12:13) (Bjørdal 2009), Kvåle, Time (fig. 2.12:14) (Soltvedt *et al.* 2007), Jåsund, Sola (fig. 2.12:6) (Fyllingen 2012) and Tjora, Sola (fig. 2.12:7) (Fyllingen & Armstrong 2012) (for an overview of two-aisled houses in Rogaland, see also Børsheim (2005) and Soltvedt *et al.* (2007)). Most of these houses are located in Jæren's central agricultural areas that, as the numerous burial sites from Early Bronze Age periods II and III clearly show, continued to be a core area for Bronze Age habitation in southwest Norway after period I (Møllerop 1963; Solberg 1994). However, as will be demonstrated below, the beginnings of a decline relative to former times are already apparent in the Early Bronze Age.

The introduction of agriculture to Rogaland

There is now general agreement that an arable-pastoral economy was introduced in earnest to southwest Norway at the beginning of the Late Neolithic. This was associated with a marked southern Scandinavian (northern Jutish) Bell Beaker influence, probably carried to some degree by regular immigration (Solberg 1994; Prescott 1996, 2012). According to B. Solberg, bifacially flaked daggers of types I and II comprise 44% of the 755 flint daggers found to date in Rogaland (Solberg 1994, 114), showing that Late Neolithic I is well-represented in the area. This period coincides with a significant phase of woodland clearance that is apparent in the pollen data from Rogaland for the period 2500-2200 BC (Prøsch-Danielsen & Simonsen 2000; Høgestøl & Prøsch-Danielsen 2006). However, most of the many radiocarbon dates for the earliest houses in Rogaland (calibrated at 2 σ) fall later than 2200 BC and cannot therefore be linked to the above-mentioned woodland clearance phase at the beginning of the Late Neolithic.

This situation begs the question of whether it actually was a *combined* arable-pastoral package that was introduced at the beginning of the Late Neolithic and which, as proposed by C. Prescott (1996, 2005, 2012), swiftly led to major changes in society within the course of a single generation. There is much evidence to suggest a more gradual transition (cf. also Anfinset 2012, 235) and this is consistent with the woodland clearances at the beginning of the Late Neolithic being primarily seen as prompted by a desire to create more grazing land, combined with small-scale cereal cultivation (Prøsch-Danielsen &

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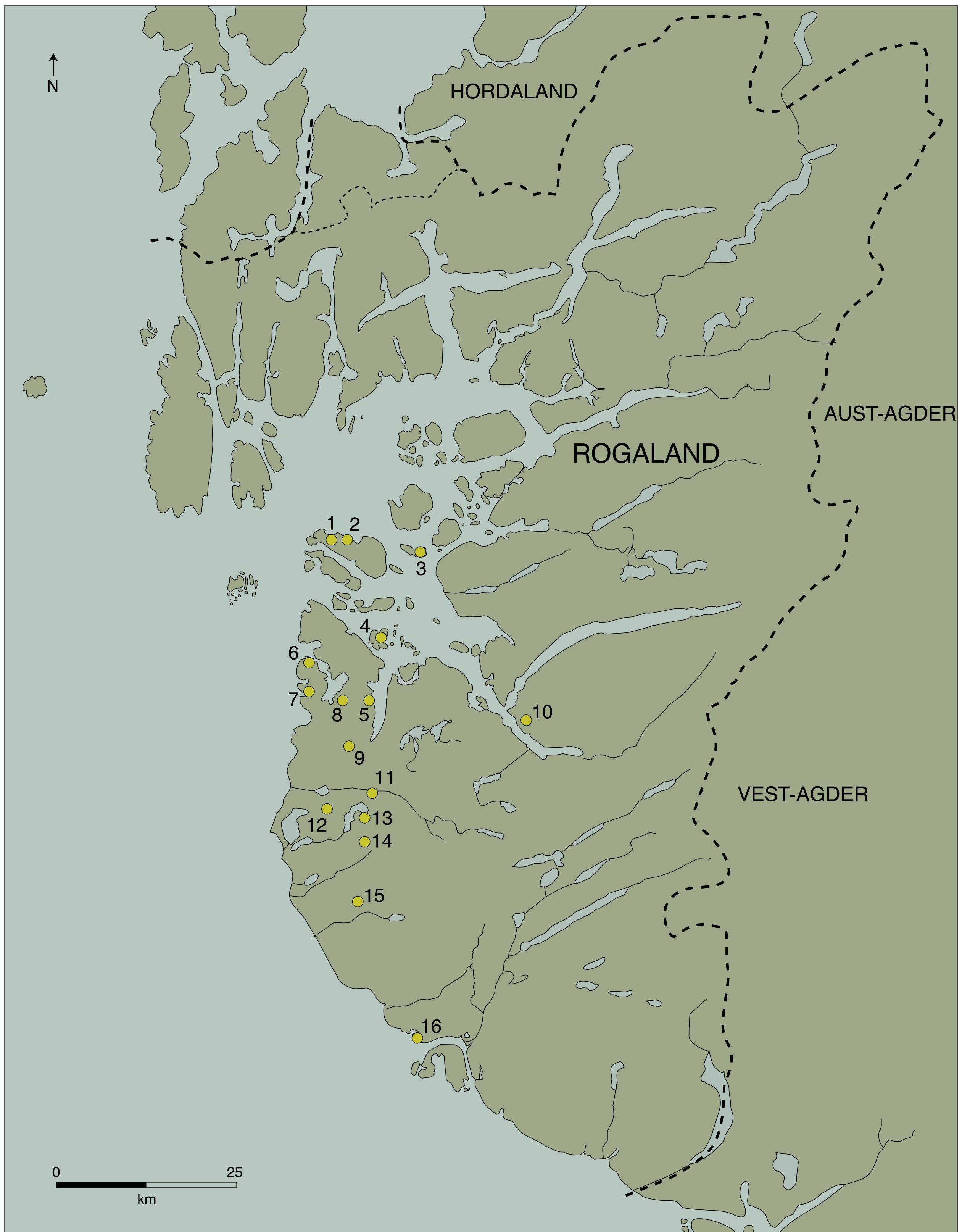

Figure 2.12. Map of sites with radiocarbon-dated Late Neolithic and Bronze Age houses in Rogaland. 1) Voll, Rennesøy m., 2) Sørby, Rennesøy m., 3) Talgje, Finnøy m., 4) Skeie + Austbø, Stavanger m., 5) Gausel, Stavanger m., 6) Jåsund, Sola m., 7) Tjora, Sola m., 8) Røyneberg + Jåttå, Stavanger m., 9) Skeiane, Sandnes m., 10) Forsand, Forsand m., 11) Orstad, Klepp m., 12) Klepp, Klepp m., 13) Frøyland, Time m., 14) Kvåle, Time m., 15) Kvia, Hå m., 16) Hellvik, Eigersund m.

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Forsand, house XXV
Orstad, Klepp, house I
Forsand, house LV
Forsand, house CCXV
Forsand, house CCXXXVII
Forsand, house LXXIV
Forsand, house LVIII
Forsand, house LX
Forsand, house CCXII
Forsand, house LVII
Forsand, house LXXIII
Austbo, Stavanger, house II
Austbo, Stavanger, house I
Forsand, house XC
Forsand, house XXXII
Skeiane, Sandnes, house I
Klepp, Kleppestemmen, house II
Forsand, house XLV
Kvåle, Time, house III
Tjora, house 10

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◄ *Figure 2.13. Selected radiocarbon-dated Bronze Age houses in Rogaland ordered according to size and calibrated dates. The dating of each house is shown as a horizontal bar (black: 1 σ, white: 2 σ). Where more than one radiocarbon date is available, an average of the dates is given (see list of dates in vol. I, appendix D). Calibration of dates is according to oxCal ver. 4.2. For house plans see note 5.*

Soltvedt 2011, 132), while the major breakthrough for cereal cultivation first took place a little later, between 2200 and 2000 BC (Prøsch-Danielsen & Selsing 2009, 14). Given the available radiocarbon dates for the houses in Rogaland, the emphasis should perhaps be placed slightly later, at the transition between the 3rd and the 2nd millennium BC.

These developments can also be linked to a woodland clearance phase between 1900 and 1400 BC (Prøsch-Danielsen & Simonsen 2000; Høgestøl & Prøsch-Danielsen 2006). At Kvåle, the earliest clearance cairn is dated to 1930-1780 BC (Soltvedt *et al.* 2007, 198) and clearance cairns were employed at Forsand in Early Bronze Age period II and these are seen as the result of intensive cultivation of manured fields (Løken 1998c, 186; Bakkevig 1998, 56f); the charcoal-rich fill of a clearance cairn at Jåsund has also been radiocarbon dated to the Early Bronze Age (Fyllingen 2012, 60). It is obvious that the clearing of stones from the fields and the presence of settlements with several generations of houses on the same site,[9] or houses showing abundant signs of alteration and repair,[10] bear witness to the introduction of a new settlement phenomenon.

This high degree of permanence is also evident from the radiocarbon dates and, in this respect, it is remarkable that where numerous dates have been obtained for features belonging to the same house, in a number of cases these show a very wide chronological range. For example, Jåttå house II and Jåsund house I both have a few early dates in either LN I (Jåsund) or the transition between LN I and LN II (Jåttå), while their latest dates fall several centuries later (vol. I, appendix D). This situation has been highlighted most recently with regard to the Jåsund house by H. Fyllingen (2012). Although this building had two phases, with replacement of some of the posts, the radiocarbon dates are distributed over a period of no less than 700 years. It seems likely that the house's actual period of use was between 2000 and 1650 BC (Fyllingen 2012, 116), but this was still a very long time and indicates great permanence in the settlement.

There seems therefore to have been a real 'boom' in the economy that evidently took off some centuries into the Late Neolithic and with which many of the bifacially flaked flint sickles found in Rogaland can apparently be linked (see also Solberg 1994, 117; Soltvedt *et al.* 2007, 198). Judging from the dates for the houses, this period of growth continued throughout Early Bronze Age period I, 1700-1500 BC, followed by an apparent recession in subsequent centuries, i.e. in Early Bronze Age periods II and III.

Bronze Age three-aisled houses in Rogaland

As mentioned above, there are marked differences between Rogaland and Thy/ southern Jutland, both in the number of radiocarbon-dated two-aisled houses and also of similarly dated three-aisled Bronze Age houses. Some houses in Rogaland do fall within period II (fig. 2.13), but houses from the subsequent periods III and IV are especially few in number, i.e. quite the opposite of the situation in Thy. Although it is tempting to see the scant representation of period III and IV houses in Rogaland as indicating a regional recession, caution is advisable as there are also many indications of continuity. For example, the range of crops cultivated in the fields shows great consistency from LN II and up through the Bronze Age (Soltvedt & Jensen 2011; Prøsch-Danielsen & Soltvedt 2012). Similarly, there are no indications of major regressions in the pollen data (Prøsch-Danielsen & Simonsen 2000, 35) and radiocarbon dates from clearance cairns at Kvåle testify to activity in the area during the middle of the Bronze Age, although no houses from this period were found (Soltvedt *et al.* 2007). The same appears to be true at sites like Håbakken in Klepp (Juhl 2001, 48) and Tjora in Sola (Fyllingen & Armstrong 2012). Consequently, no dramatic recession appears to have taken place. Instead we can perhaps speak of a relocation of sites (Fyllingen 2012, 127) and maybe also of a certain reduction in activity in the Middle Bronze Age, as indicated by a reduced number of burials from period II onwards in Rogaland (Møllerop 1963; Hornstrup 2011), which is consistent with the radiocarbon dates for houses. It therefore seems reasonable to speak of a somewhat lower level of activity in periods III and IV compared with previous periods, especially LN II and Early Bronze Age period I.

The end of the Bronze Age apparently saw a new period of expansion, with the majority of the Bronze Age houses at Forsand being dated to periods V and VI (Løken 1998a). In terms of the vegetation, this concurs with a further expansion in human impact on the landscape, specifically in the period 900-700 BC, that in parts of Rogaland, including the central and southern part of Jæren, led to complete deforesta-

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tion and the formation of permanent heath prior to the end of period V (Prøsch-Danielsen & Simonsen 2000, 41; Høgestøl & Prøsch-Danielsen 2006, fig. 3). In other words, from period V onwards, there was a new expansion in settlement that also can be observed in other parts of Scandinavia (Kristiansen 1985; Welinder 1998; Myhre & Øye 2002; Meling 2012).

House construction: Rogaland and Jutland compared

In contrast to Jutland, large three-aisled Bronze Age houses exceeding 250 m² in floor area are not found in southwest Norway. The largest example from this region is the very early house II at Kleppestemmen, which has been radiocarbon dated to Early Bronze Age period I (fig. 2.13, vol. I, appendix D) and is perhaps contemporaneous with, or only a little later than, the early three-aisled house at Kvåle, described above. The Kleppestemmen house has no preserved wall posts, but given its large cross span, combined with the length of the rows of roof supports, it must have been somewhat larger than Austbø house II and Forsand house XXXII from period II; a floor area of c. 225 m² is not unrealistic. Due to their dimensions and cross span, all these buildings belong to T. Løken's 'houses of hall-like character' (Løken 1998a, 2001, 55f). In Løken's presentation of Forsand (Løken 1998a, 116ff), this type of house is interpreted as being used exclusively for habitation, in contrast to the somewhat smaller longhouses with opposing entrances. Løken's argument is that, due to their great width, the large hall-like houses at Forsand did not have byres as this would result in too much free and unusable space in the middle of the building. However, this is contradicted by the Danish Legaard house III, which is of equivalent width to the large Forsand houses and has a byre with stalls. Pairs of postholes possibly relating to internal doors seen in all three hall-like Norwegian houses suggest the existence of walls dividing them into two sections, indicating that these buildings were used for more than just habitation. On the other hand, Løken is doubtless correct in linking these houses with a higher level of society, corresponding to the situation in other parts of southern Scandinavia during the Bronze Age (Løken 1998a, 119). However, the absence in Rogaland of the very large Bronze Age houses evident in Jutland perhaps suggests a lower level of social stratification.

Byres with individual stalls, as seen in Jutland (see below), are unknown in Norwegian Bronze Age houses (Myhre & Øye 2002, 98; Løken 1998b, 172). Consequently, housing of cattle in stalls is only indirectly assumed from variations in the distance between pairs of roof-bearing posts or the presence of opposing entrances (Løken 1998a, 117). On this basis, several Bronze Age houses are thought to have had a byre section in the western part and a habitation area to the east (Løken 2005, 286), in contrast to Danish Bronze Age houses, where the few houses with traces of stalls have, as a rule, byres in the middle or eastern part of the house (see below).

Of particular note in Rogaland is the consistency in house size throughout the Bronze Age. From figure 2.13, it is apparent that Austbø house IV and Forsand houses XLVIII and LIX[11] from the Late Bronze Age were fairly large, with a floor area of 150-200 m², closely followed by Forsand house XXV and Orstad house I, with just less than 150 m². The general reduction in the size of longhouses seen in Jutland during the Bronze Age is therefore not evident in southwest Norway. Not until the first half of the Pre-Roman Iron Age is there a general decline in the size of longhouses, only for this to be superseded by larger houses in the middle of the period. Overall, developments in house construction from the Bronze Age to the Iron Age were much more gradual in southwest Norway than in Jutland (Løken 1998a, 116).

Another difference between the two regions is the absence of post-built animal pens from Rogaland (Bech & Olsen vol. I, chap. 6). This apparently also applies to the angular ditch structures similarly interpreted as animal enclosures (e.g. type A), while some of the circular ditches seen in Thy are most likely equivalents to the Norwegian *alvedans* structures used for storage (Lillehammer 2004; Bech & Olsen vol. I, chap. 6, type B).

A trait that also separates Norwegian Bronze Age houses from Danish examples is the lack of cooking pits inside the houses (Løken 1998a, 108f; Soltvedt *et al.* 2007, 49); this is a common feature throughout Jutland. Cooking pits in southwest Norway are associated with outdoor activities (Hemdorff 1987, 231; Dahl 2008, 6), whereas in Jutland these have both indoor and outdoor functions. Conversely, some small Bronze Age houses in Rogaland have actual hearths, used for heating and doubtless also indoor food preparation, as seen in Jutland (Hemdorff 1987, fig. 2; Løken 1998a, 111ff). There is no reason to believe that the same activities did not take place in the larger houses (Løken 1998a, 108), but these have mostly left no visible traces; regular hearths are also scarce in most Bronze Age houses in Jutland.

Other traits shared between Thy and Rogaland are inset entrance doors, sometimes arranged as two entrances on the same side of the house (Løken 1998a, 109; Bech & Olsen vol. I, chap. 4). Likewise, house walls in both areas were mostly made using closely-spaced posts, indicating wattle-and-daub construction like in Thy (Løken 1998a, 108, 1998b, 172). The open,

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treeless landscape characteristic of both regions during the Bronze Age explains this similarity.

To conclude, there are more similarities than differences between Thy and Rogaland and, with respect to wall construction, the similarities between the two areas are even closer than between southern Jutland and Thy. Even so, there were clearly regional variations within a common house-building tradition.

Danish byres from the Bronze Age

Danish three-aisled Bronze Age houses are not easily classified typologically. Apart from a trial correspondence analysis (Guldager 2007), the only attempted classification is that of M. Rasmussen (1999), employed in a discussion of possible byres in Early Bronze Age houses in Denmark. Rasmussen's study of 37 ground plans resulted in three main house groups, based on the number of internal partition walls. Two of these were each further subdivided according to their size or ratio of length to width. Wall type, on the other hand, is found not to be a diagnostic criterion. About a third of the houses could not be classified according to these criteria, which illustrates the typological problems mentioned above. All the houses included in Rasmussen's analysis in which a byre with stalls was, or could have been, present are long, fairly narrow buildings with partition walls, normally with a floor area greater than 200 m^2. The question of whether all the houses in this group actually had byres is left open by Rasmussen. It is possible that cattle pens or outhouses were used in conjunction with the smaller buildings (Rasmussen 1999, 284ff).

Based on the increasing number of Bronze Age houses found in Jutland in the interim, it is now possible to address the question of byres anew from a more direct point of view, simply by examining remains of buildings where there is clear evidence of cattle stalls (Bech & Olsen 2013, 18ff).

There is no definite evidence for byres in two-aisled Bronze Age houses in southern Scandinavia (Nielsen 1997; Poulsen 2009, 159). The earliest traces of byres as archaeologically visible structures are the sporadic occurrences evident in three-aisled Early Bronze Age houses in western Denmark (fig. 2.14).

One of the best-known examples of a Bronze Age byre is in the tripartite house III with bole walls found at Legaard, Thy (fig. 2.15Q), where a number of small oblong trenches, positioned at right angles to the side walls in the middle of the building, are interpreted as traces of stall partitions. At the bottom of these trenches, small holes made by hammered-in stakes were occasionally encountered. Due to differences in the fill, these could be identified as constituting two discrete generations of stall structures, each comprising stall compartments about 1-1.1 m in width, accommodating a total of c. 14-16 cattle (Mikkelsen & Kristiansen vol. II, chap. 29; see also reconstruction by Draiby vol. II, contribution in chap. 29). In the western end of the house were living quarters with cooking pits. The eastern end also had fire features and is interpreted as a further habitation area, apparently also used for storage and food preparation (Mikkelsen & Kristiansen vol. II, chap. 29; Kristensen vol. II, chap. 18). The less well-preserved Legaard house IX apparently also had a byre in its central part (fig. 2.15P).

An almost exact parallel to this byre position was encountered at a relatively recently excavated site in southern Jutland, Kongehøj II in Vejen, located only about 20 km from the well-known Bronze Age site at Højgård (Poulsen 2008; Poulsen & Brønd 2008). Radiocarbon dates from Kongehøj II house K3 (fig. 2.15O) show this to be contemporary with Legaard house III (fig. 2.16). Although its floor area is about 20 m^2 less, it has a byre in the middle of the building, exactly as seen at Legaard, with ten stalls marked out by small trenches at right angles to the outer wall. Both the position of the byre and the dimensions of the individual stall compartments are similar to those of the Legaard houses.

At least 13 other Bronze Age houses in Jutland have similar traces of stall partitions, and when these are compared, some recurring features are apparent (fig. 2.15). Three other houses have stall compartments in the middle of the building, as at Legaard and Kongehøj II (fig. 2.15F, J, L). A house at Mannehøjgård, like house I at Bjerre 4A (fig. 2.15A), has a space between the byre and the eastern gable (fig. 2.15N), but in both cases the byre covers the main part of the eastern half of the house as with the numerous other houses with clear indications of a byre at the eastern end (fig. 2.15A-E, G-H and K). House XXX at Spjald (fig. 2.15M) appears to have had a byre both in the middle and at the eastern end.

As is apparent from figure 2.15, very few examples have stall partitions combined with more closely-spaced roof-bearing posts or other structures revealing the presence of a byre. Only in Legaard house III and, to some extent, Kongehøj II house K3 (fig. 2.15O) does the somewhat closer spacing of the roof-bearing posts in the area with stall partitions indicate special use of this part of the house. Consequently, in almost all the cases illustrated, deeper ploughing, which destroys the small, shallow trenches from the stall partitions, would have left us with no indication of byres whatsoever. The obvious conclusion is that byres could have been much more common in Bronze Age houses than can be demonstrated on the basis of presently available archaeological data.

House XXXI at Højgård can be an example of this phenomenon: A high phosphate concentration in its

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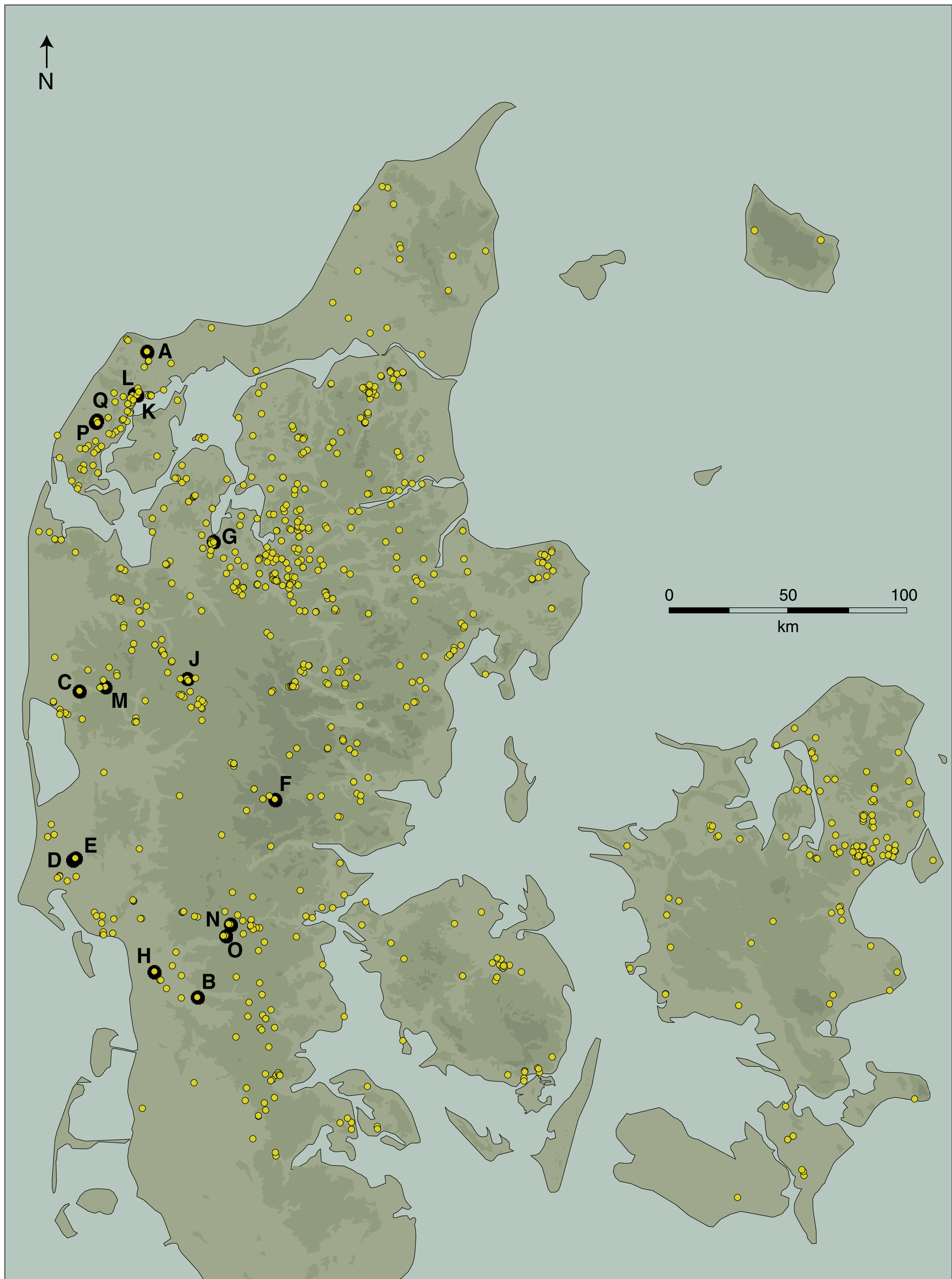

Figure 2.14. Distribution of Bronze Age houses with stall partition trenches (fig. 2.15). Background map: Bronze Age sites with houses (fig. 2.2).

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eastern end is taken by Ethelberg (2000, 193ff) as clear evidence of the presence of a byre, even though no stall partitions or closely-spaced roof supports were observed. A less certain result of phosphate analysis was obtained from a house at Østergård, southern Jutland (Ethelberg 2000, 195) and a similarly uncertain outcome of phosphate analysis from Legaard house III (Mikkelsen & Kristiansen vol. II, chap. 29) provides a clear warning against putting too much confidence in being able to demonstrate the presence of byres in Bronze Age houses by this method. It is therefore worth considering whether byres in many Bronze Age houses were used in a different manner than later in the Iron Age, when they can by securely identified by phosphate analysis (e.g. Petersen & Jensen 1995, 100; Ethelberg 2003, 268).

Unfortunately, less than half of the above-mentioned Danish Bronze Age houses with byres are well-dated. There are presently radiocarbon dates for seven houses from the Early to Middle Bronze Age (periods II-IV), with none from later in the period (fig. 2.16). House K16 at Mannehøjgård I is indirectly dated to the Early Bronze Age, based on its stratigraphical relationship to two radiocarbon-dated houses (S. Terp Laursen pers. comm.). Interestingly, this date is consistent with the radiocarbon-dated house II at Nygårdstoft that also has a row of cattle stalls parallel to the eastern gable. The close similarity to the less-securely dated Bronze Age house with a byre at Hover (fig. 2.15C) (Jensen 1971; Ethelberg 1987, 164) makes it highly possible that the latter is coeval with the two others.

The two houses at Nybro, western Jutland (fig. 2.15D-E), are dated by J. Nielsen and M. Mikkelsen (1985, 61) to the final part of the Late Bronze Age, period VI, on the basis of pottery from a feature in house II (fig. 2.15E). The wall construction of the other house (fig. 2.15D) is unusual in a Danish context (Jensen 1988, 160), with a closest affinity to constructions seen in houses located further southwest along the North Sea coast. Similar traces of small hammered-in stakes for a wattle wall are found in much earlier Dutch Bronze Age houses, for example in West Friesland and Drenthe (Ijzereef & van Regteren Altena 1991, 69; Arnoldussen 2008, 217). However, this feature also occurs in the Late Bronze Age house at Rodenkirchen (Strahl 2004) and in later Iron Age houses in the Dutch and northwest German marshlands (Waterbolk 1994, 2009).

Parallels to the entrance in the eastern gable of one of the Nybro houses are rare in a Danish Bronze Age context, but are well known in the Dutch Bronze Age and the Early Iron Age of northwest Germany (e.g. Waterbolk 2009; Haarnagel 1979). The gable entrance is therefore consistent with the stake-built walls and may point in the same geographical direction. But it is perhaps wise not to put too much emphasis on these similarities as there is another, possibly contemporaneous, Danish example of a house with a byre entrance in its eastern gable. This was found at Båndruplund in northwest Jutland and is dated to Late Bronze Age period VI or the Early Pre-Roman Iron Age (Mikkelsen 2004, 7). Apart from its gable entrance, it is otherwise a fairly normal Danish house of the time.

To sum up: The evidence for housing of livestock in byres in Bronze Age houses is still very incomplete, being based solely on the few examples where clear traces of cattle stalls are preserved; these mainly date from the early and middle parts of the period. The limited number of known Late Bronze Age houses makes it difficult to evaluate a possible chronological development in the position of the byre, but it appears that a byre in the middle of the house is solely an Early Bronze Age phenomenon. Byres also occur in the eastern end, but this was perhaps introduced a little later. In the Late Bronze Age, byres appear, as a rule, to have been at the eastern end, pointing towards the situation in the Iron Age.

At present, our knowledge of byres with obvious stall partitions comes mainly from the southern, western and northwestern parts of Jutland (fig. 2.14). In recent years, many Bronze Age houses have been found in northeastern Jutland, around Viborg and in Himmerland, but byres with stall partitions appear not to be present here, even in cases where

Figure 2.15 (p. 50-51). Bronze Age houses with stall partition trenches in Jutland. The position of the stall partitions is indicated on a simplified version of each house.

A: Bjerre 4A, house I (site no. 110211-32; cf. Mikkelsen & Bech vol. II, chap. 16); B: Enderupskov house II (site no. 200201-107; cf. Ethelberg 2000, 178); C: Hover (site no. 180495-95; cf. Jensen 1971); D-E: Nybro house I-II (site no. 190704-146; cf. Nielsen & Mikkelsen 1985); F: Dalsgård house I (site no. 170805-307; cf. Jeppesen 2004); G: Snebæk house I (site no. 130107-292; cf. Bertelsen et al. 1996); H: Nygårdstoft (site no. 190401-45; cf. Feveile & Lauridsen 2003); J: Gilmosevej (site no. 180318-57; cf. Pedersen 2006); K-L: Landlyst houses I + IV (site no. 110309-80; cf. Bech & Olsen vol. I, chap. 4); M: Spjald house XXX (site no. 180401-204; cf. Rasmussen & Adamsen 1993); N: Mannehøjgård I house K16 (site no. 190307-192; cf. Laursen 2005); O: Kongehøj II house K3 (site no. 190307-208; cf. Poulsen & Brønd 2008); P-Q : Legaard houses IX + III (site no. 110112-279; cf. Mikkelsen & Kristiansen vol. II, chap. 29).

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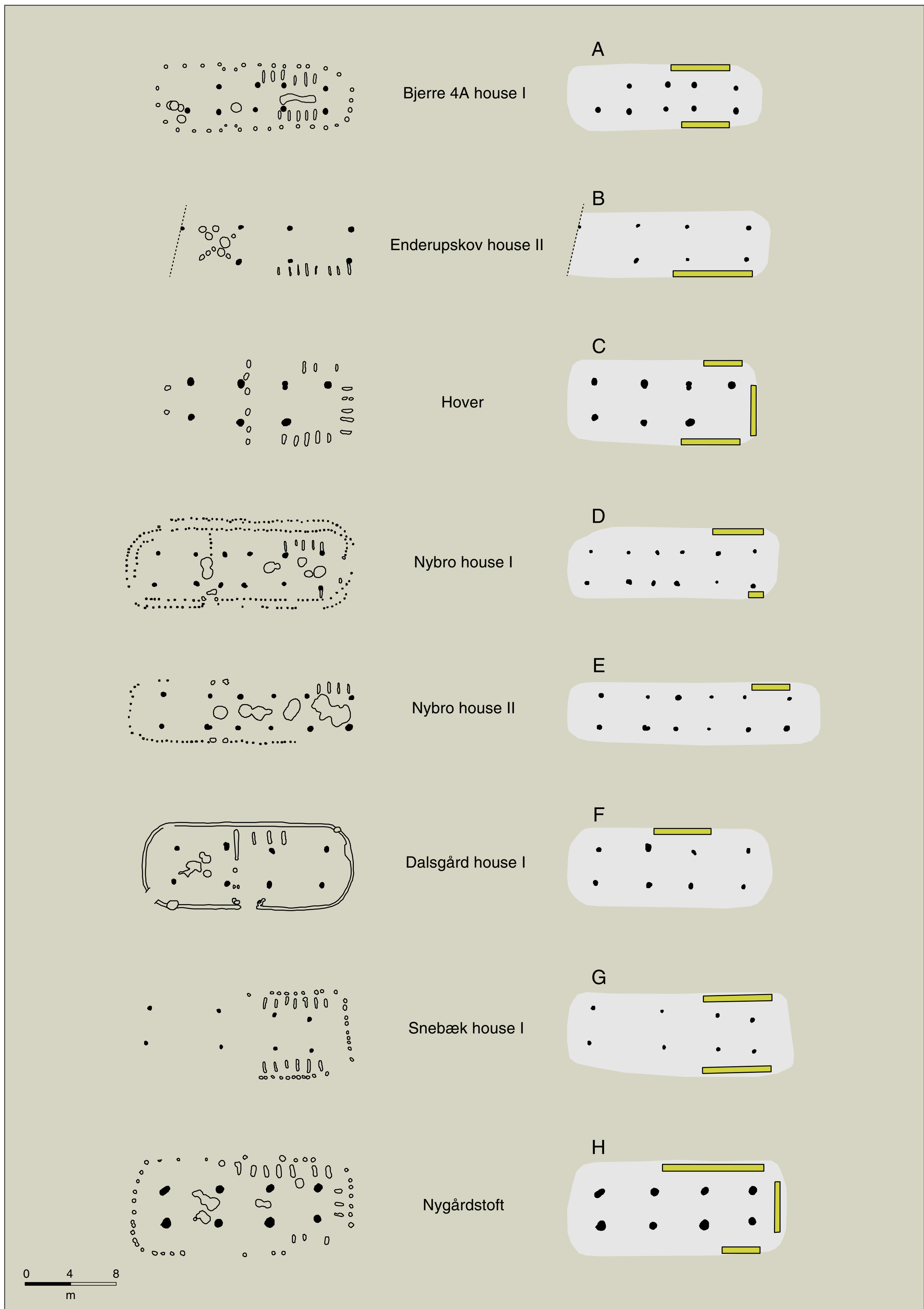

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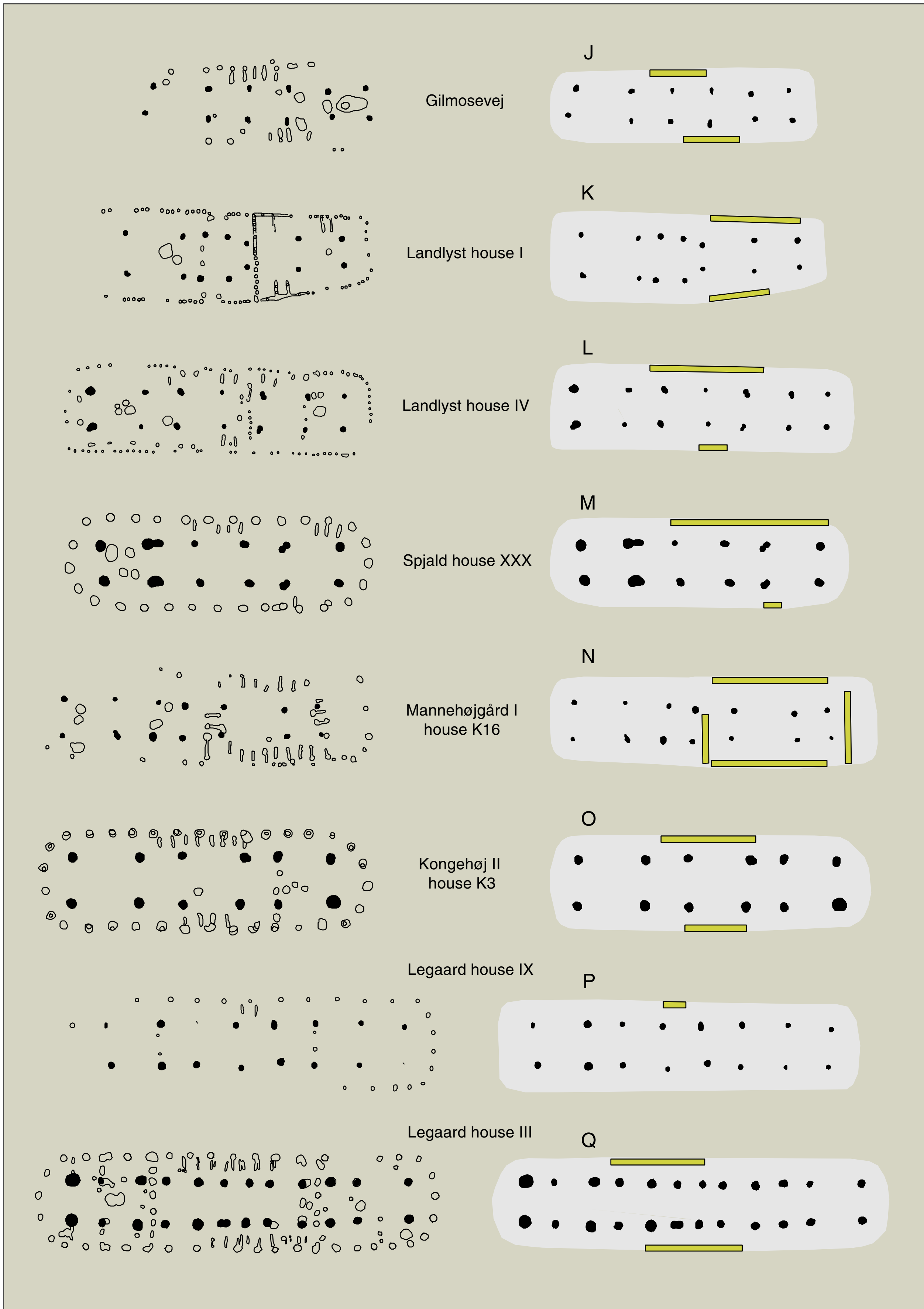

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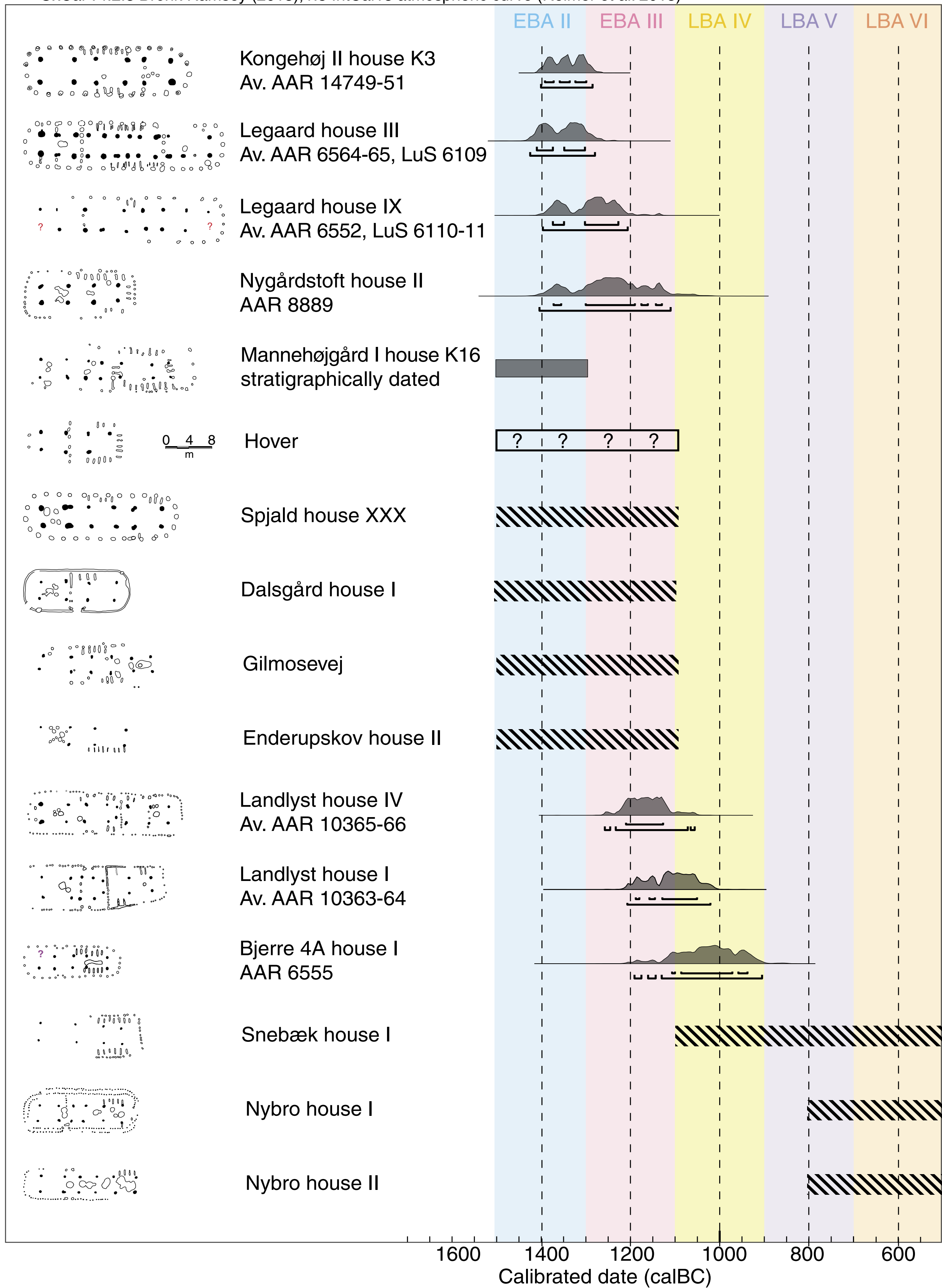

Figure 2.16. The houses from figure 2.15 arranged according to date (for radiocarbon dates, cf. appendices B-C).

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preservation conditions should permit their identification (M. Mikkelsen & T.T. Christiansen pers. comm.). Perhaps this difference indicates a greater importance of cattle husbandry in areas closer to the North Sea than in other parts of Jutland (cf. Holst & Rasmussen 2013).

Bronze Age byres in the Netherlands

It is no coincidence that C.J. Becker, when publishing the first new Bronze Age houses from Jutland since the Fragtrup excavations, also pointed out the close relationship between coeval houses in Jutland and northwest Germany and the Netherlands (Becker 1968, 88). A generation later, this resemblance was also stressed by K.-H. Willroth (2002), who drew attention to the similarities between house 13 at Emmerhout, Drenthe, and house III at Legaard in Thy – both with a byre in the middle of the building. This resemblance is seen as being a result of links between southern Scandinavia and the regions along the southern North Sea coast, together forming "eine eigenständige Hauslandschaft" (Willroth 2002, 114ff; Harsema 1997).

In the following, we will therefore take a brief but rather more detailed look at the evidence for stall partitions from Dutch Bronze Age houses. How close are the similarities and to what extent do the dates correspond with the Danish evidence?

Based on the relatively few examples of stall partitions in Dutch Middle Bronze Age houses, S. Arnoldussen (2008), in his comprehensive book about Bronze Age settlements in the Dutch river area: *A Living Landscape*, concludes that archaeologically visible structures of this kind are few in the Netherlands and may in fact have been a Nordic tradition (Arnoldussen 2008, 220; Arnoldussen & Fokkens 2008, 31). According to Arnoldussen, only eight examples of houses with stall partitions are known, mainly from Drenthe in the northeastern part of the country. Two other possible examples are mentioned from other areas (Arnoldussen 2008, 200). He therefore appears to be correct in his assertion: There are fewer examples of stall partitions in the Netherlands than in Jutland and, furthermore, very few of the Dutch houses appear to have had a byre in the middle section, e.g. Emmerhout house 13.[12]

Other longhouses from the Dutch Middle Bronze Age without stall partitions have a clear bipartite arrangement with more close-spaced pairs of roof-bearing posts in the eastern end of the house. The latter are normally, and no doubt correctly, interpreted as being indicative of a byre section (Waterbolk 1964; Harsema 1992, 80). A number of houses in Drenthe belong to this group of so-called 'Elp type' houses (Arnoldussen 2008, 192ff); there appear to be no counterparts to these in Denmark.

Unfortunately, very few of these Middle Bronze Age houses in Drenthe combine a published house ground plan with reliable radiocarbon dates (fig. 2.17) (Arnoldussen & Fontijn 2006; Arnoldussen 2008).[13] When compared with Danish houses, general agreement is seen between the dates for the Legaard houses and Hijken house 5/Emmerhout house 13. In radiocarbon-dating terms, these are coeval, while the dated houses of Elp type appear to be slightly later (Arnoldussen 2008, 212).

Many authors believe that the introduction of byres to longhouses on the northwest European plain could have coincided with the transformation from two- to three-aisled houses (Rasmussen & Adamsen 1993; Ethelberg 2000, 203; Mikkelsen & Kristiansen vol. II, chap. 29). But this link is difficult to prove, given the present gap between the earliest date for three-aisled houses and that for the first archaeologically visible byres around 1500 BC. Furthermore, as clear traces of cattle stalls are located in the middle and eastern parts of Early Bronze Age longhouses, the very existence of early hybrid houses with a three-aisled construction only at the western end (fig. 2.7), i.e. usually the living quarters, could indicate that housing of cattle in byres was not involved in the introductory phase of the three-aisled construction prior to 1500 BC. A similar argument has recently been put forward by Pilati (2012). Conversely, it is quite possible that the introduction of byres after 1500 BC contributed to the sudden success of the three-aisled house (Fokkens & Arnoldussen 2008, 13).

As pointed out by C. Årlin (1999), taking cattle into houses was not an easy step. In the Early Bronze Age, there were apparently specific rules about how to handle refuse and waste, with this often being disposed of at some distance from the house (Rasmussen 1993b, 96ff, 1995, 102f; Kristensen vol. II, chap. 18). Much indicates that house floors were kept clean and, at least from our modern point of view, this seems to contrast with the fact that cattle not only brought manure but also insects and odours. Cattle were taken into the houses nevertheless, but why was this? As some authors have stressed, cattle became "members of the household" (Rasmussen 1999, 287), not only on the basis of rationality (ease of collecting manure, protecting milking cows etc.), but also as a symbolic manifestation of their importance (Roymans 1999, 293). In house III at Legaard, access to the house was through the byre; this can be seen as both underlining the latter's importance and as a demonstration of status to visitors.

Various post-built enclosures in Thy are interpreted as animal pens and these may have functioned as byre substitutes or supplements. In particular, post-built enclosures consisting of two or more par-

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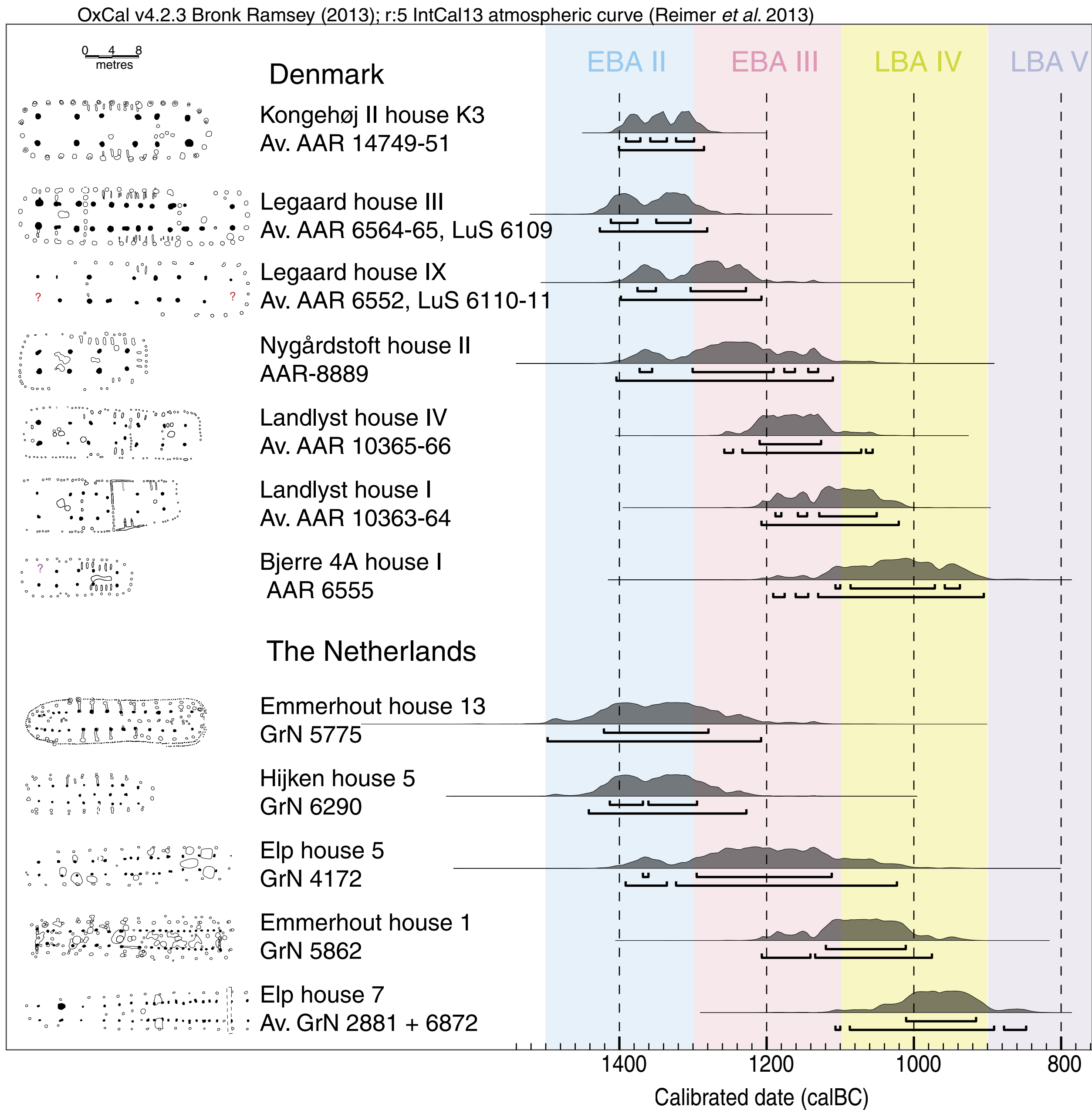

Figure 2.17. Radiocarbon-dated houses in Drenthe, the Netherlands, of the 'Emmerhout' and 'Elp' types, compared with Danish radiocarbon-dated houses with stall partition trenches in Jutland.

allel rows of post, usually arranged alternately and forming a fence, 1.2-1.5 m wide with a curvilinear form, are typical of the area (see Bech & Olsen vol. I, chap. 6). In the first international presentation of the Bjerre sites, attention was drawn to a very similar enclosure and possible livestock pen at Hauwert, West Friesland, as an indication of the similarities between Dutch and Danish Bronze Age sites (Bech 1997, 12). However, the Hauwert enclosure is not a common type in the Netherlands (S. Arnoldussen pers. comm.; Arnoldussen 2008, 265ff), although it must reflect some form of shared tradition or influence between the two regions.

To conclude, Bronze Age houses within the different regions of the North Sea area, as described above, are first of all products of regional traditions. However, on a general level they also display overall affinities with regard to house type, functions and the introduction of three-aisled building construction. Affinities between the regions can also be clearly seen in relation to the subsistence economy and land-use, as will become apparent in the following section.

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Economy

Mixed farming

No other Bronze Age settlement, either in Denmark or the rest of southern Scandinavia, covers the entire spectrum of agricultural strategies employed by Bronze Age farmers in the way that the Bjerre complex does. The evidence ranges from preserved arable fields with plough (ard) marks, through remains of crops and finds of harvesting tools to traces of domestic livestock that also included draught animals for working the fields. In parallel with this, pollen and other palaeoecological data, together with the results of wood and charcoal analyses, provide a picture of the landscape in which the Bronze Age farmers operated. Such a breadth of evidence is only rarely found preserved and recorded to the extent encountered at Bjerre Enge. Other sites across northern Europe show similarities and have features in common within one or more of these elements, and this is particularly true of the North Sea area. In the following, we will focus on selected aspects of Bronze Age agricultural strategy; a more detailed presentation of the situation at Bjerre is given in the individual chapters of this book.

The fields

In Denmark, traces of prehistoric cultivation in the form of ard marks are primarily associated with barrows. These are encountered either at subsoil level, beneath the actual barrow, or preserved under barrow fill that has slipped down around its margin (Thrane 1984b, 1990, 1991; Rasmussen 1993a). In only a small number of cases have traces of ard ploughing been found preserved in other circumstances, for example at Bjerre where they were discovered under coversand deposits (cf. also Liversage *et al.* 1987; Liversage & Robinson 1988; Boas 2000). The latter situation is probably much more widespread than suggested by the number of known localities, but fortunate circumstances or systematic trial excavations in drift-sand areas are required for it to be identified. In a few other cases, deposition of cultural deposits, a combined accumulation of coversand and cultural layers (Draiby 1985; Runge 2009) or even the growth of raised bog peat over previously cultivated fields has led to the preservation of ard marks; the latter was the case in Store Vildmose, northern Jutland (Nielsen 1993).

In the cases where ard marks have been found beneath Bronze Age barrows, this obviously provides a *terminus ante quem* for the ploughing activity that can only rarely be dated more precisely. There are, however, several examples where earlier structures and features, such as the remains of settlements and houses of known archaeological date, were ploughed over prior to the construction of the Bronze Age barrow. In these cases, the date of the ard ploughing can sometimes be established more closely (Thrane 1984a; Rasmussen 1993a).

A well-dated example of ard ploughing from Diverhøj on Djursland, eastern Jutland, has been published by P. Asingh (1988). At this site, two phases of ploughing could be identified prior to the construction of an Early Bronze Age barrow, with the second phase being particularly clear. It took place around a clearance cairn dating from LN I that later became covered by the Bronze Age barrow in period II (Asingh 1988, fig. 17, 144; Rasmussen & Adamsen 1993, 139). In this case, the dating precision is to within a period of perhaps 700 years. Heavy ploughing is evident at Diverhøj, with closely-spaced, parallel ard marks running around the aforementioned clearance cairn. This is typical of ploughing next to a field boundary, as recorded for example in the Pre-Roman Iron Age fields in Store Vildmose (Nielsen 1993, 121ff) and similar ploughing was seen around the foot of a Late Neolithic barrow in West Friesland (Tegtmeier 1993, 87). At some point, Diverhøj probably had fields to all sides, with the boundary between burial monument and field being ploughed precisely in the same way as a normal field boundary. As in the case of the other fields found associated with barrows, an entire field was not preserved at Diverhøj.

We can examine this situation in more detail at Glesborg, also on the Djursland peninsula, where N.A. Boas has investigated large parts of a field system dating from the end of the Late Bronze Age that was buried beneath coversand deposits (Boas 2000). Here too, the field boundaries have not been fully determined. Nevertheless, one field clearly measured at least 50 x 20 m, while another extended over at least 90 x 25 m, i.e. an area of more than 2000 m^2. On the surface of one field, parallel ard marks could be observed extending over a large continuous area. These were not as closely spaced as those seen at field boundaries, but undoubtedly represent simple back and forth ploughing along the same orientation. Similar traces are often observed in other occurrences of ard marks, but here they are associated with other episodes of ploughing of different orientation, such that their mutual relationship is difficult to determine as several separate cultivation operations are obviously represented. The special feature of the field at Glesborg is that the ard marks evidently represent a single cultivation operation and were only found uppermost in the plough soil. If seed corn was sown in the furrows produced by ard ploughing, as suggested by such as H. Fokkens (1998), the many parallel traces resulting from the same ploughing episode make a great deal of sense and could therefore represent a single spring ploughing in advance of sowing.

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The reason that the ard marks were preserved at all is because the field was covered by wind-blown sand immediately after ploughing (Boas 2000, 10). This particular example shows that ploughing did not take place in different directions within a single operation, forming a criss-cross pattern, as is otherwise considered to have been the norm in the main body of the field away from the boundaries (Nielsen 1993, 115ff). The other ard marks at Glesborg also show the same clear tendency towards uniform orientation of the ploughing (Boas 2000, figs. 11, 12), but whether these also only represent a single ploughing episode is, however, more doubtful.

The only other Danish locality where it has proved possible to uncover and record the ploughing pattern for several entire fields is the Pre-Roman Iron Age field complex in Store Vildmose (Nielsen 1993). Here it proved possible to calculate the areas of four fields as, respectively, 671, 750, 869 and 1540 m^2, i.e. somewhat smaller than those at Glesborg.

The closest parallel to the fields in Store Vildmose, from a Bronze Age perspective, is the field system uncovered at Bjerre 4. Here several fields were abandoned following a cultivation phase during Late Bronze Age period V, after which they became overgrown and then covered by wind-blown sand (Clemmensen *et al.* 2001; cf. Mikkelsen & Bech vol. II, chap. 16).

Overall, traces of ploughing dating from the Neolithic to the Pre-Roman Iron Age found in Denmark show such great similarity that the way in which this ploughing took place is unlikely to have changed much through time (Thrane 1984b; Jensen 1988). The only change that is apparent is in the degree of permanence of the arable fields and the requirement for manuring, both of which will be dealt with in more detail in the following sections.

The Bronze Age fields at Bjerre 4

The characteristic feature of the prehistoric fields at Bjerre 4 is that they apparently represent a coeval field system made up of small plots of slightly irregular, rounded form. The fields, which partially incorporated a habitation area belonging to an earlier settlement dating from Bronze Age period IV (Bjerre 4A), did not for the most part come into contact with each other, but were separated by uncultivated areas of various sizes. The area of the individual fields varied from 300 to 1000 m^2 and was evidently determined primarily by local natural conditions as small natural hollows were avoided when ploughing (Mikkelsen & Bech vol. II, chap. 16).

With partially detached fields in an apparently somewhat random arrangement, the field system at Bjerre 4, in a similar fashion to that in Store Vildmose, appears much less structured than the normal 'Celtic fields' that have rectangular plots abutting one another and are surrounded by field banks (Hatt 1949; Brongers 1976; Müller-Wille 1979; Fries 1995). The fields at Bjerre presumably also had a much shorter lifetime but nevertheless possessed a certain degree of permanence that permitted the formation of small field banks in a few places. The majority of the field boundaries were evident, however, simply as areas where the light grey sandy soil that constituted the cultivation layer had a slightly greater depth than elsewhere on the fields. The difference was often no more than 10 cm at the most and only in rare cases did it exceed 20 cm higher than the adjoining field surfaces (cf. Mikkelsen & Bech vol. II, chap. 16, fig. 16.14).

The fields at Bjerre can best be described as a 'pre-Celtic field system', but with a few features that point the way forward, i.e. a few field banks and, consequently, a certain degree of permanence in their exploitation. The latter is not true of the cultivation traces found associated with barrows, but this can be explained by the fact that barrow construction had, on the whole, come to an end by the Late Bronze Age. The ard marks beneath the barrows are therefore at least several centuries earlier than the fields at Bjerre 4. The reason that field boundaries have in some cases been identified in the fields associated with barrows (Thrane 1984a, 114ff), but not actual field banks, could therefore be because fields first acquired a slightly greater permanence during the Late Bronze Age, as evident at Bjerre 4. This is consistent with the growing significance ascribed by archaeologists to arable agriculture during the latter period (Welinder 1998, 189ff; Kristiansen 1998b, 104ff). Nevertheless, settlement remained sufficiently labile and comprised relatively small units and it seems that proper 'Celtic fields' did not become established in Thy at that time. This development apparently first took place synchronously with the formation of the first real villages in the area at the beginning of the Pre-Roman Iron Age (Mikkelsen vol. II, chap. 28).

Farming in wetlands: A marginal and non-viable habitat?

Since the discovery of the Bronze Age sites at Bjerre Enge, several scholars have commented upon their location on the wet former seabed. K. Kristiansen sees the area as an "economically non-viable habitat … but with good grass-production" that was exploited in the absence of anything better (Kristiansen 2006, 190). P. Lagerås and M. Regnell consider the sandy soils at Bjerre to be naturally very nutrient-poor and not well-suited to cultivation (Lagerås & Regnell 1999, 267), and S. Nielsen has difficulty in envisaging permanent all-year-round habitation in this damp and inhospitable area (S. Nielsen 1999, 159).

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The main reason for making use of the area as early as 1500 BC can hardly have been population pressure or lack of cultivable land on higher ground, as problems of this kind first become apparent in Thy some centuries later (Kristiansen 1978; Bech & Hornstrup 2013). It is therefore our view that settlement of the area is unlikely to have been out of necessity. On the contrary, it came about because the area offered both good grazing and the opportunity for arable cultivation. In this respect, Bjerre Enge resembles other areas along the North Sea coast where a similar exploitation of coastal wetlands took place. The prerequisite for this was a marked regression, i.e. a fall in sea level in the North Sea, in the period between 1500 and 900 BC. This created new land and with it the opportunity to exploit former marine areas (Behre 2007; Søgaard *et al.* vol. I, chap. 8). This widespread cultivation of apparently marginal, low-lying sandy areas, together with the tendency towards greater permanence of cultivation as observed at Bjerre, brings the question of possible manuring of arable fields very sharply into focus.

In southwest Norway, close to the airport at Sola near Stavanger (fig. 2.18:1), evidence has been found of ard ploughing of a wet, low-lying terrain in a former marine area. At this site, marine sand was covered by a peat-like deposit that was found to be rich in pollen of grasses and sedges. There was cultivation of this peaty substrate in either the Late Bronze Age or the Pre-Roman Iron Age, i.e. between 800 and the mid-2nd century BC; it subsequently became covered by wind-blown sand (Prøsch-Danielsen 1993; Prøsch-Danielsen & Selsing 2009, 36ff). The cultivation of a wet, former marine area that later became covered by wind-blown sand corresponds precisely to the situation at Bjerre Enge and, although it cannot be proven, there is nothing to hinder the Norwegian site from being coeval with the field system at Bjerre 4. As the phosphate values at Sola were relatively low, L. Prøsch-Danielsen does not believe that the field was manured by deliberately adding organic matter obtained from elsewhere to the soil, but that nutrients naturally present in the peaty material were sufficient to secure a high yield (Prøsch-Danielsen 1993, 241). This conclusion is also relevant with respect to Bjerre, where the phosphate level in the prehistoric plough soil was similarly modest (cf. below and Dalsgaard & Nielsen vol. II, chap. 26).

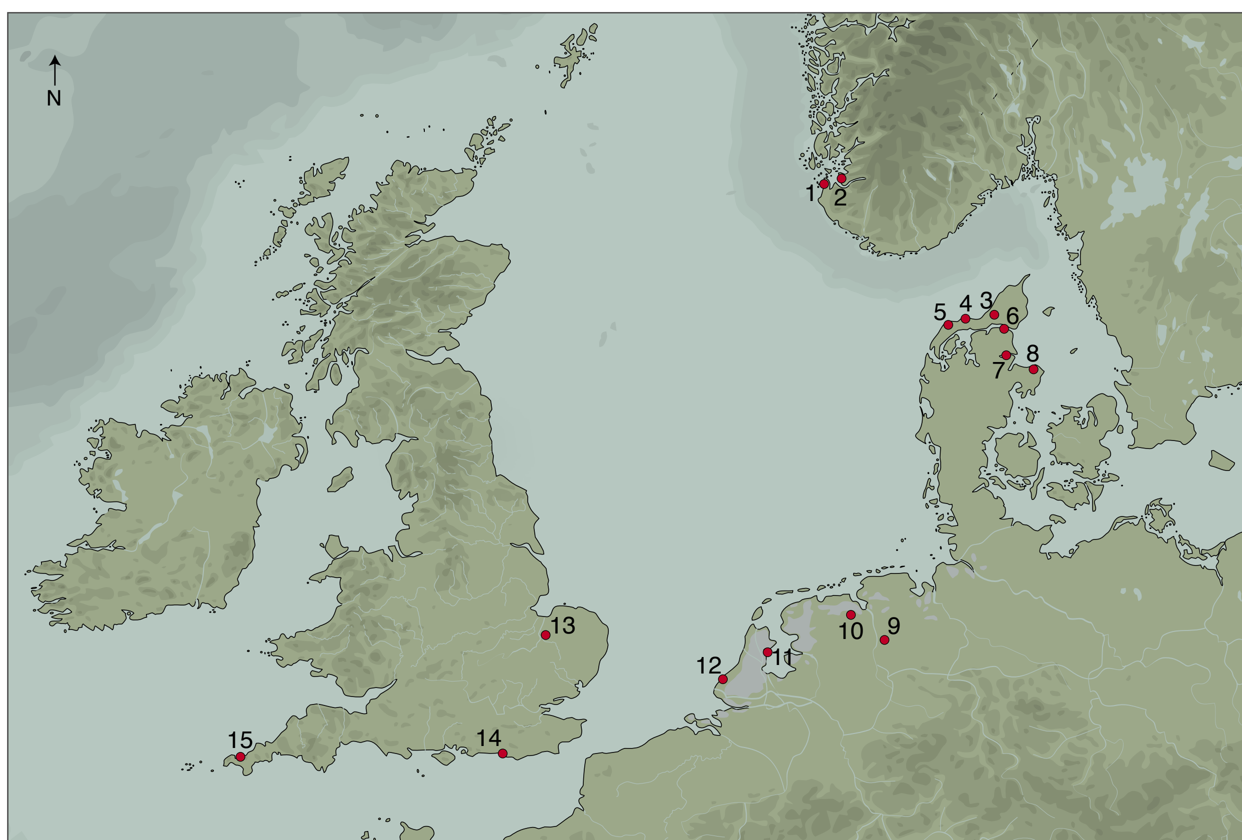

Figure 2.18. Northwestern Europe, showing the localities mentioned in this section on farming. 1) Sola, 2) Forsand, 3) Store Vildmose, 4) Bulbjerg, 5) Bjerre, 6) Nørre Hedegård, 7) Alstrup Krat, 8) Glesborg and Diverhøj, 9) Telgte, 10) Zeijen, 11) Bovenkarspel, 12) Noordwijk and Zuiderpolder, 13) Grimes Graves, 14) Itford Hill, 15) Gwithian.

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In a coastal dune area bordering the North Sea near Noordwijk, about 30 km north of Haag in the province of South Holland (cf. fig. 2.18:12), a site dating from about 1850 BC was excavated revealing a field system and a 23 m long two-aisled house (van Heeringen & van der Velde 1999; van der Velde 2008). Just as at Bjerre, this was a former marine area where coastal processes involving the formation of beach ridges had created new land. According to geographical studies, the site was only above sea level for a few hundred years prior to habitation (van Heeringen & van der Velde 1999, 26). It was abandoned as a consequence of increased waterlogging and peat formation at a time corresponding to the beginning of the Early Bronze Age in southern Scandinavia (van der Velde 2008, 169). The house and the field system immediately to the south of it are considered to be coeval. The latter comprises two phases, the first of which is represented by an extensive surface covered with ard marks. In the second phase this is then divided up by the cutting of what are assumed to be drainage ditches forming rectangular plots, two of which measure respectively 11 x 20 m and 20 x 20 m. In total, the cultivated area is estimated to have been 1.2 ha. The study of archaeobotanical remains suggests manuring of the fields as remains of bread wheat were found together with arable weeds, such as curly-top knotweed more commonly referred to as 'pale persicaria' (*Polygonum lapathifolium*) and black nightshade (*Solanum nigrum*) (van der Velde 2008, 168). According to van der Velde, wheat cannot grow on poor sandy soil unless manure is applied.

At Zuiderpolder, close to the North Sea near Haarlem, in the province of North Holland, and within the same overall area with tidal flats and coastal barriers as the Noordwijk site described above (fig. 2.18:12), Bronze Age fields with ard marks were encountered on a sandy ridge surrounded by expanses of alder peat. These fields date from c. 1500-800 BC and are sealed by peat deposits dated to 700 BC (Bakels 1997). There were several cultivation horizons at the site, 15-40 cm in thickness and separated by layers of coversand. The cultivation horizons were found to contain very large numbers of freshwater algae, mostly *Pediastrum*, and high pollen values of pondweed (*Potamogeton* sp.). Together with the very dark brown colour of the plough soil, the presence of these species has been interpreted as evidence of the intentional addition of material from a nearby bog as a form of manuring or means of improving the soil quality of the field (Bakels 1997, 442). A similar phenomenon has also been observed in connection with a plough soil with ard marks at Velserbroek in North Holland, dated to c. 100 BC (Therkorn 2008, 158).

The classical locality of Gwithian on the west coast of Cornwall, southwest England (fig. 2.18:15), also contains features that can be directly paralleled with Bjerre Enge. Here too, in the late 2nd millennium BC, there was ard cultivation of a coastal lowland area with coversand deposits. Although this was a more regular system than that evident at Bjerre Enge, the fields were of similarly modest dimensions (one was c. 30 x 30 m; Megaw 1976, fig. 4.1). Ard marks and cross-ploughing are evident in exactly the same way and, as was also the case at Bjerre, household refuse had clearly been spread out across the fields: At Gwithian this evidence is interpreted as an indication that the fields were almost certainly manured (Barker 1985, 212).

The presence of small potsherds and other household refuse in the plough soil is a recurrent feature of many Bronze Age fields in the North Sea region. It has also been observed at Itford Hill in Sussex (Barker 1985, 215), at Bovenkarspel in West Friesland (Ijzereef 1981, 180; Buurman 1988, 283), at Telgte in Lower Saxony (Reichmann 1982, 447), and in Denmark, in addition to Bjerre Enge, it has been reported from the fields at Glesborg, Djursland, eastern Jutland (Boas 2000; Robinson 2003, 162). Cultivation layers of possible Late Bronze Age date associated with a field system beneath the tell site at Nørre Hedegård in northern Jutland were similarly found to contain pottery and flint (Runge 2009, 119) (fig. 2.18:6). In these contexts, the phenomenon has generally been seen as indicating the intentional spreading of household refuse, either on its own or mixed with animal dung, in the process of manuring the fields (Barker 1985, 212; Buurman 1988; Boas 2000; Brinkkemper & van Wijngaarden-Bakker 2005, 496; Fokkens 2005, 427; Runge 2009; Dalsgaard 2009; Henriksen *et al.* vol. II, chap. 25). In historical times, the use of mixed middens is known from large parts of the continental North Sea area. This involved combining various organic materials – refuse, turf, ash etc. – that then underwent a composting process before being used as manure (Schmidt 1939, 21; Kroll 1975, 86ff). Investigations on the island of Sylt have demonstrated the use of this practice in the Bronze Age (Harck 1987; Kroll 1987), and it is also thought to have been employed in the Netherlands (Fokkens 1998, 119ff; Hing 2000, 206).

An alternative explanation for the presence of potsherds and other settlement material in prehistoric plough soils could, of course, be the ploughing up of earlier settlements. At Bjerre Enge, this could explain a major part of the distribution seen at Bjerre 4, but probably not all of it, and it seems likely that intentional spreading of ash and other household refuse also took place (cf. Mikkelsen & Bech vol. II, chap. 16). The presence of small potsherds and fire-cracked stones in cultivation layers elsewhere at Bjerre Enge, in places where no features, accumulations of cultural deposits or other traces of settlement activity have been recorded, reinforces this perception; it is further confirmed by the results of recent investiga-

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tions of cultivation layers dating from c. 500 BC in Østerild Klitplantage, Thy, where similar circumstances prevailed (site no. 110212-48).

In all the above examples of cultivation of low-lying sandy areas, the question of manuring, or soil improvement in one form or another, has been addressed and in several cases it has been argued that it did take place. However, the evidence basis for this conclusion varies from case to case: At Nordwijk, the argument is based on the archaeobotanical evidence; pollen data were employed at Haarlem, and at Gwithian reference is made to the presence of household refuse in the plough soil. Only at Sola is phosphate analysis included in the arguments though, as already mentioned, without being able to provide any positive demonstration of manuring. This latter seems, however, to be possible in a Dutch investigation of a Celtic field system at Zeijen, Drenthe (fig. 2.18:10). T. Spek *et al.* (2003) conclude that the phosphate content of the basal layers of the field banks suggest that during the "Late Bronze Age and Early Iron Age", i.e. the Late Bronze Age in Denmark, moderate manuring was employed in cultivation resulting in an average phosphate content of c. 200 ppm P (mg P/kg dry soil). At this time the fields had only slightly raised boundaries consisting of large stones, turf and clods of earth cleared from their surfaces. By contrast, the regular arrangement of field banks evident in the system belonged to a later phase of use involving heavier application of manure (Spek *et al.* 2003, 167).

At Forsand, Rogaland, in southwest Norway (fig. 2.18:2), pollen and phosphate data have been used to demonstrate a close relationship between cereal cultivation, various arable weeds and high levels of phosphate in areas that also have clearance cairns (Prøsch-Danielsen & Simonsen 1988). The earliest of these cairns dates from the Early Bronze Age and this is interpreted as evidence for the systematic gathering of stones into clearance cairns and the cultivation of permanent, manured fields at this early stage (Løken 1998c, 186; Bakkevig 1998, 56f). At Vestlandet there is thought to have been intensive agriculture and manuring in the Late Bronze Age and Pre-Roman Iron Age (Diinhoff 1997, 128, 1999).

Finally, Danish investigations at Alstrup Krat near Mariager in northern Jutland suggest that manuring was associated with cultivation as early as the end of the Neolithic or beginning of the Early Bronze Age (Bech 2003, 98); at Nørre Hedegård in northern Jutland, the practice predates the earliest tell phase at the transition between the Late Bronze Age and the Pre-Roman Iron Age (Dalsgaard 2009) and it was employed during the Pre-Roman Iron Age on the fields in Store Vildmose, similarly in northern Jutland (Nielsen 1993, 112f) (fig. 2.18:3). Based on this evidence, it was to be expected that manuring, by the intentional addition of farmyard manure and/or other organic matter, was practised on the sandy Bronze Age fields at Bjerre Enge at least by the Late Bronze Age.

The subject is addressed directly by K. Dalsgaard and M. Westergaard-Nielsen in their chapter on the pedological investigations at Bjerre 4 (vol. II, chap. 26) which, in its title, poses the question of whether the fields at Bjerre were manured. P.S. Henriksen, D.E. Robinson and K. Kelertas also consider the subject in the presentation of their archaeobotanical investigations (vol. II, chap. 25), and S.T. Andersen indirectly touches upon it in his presentation of the pollen data (vol. I, chap. 9).

As is often the case when a question is addressed in detail, the situation proves to be more complex than initially assumed. Previous presentations of the Bjerre settlements have argued that the fields were manured, based for example on the pollen evidence. However, if all the analytical data now available are examined, it becomes evident that there is not complete agreement between the findings, and the picture is more complex than previously thought.

Manuring at Bjerre

On the basis of their pedological investigations at Bjerre 4, K. Dalsgaard and M. Westergaard-Nielsen conclude that the low level of phosphate found in the cultivation layer indicates that addition of actual farmyard manure, if it took place at all, was extremely limited and could never have been in the form of regular application. Conversely, settlement material and ash in the plough soil have contributed to a slightly elevated phosphate content. The cultivation potential of the sandy soil was, however, found to be greater than for many other sandy soils due to the large proportion of fine sand present which, together with a high water table, results in a high availability of water for the crops. A regular addition of farmyard manure would therefore not have been necessary unless the fields were permanently cultivated (vol. II, chap. 26). The degree to which the latter was the case is therefore of crucial significance to an evaluation of whether the fields at Bjerre were manured, i.e. had their nutrient levels improved, by the addition of organic material in some form or other.

The archaeological and archaeobotanical evidence is consistent in indicating a certain permanence in the cultivation system; P.S. Henriksen *et al.* (vol. II, chap. 25) point out that the weed flora of the fields cultivated by the inhabitants of Bjerre 7 indicates permanent cultivation. The field system at Bjerre 4 lies only c. 750 m distant from Bjerre 7 and is perceived as being coeval with it (Mikkelsen & Bech vol. II, chap. 16). Whether the fields at Bjerre 4 were cultivated by the inhabitants at Bjerre 7, it is impossible to say, but it seems likely that cultivation methods were the same as at Bjerre 7.

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Based on pollen data from cultivation horizons in the southern part of Bjerre 7 it has previously been suggested that high values for pondweed (*Potamogeton* sp.) pollen indicate that peat was applied to the fields to improve the soil (Andersen 1991; Bech 1997, 10). This interpretation is closely related to the situation described above from the Netherlands, but was, however, not included in the manuscript on the pollen studies left by the late S.T. Andersen (vol. I, chap. 9). The presence of pollen of wetland species, such as sedges (*Carex* sp.) and pondweed (*Potamogeton* sp.), is now taken to indicate that the deposits themselves were formed under wet conditions. Conversely, the source of pollen of dandelion (*Taraxacum*) type found by Andersen in the cultivation layers at Bjerre 7 is seen as being manure from a settlement area. This conclusion relates to the very high values of this pollen type found in the byre of house I at Bjerre 4A, which Andersen sees as evidence for the cattle having grazed on dandelion-rich areas (vol. I, chap. 9). Dandelions are insect- rather than wind-pollinated and consequently only release very small amounts of pollen into the air. The high pollen values for this plant are therefore seen as being due to the presence of cattle dung and it is concluded that the animals either grazed at the pollen sampling site or their dung was taken from the byre and spread out across the fields. Although the frequency of dandelion-type pollen in the plough soil at Bjerre 4 is slightly less than that at Bjerre 7, the same phenomenon is also seen there (Andersen vol. I, chap. 9, fig. 9.2; Søgaard *et al.* vol. I, chap. 8).

In summary, it can be said that the archaeobotanical data indicate that the fields were under more permanent cultivation in the Late Bronze Age than in the Early Bronze Age. At the same time, the pollen data suggest that peaty deposits of a certain soil-improvement value were ploughed up and that dung from farm livestock was, in one form or another, either actively or passively, added to the fields. A possible explanation for the low phosphate content of the plough soil, as revealed by the pedological analyses, could be that the crops took up most of the applied phosphorus and that the more direct evidence for manuring was thereby removed by the Bronze Age farmers themselves in their harvests. Leaching-out of the phosphate, on the other hand, is not considered to have been a significant factor as the later soil processes mainly would occur in the covering sand (K. Dalsgaard pers. comm.)

Wheat is a more demanding crop in terms of soil quality than barley (Hing 2000, 179ff) and as we cannot be sure that all the crops represented in the archaeobotanical data from Bjerre were actually cultivated *in situ* on the raised seabed, there may have been some degree of exchange with crops grown in more fertile, clay-rich areas. However, the suggestion made by several scholars that soil conditions at Bjerre Enge were marginal and poorly suited to arable cultivation must be taken with a certain degree of reservation. The lack of stones in the sandy soil at Bjerre Enge made it much easier to plough with an ard than many other areas with stony soils (cf. Zimmermann 1995, 308; Bakkevig 1998, 57f), and the high water table provided the crops with a buffer against desiccation in summer. The fact that similar landscapes elsewhere around the North Sea were exploited in a corresponding fashion also suggests that, in an arable context, it was definitely worth the effort and even conferred certain advantages.

The crops

There was great uniformity in the range of crops grown in Jutland during the Bronze Age, combined with considerable continuity over long periods (Henriksen 2000; Robinson 2003). Even though it can be difficult to compare the frequency of the various forms of wheat and barley due to differences in the way these crops were processed, it appears that naked barley was generally dominant, followed by the wheat species emmer and spelt. Of the latter two, emmer was most common in the Early Bronze Age at Bjerre, while spelt and emmer were of equal abundance in the Late Bronze Age (Henriksen *et al.* vol. II, chap. 25). Bread wheat was generally uncommon and the abundance of this crop at Egehøj, Djursland, remains an oddity (Rowley-Conwy 1984). The overall stability of the crop spectrum is emphasised by D. Robinson: in Thy this is seen from the Single Grave culture up to and including the Late Bronze Age, on Djursland in eastern Jutland it applies from the Late Neolithic up to and including the Late Bronze Age and in southern Jutland it is evident from the Middle Neolithic to the Middle Bronze Age (Robinson 2003). The Late Bronze Age is poorly illuminated in the latter area due to the aforementioned deficiencies in the source materials.

Although there are minor local and regional variations in crop composition, many similarities are also seen along the entire North Sea coast, from southwest Norway, through Jutland to northwest Germany and the Netherlands. This is true for example of the major presence of naked barley and emmer in the early part of the Bronze Age (Bakkevig 1995; Soltvedt 2000; Soltvedt *et al.* 2007; Buurman 1987, 1997, 114f; Brinkkemper & van Wijngaarden-Bakker 2005, 496). In many places, however, the more robust and higher yielding hulled barley made steady advances in the course of the Bronze Age, and in the Netherlands it had completely replaced the naked variety by 800 BC (Brinkkemper & van Wijngaarden-Bakker 2005, 496; Hing 2000, 179ff). As demonstrated by Henriksen *et al.*

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(vol. II, chap. 25), naked barley continued to dominate relative to hulled barley in northwestern Jutland well into the Iron Age. In contrast, the major occurrence of gold of pleasure (*Camelina sativa*) at Bjerre 7 in Late Bronze Age period V shows that, in the case of this oil-rich plant, the Bronze Age farmers were quick to pick up developments elsewhere across northern Europe and include it among their crops (Harding 1989; Louwe Kooijmans 1993, 104; Hing 2000, 190).

Gold of pleasure is quick-growing and thrives on wet soils. In modern experiments involving the cultivation of a range of crops in the Dutch saltmarsh it gave by far the greatest yield (Hing 2000, 207; Brinkkemper & van Wijngaarden-Bakker 2005, 506) and there is little doubt that the plant would have been at home at Bjerre Enge. In addition to increasing crop diversity with its flexibility of cultivation, perhaps it also enabled an intensification of agriculture production (Hing 2000, 207). It could have been included in crop rotation and, in addition to its production of oil-rich seeds, it is also useful as a fodder plant (Brinkkemper & van Wijngaarden-Bakker 2005, 504). In many areas cultivation of gold of pleasure also increased, together with millet (*Panicum miliaceum*) and flax (*Linum usitatissimum*) (Harding 1989; Hing 2000). However, neither of the latter two appears to have been cultivated at Bjerre (Henriksen *et al.* vol. II, chap. 25).

Livestock

There is little doubt that livestock formed part of a mixed farming strategy at Bjerre in the Bronze Age, in which arable and pastoral agriculture were combined and mutually dependant in the same way as seen in the Bronze Age agricultural economy of other parts of northwest Europe, for example the Netherlands (Louwe Kooijmans 1993; Hing 2000, 31; Brinkkemper & van Wijngaarden-Bakker 2005, 491ff).

The faunal assemblage recovered from Bjerre is relatively modest and does not cover the entire habitation period; due to preservation conditions it dates almost exclusively from the Early Bronze Age. Nevertheless, the animal bones from Bjerre still constitute the largest combined assemblage of its kind from this period in Denmark. In his presentation of the material, G. Nyegaard (1996, 10ff, vol. II, chap. 27) emphasises the large proportion of cattle bones. These include a metatarsal displaying morphological changes to its lower part that are generally interpreted as an indication of prolonged work-related loading and the bone possibly comes from an ox employed as a draught animal in field cultivation at Bjerre (Nyegaard vol. II, chap. 27).

Moreover, the relatively large proportion of bones of very young calves killed in their first months of life can be interpreted as indicating a slaughtering strategy directed towards milk production. A similarly large proportion of bones of very young calves is also evident in a later assemblage, dated to the middle of the Late Bronze Age, recovered from Bulbjerg (Troldsting). Nyegaard therefore considers it probable that there was a connection between the high incidence of very young calves in the bone material and milk production at these two sites (Nyegaard 1996, 158, vol. II, chap. 27). Bjerre and Bulbjerg (Troldsting) are the localities in Nyegaard's study with the largest numbers of bones from calves slaughtered at a young age. But as most of the Bronze Age assemblages come from Funen and Zealand, early slaughter could perhaps have been a western Danish phenomenon. A serious lack of Bronze Age faunal remains from other parts of Jutland must, however, be addressed before more can be said on this subject. In the same vein, it is interesting that T. N. Raahauge's analysis of the extensive faunal assemblage recovered from the Smedegård tell site, dated to the Early Iron Age and located only about 5 km from Bjerre, revealed a similar trend. A very large proportion of the calves at Smedegård were slaughtered within the first couple of months of life and this is interpreted as being related to a milk production strategy (Raahauge n.d., 2002, 25). Although the two assemblages from Bjerre and Smedegård differ in date by as much as 1000 years, it is obvious to see both of them as expressions of the same form of cattle husbandry that apparently has its roots in the Early Bronze Age. Dairy products would have included cheese and yoghurt, and fresh milk was probably also drunk (Raahauge n.d.). Given an estimated annual yield for a Bronze Age or Iron Age cow of around 100-150 litres (Fokkens 1998, 139), the actual amount of milk available to a household would have been quite limited. Nevertheless, the nutritional value of this, in terms of the calories it potentially provided, could have been quite significant (Ijzereef 1981, 187ff).

The idea that Bronze Age strategy for cattle herds around the North Sea was, to a very great degree, directed towards dairy production is supported by analyses of refuse heaps dating from the Middle Bronze Age at Grimes Graves in Norfolk (Legge 1992). These data demonstrate a correspondingly high slaughter frequency for young calves to that observed in Denmark and are interpreted in terms of milk production being the most important aspect of cattle husbandry. It is also pointed out, with references to ethnographic parallels, that processed dairy products, such as cheese, could be easily stored and transported. In this way, it was possible to realise any surplus production.

The use of oxen as draught animals and the apparent importance of milk production are both consistent with Bronze Age farmers beginning to make use of byres and various forms of animal pens etc. to protect their livestock against the elements (Nyegaard vol. II,

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chap. 27) as well as thieves and predators. The collection of animal dung from byres and pens could have been a further asset that became increasingly important with time as agriculture intensified during the course of the Bronze Age.

G. Nyegaard mentions that the open, partly grass-covered Bronze Age landscape at Bjerre would have been ideal for sheep and that they may have constituted a greater proportion of the livestock than that suggested by the total number of sheep/goat bones fragments in the assemblage (15% for the Early Bronze Age), the difference being due to preservation conditions. Compared with the proportion of sheep/goat bones recorded at the later site of Bulbjerg (Troldsting), and the even later Smedegaard, a picture emerges of a gradually increasing proportion of sheep/goat over time, culminating in a clear dominance relative to cattle in the Early Iron Age at Smedegård (Bech & Mikkelsen 1999, 76). However, in her account of the animal bones from the latter site, T.N. Raahauge expresses scepticism with respect to this conclusion as she suggests that the relatively small faunal assemblages recovered from both Bjerre and Bulbjerg must be considered as flawed on taphonomic grounds. Consequently, she finds it difficult to assess the differences between the Bronze Age and the Iron Age livestock in Thy. However, she does tend towards

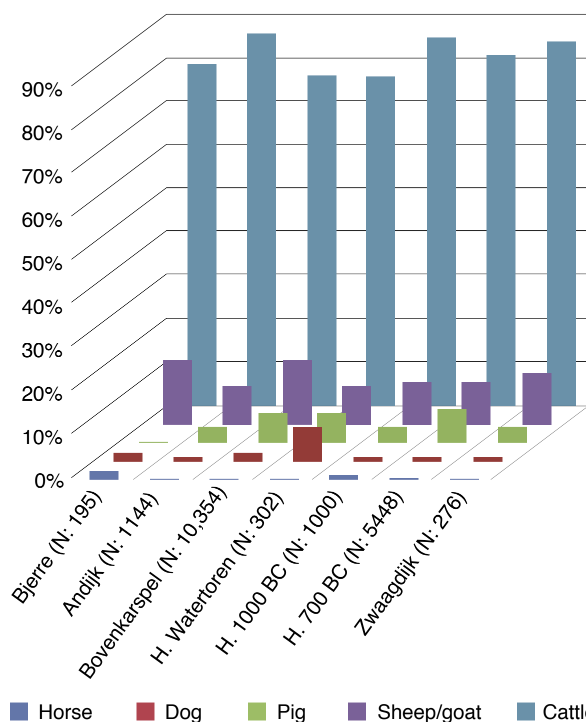

Figure 2.19. Stock frequencies at Bronze Age sites at Bjerre and in West Friesland (Bjerre after Nyegaard (vol. II, chap. 27), West Friesland after Barker (1985)). H = Hoogkarspel.

the view that its overall significance in the Bronze Age was less than previously asserted (Raahauge n.d.). In our view, the overall species composition evident in the assemblages from Bjerre and Bulbjerg is credible, even though the size of the available datasets is limited, not least because this picture is consistent with situations seen elsewhere. Similarities in the species composition evident at Bjerre and that seen at Bronze Age settlements in West Friesland have been highlighted previously (Bech 1997, 10); in both cases, cattle were very clearly dominant (fig. 2.19). Moreover, developments during the Bronze Age and Early Iron Age in the direction of a greater emphasis on sheep/goat relative to cattle represent a general phenomenon seen across large parts of northwest Europe (Kristiansen 1998b, 109f; Brinkkemper & van Wijngaard-Bakker 2005, 498f).

Flint-working

During the Neolithic, high-quality flint extracted from mines in the Limfjord area formed the basis of far-reaching exchange networks. This was particularly true in the Late Neolithic (cf. below) and it is therefore no surprise that flint continued to be an important raw material for the production of numerous tool types in northern Jutland during much of the Early Bronze Age. As the finds from Bjerre clearly show, production of asymmetrical, bifacially flaked flint sickles constituted a particularly characteristic element in this activity (Eriksen vol. II, chap. 21). In contrast, not a single bifacially flaked flint dagger or polished flint axe has been encountered on the Bronze Age sites at Bjerre and there is one lone arrowhead. This part of the flint inventory must have been replaced by bronze axes and daggers as early as period II. The reason that flint sickles continued to be used in parallel with sickles of bronze for several further centuries and were, moreover, superseded by blade knives in the Late Bronze Age (Juel Jensen vol. II, chap. 23), was perhaps because harvesting tools, possibly used primarily by women (Kristiansen 1998b), were perceived differently from weapons and other types of tools. Wear trace analyses have shown in several instances that both bifacially flaked sickles and blade knives were used in harvesting (Aperlo vol. II, chap. 22; Juel Jensen vol. II, chap. 23).

Since P.V. Glob's publication dealing with the stone tools of the Bronze Age (1938), asymmetric flint sickles have been dated to the Bronze Age, being termed by Glob as a "relatively rare special type" (1938, 42). E. Lomborg later confirmed their Bronze Age date but also emphasised that this conclusion is based on relatively little data, i.e. stratigraphic observations at Mellemholm in northern Jutland, where production of asymmetric flint sickles was found to

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post-date flat-field graves from Bronze Age period II (Lomborg 1960, 168f). A sickle of this type was also found in an oak coffin from period II found in the barrow Store Høj at Barde in western Jutland (Boye 1896, 38ff). Subsequent to Lomborg's publication, this has been dendrochronologically dated to 1373 BC, i.e. period II (K. Christensen 1998).

The excavations at Bjerre Enge have generated a series of radiocarbon dates that contribute further to establishing the age of these asymmetric sickles. In addition to confirming a direct link with period II, the dates also show that this type, not unexpectedly, occurs in period III, and this conclusion is supported by a date from house VIII at the Klostergård settlement (fig. 2.20) (cf. Eriksen vol. II, chap. 21; Olsen vol. II, chap. 32). A fragment of a bronze sickle in a grave dating from period III found in Thy (Aner *et al.* 2001, no. 5231) shows that asymmetric flint sickles were replaced, at least in part, by bronze sickles during the course of period III.

As for P.V. Glob's description of the asymmetric sickle as a relatively rare special type, this cannot be said to be the true for northwest Jutland (Steensberg 1943; Bech 1997, 12f). At Bjerre Enge, the manufacture of asymmetric sickles has been shown to have been on a small scale commensurate with the finished tools being used for harvesting in the local area. However, given the mass production of sickles of this type demonstrated within the Aas area of central Thy, where thousands of sickles were made at specific flint workshops close

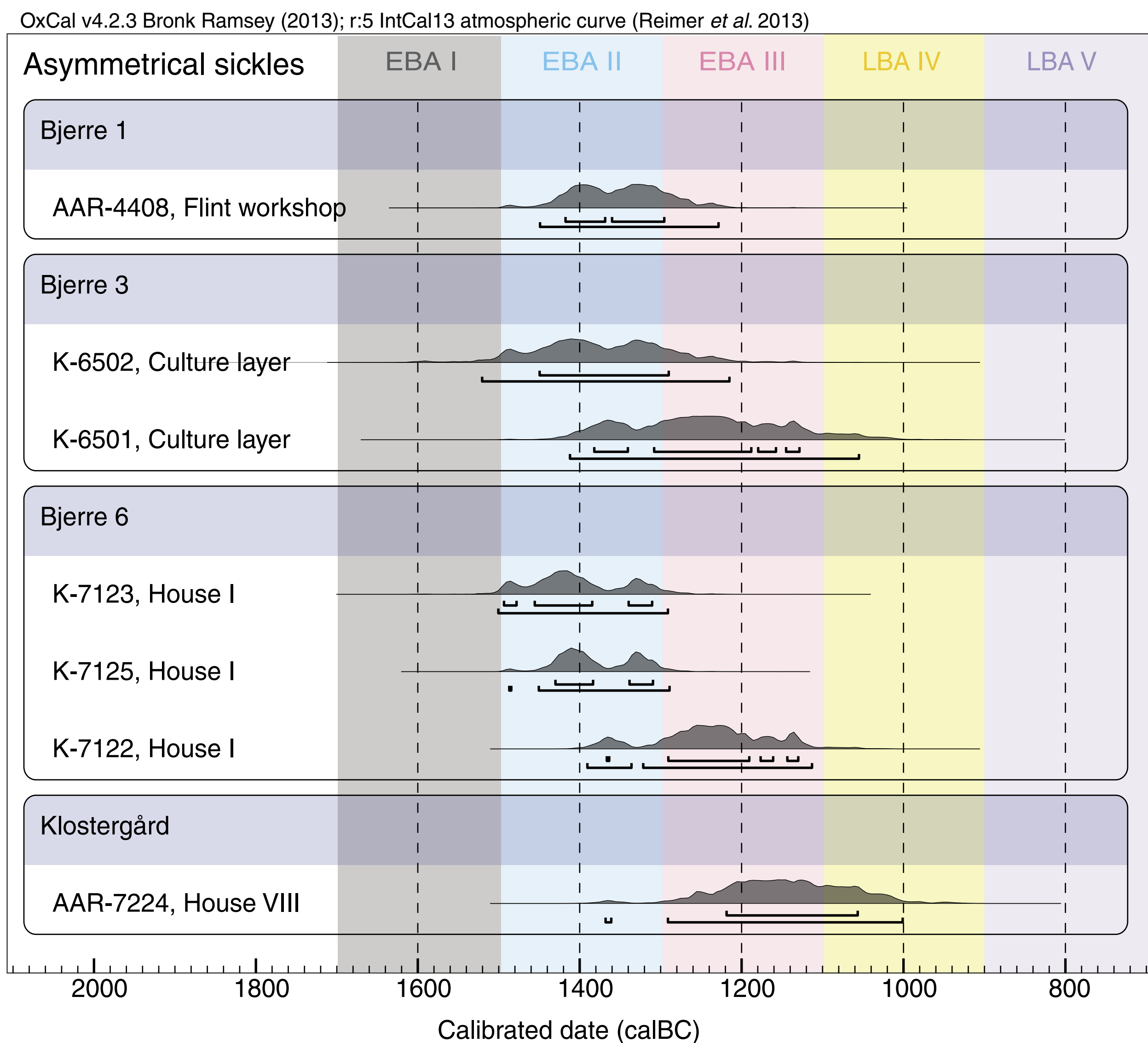

Figure 2.20. Radiocarbon dates for the production of asymmetrical sickles in Thy (for further information on the radiocarbon dates, see vol. I, appendix B).

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to the Limfjord (Steinberg 1997, 207ff; M. Mikkelsen vol. II, chap. 28), there is no doubt that production was also aimed at markets beyond the local habitation area. Unfortunately, nothing is known about how far these Early Bronze Age sickles were distributed both within and beyond Thy. Given the close links between Thy and southwest Norway (Solberg 1994), it seems obvious that a certain proportion of those sickles distributed more widely ended up as far away as Rogaland, where a foreign element would be more visible than in parts of Jutland outside Thy. However, a basic appraisal, by the first author, of the collections at the Museum of Archaeology, University of Stavanger, established that only very few asymmetric flint sickles found in Rogaland could possibly have been manufactured in northwest Jutland; the two most characteristic of these actually come from insecure contexts.[14]

As shown by the large number of bifacially flaked daggers and symmetrical sickles of undoubted northern Jutish origin found in southwest Norway (Becker 1993; Solberg 1993, 1994; Apel 2001), there was a major exchange of flint and flint tools across the Skagerrak from the beginning of the Late Neolithic. Given the relatively large number of flint daggers of the Early Bronze Age type VI found in Rogaland, and further up the Norwegian west coast to Sogn og Fjordane (Solberg 1994, 114f), this flint exchange continued at least during period I. In Early Bronze Age periods II-III, however, we must recognise that, with respect to asymmetrical flint sickles, this exchange was of such limited extent that it is barely recognisable in the archaeological record.

An apparently parallel phenomenon to the asymmetric flint sickles from northwest Jutland is encountered in southern Jutland and Schleswig-Holstein. Here there is a morphologically similar flint sickle that is, nevertheless, clearly different in detail. This has its main distribution concentrated in the western part of the area, oriented towards the North Sea, with numerous examples from the North Frisian Islands (Kühn 1979, type A, Karte 15; Bech 1997, 13). The main difference between the sickles from Thy and those from southern Denmark/northern Germany is in the form of the basal part (Kühn 1979, 66; Ethelberg 2000, 236). While it is usual for the Thy sickles to have a thicker basal part with some of the original surface (cortex) of the flint core preserved (Eriksen vol. II, chap. 21), this is not true in the case of the German type A sickles; the latter are also narrower and more angled in shape. These differences clearly show that these sickles were each manufactured in their own respective areas, but as expressions of a common morphological tradition.[15]

Type A sickles are, as already mentioned, also found outside southern Jutland and Schleswig-Holstein, i.e. in northwestern Lower Saxony and northern and western parts of the Netherlands (Kühn 1979; Gijn 1988). Apart from their basic asymmetric form, the resemblance between the Dutch sickles and those from Thy is just as slight as that seen between the north German and the northwest Jutish examples. Similarly, there is also a difference in date, with the Dutch examples extending a good way into what corresponds to Danish Late Bronze Age. The function of the Dutch sickles is also unusual in that they were used to cut grass turf and not as harvesting implements (Gijn 1988; Gijn & Wentink 2013).

Along and across the North Sea

Contacts along the North Sea coast were frequent and very direct and also a totally integrated part of the lives of Bronze Age communities there (fig. 2.21). People travelled and moved around either as a result of their role or mission in life and their training and education, or because they settled in other areas due to marriage and so on. The latter group is possibly reflected in graves that, in several respects, stand out from the local examples. However, the former is perhaps more important in relation to the continued communication that was essential to maintain the dynamics of communities and their access to bronze; it was important that people returned from their travels, bringing bronzes, skills, knowledge and established contacts.

These direct contacts are also reflected on a more general level in the numerous common features evident in architecture, the internal organisation of houses, burial practices and so on. It can be said that the common house building tradition in the introduction was closely associated with what were virtually personal contacts or, at least, links between groups aware of each other's name and identity.

Contacts along the North Sea coast are consistent with the general impression we have of Bronze Age travel routes in Europe that followed natural features in the landscape such as mountain passes and rivers. Seaborne trade avoided open sea crossings and moved primarily along the coasts (Harding 2000, 175f, 181).

As a consequence, few comparisons have been made between Denmark and the Bronze Age landscape of eastern England. Nevertheless, land-use strategies, husbandry practices and the location of settlements in response to changing conditions do indicate shared traits between the English and Danish Bronze Age, even if they do not prove any major degree of direct communication. A few very tangible signs of communication are, however, apparent in new strontium isotope data from southeast England, revealing that Bronze Age individuals originating from various regions around the North Sea lie buried side by side (Mckinley *et al.* 2013).

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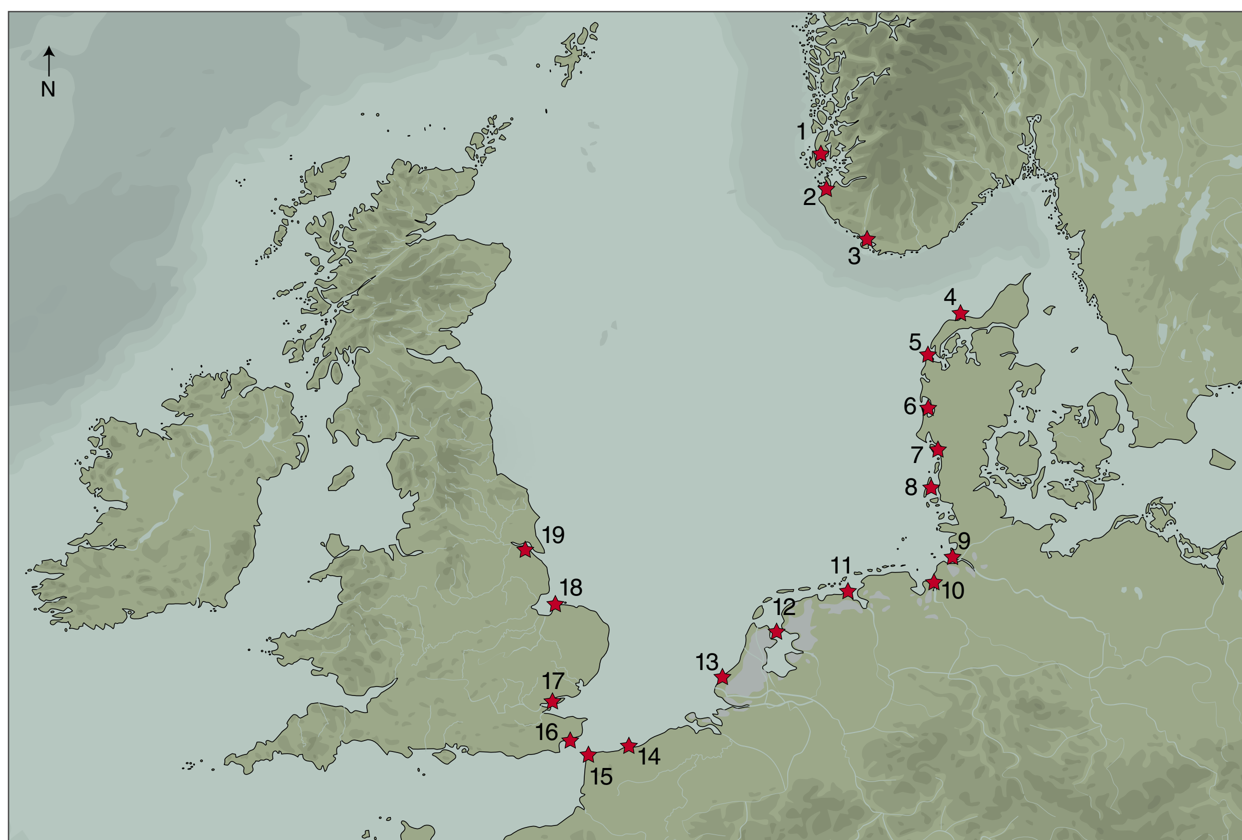

Figure 2.21. Map of the North Sea region showing hypothetically important 'stations' on a maritime trade route along the coastal area. Many others may of course have existed. From north: 1) Karmsund, 2) Jæren, 3) Lista, 4) Jammerbugt (the area between Vigsø and Svinkløv), 5) the passage into the Limfjord at Thyborøn, 6) Ringkøbing Fjord and the Skjern Å estuary, 7) the Kongeå and Ribeå estuary, 8) the North Frisian Islands, Sylt, Amrum and Föhr, 9) the mouth of the Elbe, 10) the mouth of the Weser, 11) the mouth of the Ems, 12) the Ijseel estuary and the Ijseelmeer, 13) the Rhine estuary, 14) the mouth of the Ijzer and 15) the coastal area at Calais. On the east coast of England: 16) the Dover coastal region, 17) the Thames estuary, 18) the Wash with the mouth of the Ouse and 19) the mouth of the Humber.

Contemporary land-use in eastern England

In eastern areas of England, such as East Anglia, investigations and intensive fieldwork have revealed comprehensive evidence of the Bronze Age landscape. The Yorkshire Wolds are known for their barrows located on high ground, but it has become evident that a densely-settled landscape with barrows and habitation also existed on lower terrain in eastern England, alongside rivers such as the Humber and Ouse (Bradley 2007, 154, 168). Furthermore, the Thames Valley and the Fenlands are considered to have been central areas for continental communication during the Middle Bronze Age in England (1500-1100 BC) (Bradley 2007, 201).

The Bronze Age land-use system in eastern England is revealed by traces of boundary ditches and banks, mostly interpreted as representing so-called co-axial field systems. However, some structures provide obvious evidence of livestock management: paths and droveways for cattle, sorting pens for sheep etc. It has recently been suggested that the ditch systems and compounds indicate the organisation of pasture rotation and perhaps even the ownership of livestock (Guttmann & Last 2000, 350). This fits well into the picture of a primarily pastoral economy within a mixed farming regime in the English lowlands. The need for soil improvement is demonstrated by increased evidence for manuring (Yates 2007, 138) and significant data from plant macrofossil analysis also indicates the importance of cultivation, processing and storing of crops (Doshi 2007). The Bronze Age settlements exploiting the edge of the fens in the Ouse Valley, and comparable landscapes elsewhere, may have applied a strategy that involved a seasonal change between summer pastures in the fens and winter pastures on the higher ground beyond the river (Barker 1985, 205ff). The existence of some kind of limited transhumance is suggested (Yates 2007, 83).

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The English Bronze Age dwelling was a so-called roundhouse. This constituted a marked difference from almost all other areas of Bronze Age Europe, with the exception of other areas of the British Isles, Sicily and southern parts of Italy. This different architectural preference could perhaps be connected with variations in residential patterns (Harding 2000, 30).

Roundhouses are regarded as fairly short-lived dwellings, linked to a single generation, and on the basis of evidence from South Hornchurch it is suggested that only one household module existed at that time (Guttmann & Last 2000, 349). The houses were often located in the corner area of a field and there was consequently a firm link to a defined land plot (Guttmann & Last 2000, 353ff). A household module consisted of two buildings and various associated features such as pits, smaller post constructions (four to six posts) and ditches. This is interpreted as a farmstead comprising a dwelling house and a building serving a range of economic purposes: food preparation, workshop, storage or the like. There is no evidence whatsoever of byres or stalls (Bradley 2007, 190). The typical diameter of roundhouses ranged from 4.5 to 7.5 m, with six to nine internal posts (Doshi 2007, 16ff), leading to the view that these were dwellings for a small household group of only four people (Harding 2000, 30).

On the basis of plant macrofossil data from the settlement area, the function, layout and organisation of the roundhouses at three different sites in the settlement complexes at Barleycroft Farm and Over have been analysed (Doshi 2007, 68). It is interesting that household activities do not differ between the two houses within a module, but rather between neighbouring sites.

In addition to the important English roundhouses, a small group of larger, rectangular, post-built buildings has also been recognised during recent years. At Down Farm, Woodcutts, a longhouse was found to replace two roundhouses (Bradley 2007, 193f). At Barleycroft in the Fenland, a post-built longhouse was associated with an enclosure and a co-axial field system with two roundhouses; a cremation cemetery was excavated in the vicinity (Bradley 2007, 194f, fig. 4.7). With these two house types emerging on the same site, the question remains of how to interpret their architectural differences. The Flag Fen platform was built of reused timber and posts from longhouses (Bradley 2007, 204), and these buildings are considered as having served public, ritual and specialised functions (Pryor 1991), while roundhouses represented ordinary dwelling houses.

Even though the main architectural ideas behind the construction of these buildings differ, there appear to be some structural similarities. As mentioned above, the English house module consisted of two houses – this could derive from the same strategy that resulted in houses with two units in Thy (Bech & Olsen vol. I, chap. 4). The organisation of animal husbandry can also be compared on several points.

The similarities between the situation in eastern England and the settlements in Thy are first and foremost of a general and structural character. It is very difficult to convert these into evidence of personal contact or contacts between specific groups based on navigation and traffic across the North Sea in the same way as for the contacts along the North Sea coast.

The landscapes of eastern England and Thy can be compared as areas representing Bronze Age land-use management in a changing environment and some of these changes could have happened so rapidly that they were remembered over the span of a few generations.

Land-use in a changing environment

Changes in climatic conditions and consequent fluctuations in sea level have, with varying intensity, affected large areas and can for example be observed in the coastal landscapes along the North Sea. Despite regional differences, very similar developments took place: There was colonisation of former marine areas in the mid-2nd millennium BC, with subsequent abandonment due to a rising water table, increased waterlogging and peat formation in first half of the 1st millennium in both Thy and West Friesland, as well as in eastern England.

This sequence of events can be clearly followed at Bjerre Enge: As described in several later chapters of this book, the marine surfaces at the foot of Hanstholm Knude in the northern part of Thy became available for exploitation as a consequence of land upheaval and coastal development around 1500 BC, in Early Bronze Age period II (Søgaard *et al.* vol. I, chap. 8; Bech vol. II, chap. 11). This coincided with the beginning of the period of expansion that characterised large parts of southern Scandinavia at this time, and in Thy culminated in the middle of the Bronze Age, in periods III and IV. This saw expression not only in numerous burial sites but also in dense habitation and massive exploitation of the landscape. At Bjerre Enge, habitation continued into period V, but was then abandoned, apparently in the course of the 8th century BC, concurrent with a marked change in climate that saw the water table rise and the initiation of heavy deposition of aeolian coversand (Søgaard *et al.* vol. I, chap. 8; Bech vol. II, chap. 11).

Interestingly, it is possible to identify corresponding, or very similar, sequences of events in the Netherlands, where extensive Bronze Age settlements in West

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Friesland, including well-known localities such as Bovenkarspel and Hoogkarspel, commenced with the colonisation around 1500 BC of a previously marine area (Ijzereef 1981; Ijzereef & Altena 1991; Fokkens 2005), i.e. about the same time as the colonisation of Bjerre Enge. The settlement in West Friesland was abandoned around 800 BC as a consequence of the rising water table; a result of the same climatic change that effected the entire Northern Hemisphere (van Geel *et al.* 1996). A closer parallel to the developments at Bjerre Enge could not be wished for. The almost treeless landscape of West Friesland (Prummel 1979, 100f), where wood of inferior quality, such as willow (*Salix* sp.) and alder (*Alnus* sp.), was used for house building in the absence of better materials (Buurman 1988, 272, 1997, 129), is clearly also a parallel to the timber situation documented at Bjerre (Malmros vol. I, chap. 10).

The eastern English settlements were surrounded by an open, cleared landscape, and often lay in environments or areas that had not been settled previously. Pollen data from South Hornchurch in Essex, dating from the beginning of Middle Bronze Age (1500 BC), demonstrate a cleared and extensively exploited landscape with evidence for shrubs and grasses, but almost no tree pollen. However, the land-use strategies of the Early and Middle Bronze Age were applied to landscapes that were vulnerable and easily overexploited and thereby perhaps contributed directly to the changing conditions. Expansion of wetlands can be observed during the Late Bronze Age, leading to the withdrawal of settlements to higher locations on the river terraces (Guttmann & Last 2000, 351). A similar picture emerges from pollen studies conducted in conjunction with excavations in the lower Great Ouse Valley: An open, cleared landscape that became wetter from the beginning of the 1st millennium BC onwards (Doshi 2007, 7ff); between 1200 and 750 BC marshland developed in the area (Doshi 2007, 10).

The Middle Bronze Age settlement expansion in eastern England took in regions that could not sustain a long period of settlement. They were adversely affected by the changes to soil status and some of them became increasingly waterlogged, resulting in these areas being abandoned by the later Bronze Age (Bradley 2007, 177). The fact that ditches, once cut, were often simply left to silt up, reflects the short life of some of these sites (Yates 2007, 95).

This led to the organisation of land into co-axial fields systems and structures to enable the management of livestock, pasture rotation and perhaps even land ownership. The construction of elaborate field systems and the securing of a reliable water supply reflect major intensification in land-use, but the increasingly structured management of grazing is not paralleled by an increasingly structured settlement system. This still comprised small non-nucleated farmsteads spread across the enclosure system (Barker 1985, 205ff). No evidence of central places or specialised settlements has been found, even though the trade for bronze with the Continent must have been lively (Bradley 2007, 223). It is claimed, however, that the monumental scale of what was effectively appropriation of land – as seen at Barleycroft and Over – implies coordination and/or regulation at a community level above that of the individual settlements (Yates 2007, 96). At Barleycroft, an impressive construction of large post alignments is interpreted as a so-called community project, for the assembly and benefit of larger social groups (Evans & Knight 2001, 93).

Bronze Age contacts in the North Sea region

The North Sea area was evidently the setting for numerous Bronze Age contacts. None of the smaller regions in the area could develop without manifold contacts with, and dependency on, other regions and the flow of bronze in itself provides evidence of this. The question then arises of how these contacts can be characterised. Many different circles can be drawn around the North Sea, depending on the level, type and frequency of the communication. On one level, there are the common ideas and perceptions with respect to more general aspects that bear witness to a shared way of thinking. Another level comprises the objects and individuals that move or are moved in a tangible way. With Thy as a point of departure, we will now look in more detail at these aspects in order to characterise contacts, trade links and movement during Early Bronze Age periods II and III.

The Bronze Age communities around the North Sea shared similar environmental conditions and this naturally implied a certain degree of similarity in the economic strategies adopted to meet these conditions. However, the evidence also demonstrates how very different solutions were found to the problems posed by these conditions. This is most evident in the preferred form of house construction. Ideas on architecture and building were shared by people of the northwest European lowlands but not by the inhabitants of the British Isles (cf. above). This marked difference could derive from differences in household size, mobility, functionality of house and farm and architectural and cultural preferences, or most likely a combination of several of these.

Without entering into a detailed discussion of the contemporary religion, some important points of similarity can also be identified with respect to burial traditions, and especially changes in these, during the course of the Bronze Age.

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The travellers

"There are many ways artifacts can change hands and areas. One thing is clear, however: they can never travel on their own. All movements of artifacts involved movements of people" (Bergerbrant 2007, 126).

Graves containing specific artefacts link the individuals buried in them with the distribution of these particular items. In this respect, the role of these individuals can be perceived as that of the traveller, the stranger who ended his or her days in another region and another community, and/or the more or less active individual recipient of objects or gifts. Under any circumstances, these individuals are representatives of contact, communication and participation in a community.

Over time, many scholars have highlighted the numerous obvious similarities in material culture between densely-settled areas along the North Sea coast, especially the North Frisian Islands, and the western areas of the Limfjord (Kersten & La Baume 1958, 47). But what was the nature of the contacts that transported objects along this coast? To what extent did foreign and exotic objects reach Thy, where did they come from and how were they employed in graves?

In order to address these questions, graves in Thy, on the North Frisian Islands and in the regions of Steinburg and the Ditmarshes to the north of the mouth of the Elbe have been subjected to comparison. The mouth of the Elbe is often considered to have been the North Sea coast's gateway to Europe: The North Frisian Islands are of particular interest because, as a consequence of their location, they must have been under the direct and particular influence of a probable trade route running along the coast.

All the above regions are generally considered to belong to the Nordic Bronze Age. To the south of the Elbe, and the regions of Cuxhaven and Stade, the Nordic Bronze Age borders the Lüneburger area of Lower Saxony, which constituted an independent part of the central European Tumulus culture in the Early Bronze Age (fig. 2.22). The graves in Lüneburg contain a very special inventory of grave goods and it is therefore relatively straightforward to identify exchange of objects between this area and Scandinavia.

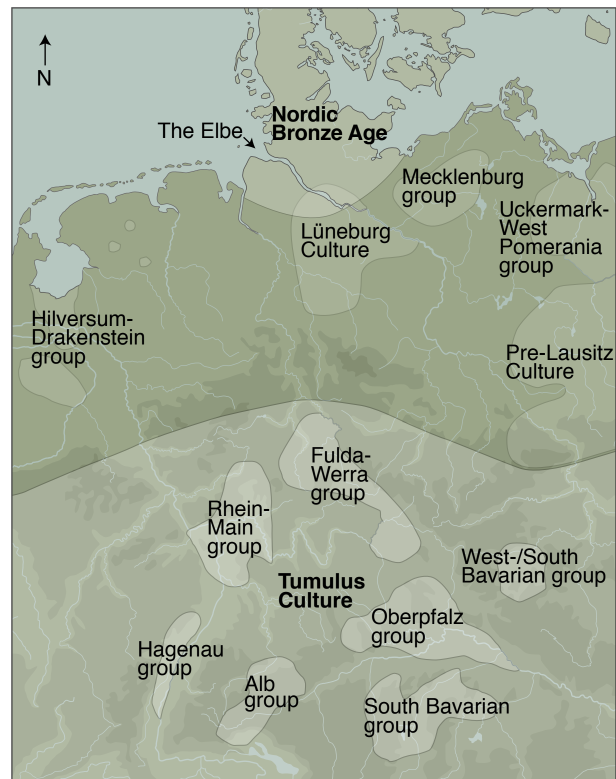

Figure 2.22. Geographical relations of the Nordic Bronze Age, the Lüneburger group and various groups related to the Tumulus culture. After Bergerbrant (2007, fig. 2).

The introduction of cremation as an example of interregional communication

Inhumation was the dominant burial practice during the Early Bronze Age in Scandinavia, while cremation was more or less universal in the Late Bronze Age. On closer examination, the picture is of course much more complex than this and, as mentioned above, there is evidence for cremation as early as period II in Thy. Similarly, the large number of cremation and urn graves dating from the Early Bronze Age on the North Frisian Islands is a well-known phenomenon. The question is how the transition from inhumation to cremation took place and how the situation in Thy compared to that in the rest of the North Sea area in this respect. As E. Aner and K. Kersten's catalogues for the Nordic Early Bronze Age now include finds from areas between Thy and the mouth of the Elbe, they provide a basis for an investigation and comparison of burial practices along the North Sea coast. The primary study area selected comprised the Ditmarshes, Steinburg, the western part of South Schleswig and the three North Frisian islands of Sylt, Amrum and Föhr. The eastern part of South Schleswig (the districts of Schleswig-Flensburg and Rendsburg-Eckernförde), the former Holbæk county and the island of Bornholm were used as comparative areas (fig. 2.23).

Cremation was introduced rather gradually to Thy. Six cremation graves have been recorded from period II, of which two were in a barrow at Egshvile (Olsen 1992), three in a barrow at Villerup (Olsen *et al.* 1996) and the sixth in a barrow at Lækjær (Aner *et al.* 2001, no. 5085): They correspond to 10% of the graves dated to this period. In period III, the proportion of cremation graves rises to 27% (fig. 2.24). Whereas

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Figure 2.23. Map showing compared regions. Legend: Red lines: Primary study areas. Yellow lines: Compared areas.

two of the six cremation graves from period II are urn graves, this is true of only three of the 56 cremation graves from period III (Aner *et al.* 2001). The other 53 cremation graves comprise burnt bone found in burial features that do not differ from those containing unburnt bone, i.e. a situation most often described as a transitional form.

Numerous variants of burial practices are evident during the period when cremation and inhumation existed side by side, resulting in a great diversity. The decisive factors are, on the one hand, the extent to which the burnt bones were either gathered up and put into a container/urn or arranged on an elongated grave bed, like an interred corpse, and on the other, whether or not the grave goods were burnt on the pyre. Of course, the size of the burial feature or structure and other relevant circumstances should also be taken into account.

In the southernmost part of the area of the Nordic Bronze Age, by the mouth of the Elbe, a similar gradual introduction of cremation is apparent. Directly north of the Elbe, in the Ditmarshes, the proportion of cremation graves rises from 2 to 14% between period II and period III. The latter is still a very low value that must be attributed to the area's generally poorer archaeological record in this respect (Aner & Kersten 1991). In Steinburg, also directly north of the Elbe, the proportion rises from 3 to 30% (Aner & Kersten 1993), with the latter probably being a more realistic value (fig. 2.24). In both these areas, urn graves are also exceptionally rare and most of the cremation graves are of the aforementioned transitional forms.

If we then turn to the North Frisian islands of Sylt, Amrum and Föhr, the picture is somewhat different. Cremation graves constitute 10% of the graves dated to period II, while the proportion for period III is no less than 72% (Aner & Kersten 1979), i.e. cremation burial was clearly the commonest burial form on the Frisian Islands at this time. Combined with the fact that more than two-thirds of the cremation graves are actual urn graves, this suggests that the practice was brought into consistent use here much more swiftly and much earlier than elsewhere along the North Sea coast.

On the whole, the situation in Thy corresponds quite closely to that seen generally along the North Sea coast, with the exception of the massive occurrence of urn graves evident in period III on the North Frisian Islands. But what of the general picture for southern Scandinavia? In the eastern part of Schleswig-Holstein, there is only a single cremation grave dated to period II. This is a cremation grave containing the remains of several individuals (Aner & Kersten 1978, no. 2220H). Subsequently, a large increase in the number of cremation graves is seen such that by period III, 53% of the dated graves are of this type and only two are urn graves; the remainder constitute transitional forms (fig. 2.24).

In the classic works on trends and chronology during the Middle Bronze Age (period III), Thy, together with Bornholm and Zealand, is seen as being subjected primarily to eastern influences, originating in central Europe and travelling via the River Oder (Randsborg 1972; Thrane 1975). An analysis of the graves found in Holbæk and Bornholm counties (Aner & Kersten 1976, 1977) reveals largely consistent data with respect to the introduction of cremation as a burial practice. Of the graves dated to period II on Bornholm, 6% are cremation graves. The figure for period III is 36%, with only a single urn grave out of a total of 32 cremation graves. In Holbæk county, 3% of the graves dated to period II are cremation graves, while the corresponding proportion is 28% in period III, with only two urn graves out of a total of 29. These figures therefore match those from Thy, apart from the slightly smaller proportion of cremation graves in period II (fig. 2.24).

On the whole, the manner of the introduction of cremation burial appears to have been very similar in the parts of southern Scandinavia examined in the study, both with respect to the relationship between periods II and III and the occurrence of actual urn

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	Region	Thy	The Ditmarsches	Steinburg	Sylt, Amrum & Föhr	Eastern Schleswig-Holstein	Bornholm county	Holbæk county (minus Samsø)
Period II	Dated graves (100%)	59	121	72	57	94	31	101
	Of these cremation graves (%)	6 (10%)	2 (2%)	2 (3%)	6 (10%)	1 (1%)	2 (6%)	3 (3%)
	Cremation graves with inhumation tradition	4	2	1	6	0	2	3
	Cremation graves with urn burial	2	0	1	0	1	0	0
Period III	Dated graves (100%)	207 (25 are sub III)	73	33	179	91	89	102
	Of these cremation graves (%)	56 (27%)	10 (14%)	10 (30%)	129 (72%)	48 (53%)	32 (36%)	29 (28%)
	Cremation graves with inhumation tradition	53 (4 are sub III)	9	10	41	46	31	27
	Cremation graves with urn burial	3 (1 is sub III)	1	0	88	2	1	2

Figure 2.24. Cremation burials, numbers, frequency and region.

	Region	Thy	The Ditmarsches	Steinburg	Sylt, Amrum & Föhr	Eastern Schleswig-Holstein	Bornholm county	Holbæk county (minus Samsø)
Period II	Cremation burials	6	2	2	6	1**	2	3
	Male	0	0	0	1	1	1	0
	Female	2	0	1	1	1	0	2
	Child	3	1	0	0	1	0	0
	Unknown gender and age	1	1	1	4	0	1	1
Period III	Cremation burials	56	10	10*	129	48	32*	29
	Male	15	3	6	9	13	9	13
	Female	12	2	1	3	4	7	1
	Child	0	0	0	0	2	0	0
	Unknown gender and age	29	5	4	117	29	17	15

*Figure 2.25. Cremation burials, gender. * one grave is a double grave, containing a female and a male. ** grave containing three individuals: a male, a female and a child.*

graves. The only area that stands out as being markedly different is the North Frisian Islands, where the practice of cremation was the most important burial form as early as period III.

The evidence is difficult to analyse statistically and it is not possible to take the figures quoted above that are exclusively based on counts of securely dated graves in Aner and Kersten's catalogues too literally. The different areas are difficult to compare directly due to a range of circumstances: The Ditmarshes suffer from an unusually poor archaeological record in this respect, Bornholm has numerous flat-field burials and the North Frisian Islands have a large number of urns with contents that cannot be dated. Holbæk county has a large number of cremation graves in the form of often poorly documented secondary burials in megalithic graves, and so on.

The role of women

Most of the cremation graves in the investigated areas cannot be identified with respect to age and sex. The grave furnishings most commonly comprise smaller objects selected from non-gender-specific types.

This is especially true of the North Frisian Islands with their many urn graves. The gender distribution of the period III graves, for which the sex of the deceased can be determined, corresponds to that widely evident for graves in general: There are between 25 and 50% more male graves than female graves (fig. 2.25). In Thy, 16 cremation graves dating from period III have been identified as male and 11 as female, while 29 could not be identified. As is the case for Early Bronze Age graves in general, this ratio is due primarily to the fact that a larger number of the objects found belong to types that identify men than those that identify

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women. No child graves have been identified in the cremation graves from period III in Thy and this is also true of most of the other investigated areas. Only the eastern part of Schleswig-Holstein has two child graves dated to period III.

The number of well-documented cremation graves from period II, for which age and gender have been determined, is so small that the material cannot be analysed statistically, only qualitatively. The six cremation graves recorded from Thy comprise two female graves, three child graves and one grave containing remains of unknown age and gender. One female grave and one child grave – both urn graves – occurred in the same barrow, Egshvile (Olsen 1992). The two other child graves were also found in the same barrow, namely Villerup (Olsen *et al.* 1996). Of the two period II cremation graves in the Ditmarshes, one is a child grave and the identification of the other is uncertain. Steinburg also has two examples, one female and the other unknown; the former is an urn grave. In Holbæk county, the three cremation graves comprise two female graves, both secondary burials in a megalithic grave, and one unknown. On Bornholm, one of the two cremation graves is male and the other is unknown. The North Frisian Islands have a male grave and a female grave, as well as four graves of unknown age and gender. The only cremation grave from period II recorded in the eastern part of Schleswig-Holstein is an urn containing the remains of three individuals, identified as a man, woman and a child. Double and multiple burials are not uncommon in the cremation graves (see below).

Even though the evidence base is flimsy, both female and child graves are very conspicuous among these early cremation graves. In several cases these are graves that are also special in other respects. Firstly, several of them have clearly been subjected to a different kind of treatment from many period III cremation graves. Urn graves are relatively common in period II and the burnt bones were also gathered together within small stone frames or in structures with the remains of cremation pits, such as the Villerup barrow (Olsen *et al.* 1996). Cremation pits are only rarely recognised and, in this respect, it is remarkable that they have been found in Thy, with two parallel records from the island of Sylt (Olsen *et al.* 1996, 183ff). However, this grave form is seen during both period II and period III in Thy and on Sylt.

In certain cases, the accompanying objects are also special. One of the female graves in Thy, at Lækjær, is relatively well-furnished with a classical set of Nordic grave goods: a dagger with a bronze pommel and chape, a small ornamental plate and a spiral-ornamented belt plate (Aner *et al.* 2001, no. 5085). The furnishing of the two child graves at Villerup is sparse, comprising a tutulus and a pottery vessel, respectively (Aner *et al.* 2001, nos. 5501A+B). The grave goods in the female grave and the child grave at Egshvile are noteworthy (Aner *et al.* 2001, nos. 5115A+B) because of the amber, glass beads and so on (see below). None of the cremation graves from period II on the North Frisian Islands are urn graves and, as already mentioned, their gender has been identified in only two cases. Here it is the female grave in particular that is remarkable (Aner & Kersten 1979, no. 2705A), with its contents including amber, a fossilised sea urchin, a bone pin and a bronze arm ring, burnt on the pyre. However, the most remarkable feature is that the grave was the central primary grave in a barrow that also contained a male inhumation (Aner & Kersten 1979, no. 2705B). This is reminiscent of the situation in the barrow at Egshvile, where the male grave is a more ordinary, albeit well-furnished, cremation grave in a stone cist, while the two earlier burials, of a woman and a child, are both special urn graves. It is also characteristic that almost all the graves contain pottery vessels as grave goods, as seen for example in one of the graves at Villerup (Aner *et al.* 2001, no. 5501B) and the female grave at Egshvile (Aner *et al.* 2001, no. 5115B) that contained a small side vessel. There is a particular coincidence between the female grave at Egshvile and grave 2664A on Sylt: Both contain very similar fibulas, with a double hourglass-shaped head and a tanged knife (Olsen 1992, 146ff). Similarly, the actual urn in the child grave at Egshvile has a parallel in the only period II cremation grave found in the eastern part of South Schleswig. The latter contained the remains of three individuals, including a child, and a dagger that had been burnt on the pyre (Aner & Kersten 1978, no. 2220H; Olsen 1992, 145). Both these urns differ from the general southern Scandinavian pottery tradition by having a relatively small base relative to the belly (Rasmussen 1993b, 135). The vessel from Egshvile is not an import, but was probably made in Thy (Rasmussen & Bech vol. II, chap. 19). It is also intriguing that this vessel apparently differs from the general range of forms prevalent at this time. One of the cremation graves in Steinburg is an urn burial of a woman (Aner & Kersten 1993, no. 9449). It contained a monofacially cast wheel pin, indicating a connection with Lüneburg. The other cremation grave was discovered in a barrow at Itzehoe, along with several other special graves (Aner & Kersten 1993, no. 9407) (cf. below) and it contained an arm ring and a burnt neck ring. One of the cremation graves in the Ditmarshes was found in a barrow containing several special graves (Aner & Kersten 1991, no. 9005C) and was richly furnished with items that included a ribbon-shaped gold finger ring. There is also a child grave in the Ditmarshes with furnishings similar to those in the female grave at Lækjær in Thy (Aner *et al.* 2001, no. 5085), i.e. a spiral-ornamented belt plate and a small ornament plate, although slightly smaller in size.

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'Foreign' women and changing rituals

On the basis of this small study, it is difficult to find unequivocal common denominators for the female graves recorded from along the North Sea coast.

Nevertheless, certain aspects do become apparent:

1. The introduction of cremation as a funerary practice to both Thy and the areas around the mouth of the Elbe did not differ markedly from the rest of Scandinavia. Although, in relative terms, a slightly greater number of cremation graves are evident in Thy and on the North Frisian Islands in period II and the North Frisian Islands stand out in particular with respect to period III, with 72% of recorded graves being cremation graves (fig. 2.24).
2. There is a difference in the character of the cremation graves between periods II and III:
    a. In period III, these graves can be directly perceived as a transitional phenomenon, composed of elements taken from both inhumation and cremation funerary practices.
    b. In period II, there was greater consistency in the use of cremation: There are a number of urn graves and also graves showing particular care of the dead. Moreover, in several cases the grave goods have clearly been burnt on the funeral pyre.
3. The cremation graves of period II appear to contain the remains of individuals who had a special history or significance:
    a. There is a very high representation of women and children.
    b. Cremation was a non-random choice – as shown by the case where a barrow was constructed over a primary cremation grave and included a secondary inhumation grave.
    c. The graves often contain special furnishings or grave goods, including a relatively large number of objects indicating contact with other areas.
    d. With respect to both special grave forms and grave goods there are several very direct links between Thy and the Frisian islands.
    e. In a couple of cases in Thy and on Sylt an early cremation grave is evident as the central grave in barrows containing several special burials, for example at Egshvile, Villerup (Aner *et al.* 2001, nos. 5115A and 5501A) and Keitum (Aner & Kersten 1979, no. 2705A) (fig. 2.26). They also often occur in barrows containing many burials or several special burials, for example at Morsum (Aner & Kersten 1979, nos. 2719A-Ee), Itzehoe (Aner & Kersten 1993, nos. 9407A-M) and Albersdorf (Aner & Kersten 1991, nos. 9005A-E).

The cremation graves of period II clearly stand out as being particularly advanced, whereas those of period III are generally more ordinary in character. The individuals buried in the cremation graves of period III also appear more anonymous than those interred in the inhumation graves of the time (Kristiansen 1997, 15, 46). Whereas period III cremation graves show the gradual introduction of the cremation practice, those of period II must, to a large extent, be seen as burials of special individuals. The importance of these individuals is not unequivocal, but there are a remarkable number of coincidences between actual objects found within the study areas along the North Sea coast, and it is also striking how many cremation graves from period II contain grave goods that indicate external contacts (see below). For example, a grave in a stone cairn in Sandnes, Rogaland, was found to contain burnt bones, together with a flint dagger, a flint sickle and a piece of unworked amber (cf. note 14). This grave has been radiocarbon dated to the end of period I or period II (1 σ) and is therefore possibly one of the earliest Bronze Age graves involving a cremation; it is also unusual due to its amber content (Løken 1978).

The cremation graves of period II clearly contain the remains of important individuals – in several cases, they constitute the central grave in barrows – even though they are child graves. These special burials are concentrated in just a few barrows, the construction and use of which must have been specially selected for the purpose. On the North Frisian Islands, some of the barrows function almost as cemeteries, accommodating numerous cremation burials (e.g. Aner & Kersten 1979, no. 2719).

At Lustrupholm near Ribe, southern Jutland, there is just such a cemetery, on a flat field and with a total of 23 cremation graves, mostly urn burials containing pottery urns or urns of organic material. The cemetery has been assigned to period III on the basis of radiocarbon dates, pottery and so on (Feveile & Bennike 2002, 132). However, four to five of the seven radiocarbon dates also fall within period II (Feveile & Bennike 2002, fig. 10) and most of the urns could equally well be dated to the latter period. Bronze objects were found in only eight of the graves and in four of these instances these had clearly been on the funeral pyre. A study of the human remains reveals that there is a predominance of female and child

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graves at Lustrupholm, relative to the general picture for the Early Bronze Age, even though the identifications must be taken with some reservation (Feveile & Bennike 2002, 133). One of the urns contained the bones of a woman and a foetus or infant (Feveile & Bennike 2002, 133). If the Lustrupholm cemetery is seen in isolation, it appears to represent a poorer and less important sector of the population that did not have access to burial in barrows. It is also possible that those interred there belonged to a particular social group, but this cannot be demonstrated solely on the basis of their gender and age when compared with the other cremation graves investigated.

The best-known example of a cremation in period II are the burnt remains of a child that were interred with Egtved Girl in Storhøj at Egtved. The most recent investigations of these two individuals revealed that the girl was 16-18 and the child 5-6 years of age (Alexandersen *et al.* 1981; Hvass 2000). As such, they cannot be mother and child as was possibly the case of the individuals buried in the grave at Lustrupholm. It has been suggested that the burnt remains of the child in the Egtved grave must be a cremation sacrifice, like that in the grave at Skelde, Broagerland, where the cremated remains of an adult individual were found in the inhumation grave of a very wealthy woman (Ethelberg 2000; Jensen 2002; Bergerbrant 2007, 114). There is a similar Early Bronze Age example from Nørhå in Thy, where the cremated remains of an adult individual were found at the foot of an inhumation grave in a barrow containing several cremation graves (Olsen *et al.* 1996, 172; Aner *et al.* 2001, no. 5176) (unpublished identification of cremated bones by S. Andersen, Unit of Forensic Anthropology, Department of Forensic Medicine, University of Copenhagen, AS 356/2001).

At least five coeval parallels, with a combination of a cremated child in an adult grave, are known from the Lüneburg area. In two instances, a cremated child was buried in the inhumation grave of an adult and in three cases the adult had been cremated (Bergerbrant 2007, 116).

The combination of inhumation and cremation in the same grave underlines the fact that, in period II, cremation should not be perceived merely as a 'transitional phenomenon', but as a completely intentional and considered funerary practice that was applied in special cases.

In statistical terms, the material does not permit far-reaching conclusions to be drawn, but the indications are that both Thy and the North Frisian Islands have a slightly greater number of cremation graves during period II than the other areas in the study.

The major dominance of cremation graves on the North Frisian Islands that is then seen in period III is difficult to explain. Together with cremation as a funerary practice here, we also see the emergence, to a much greater extent than elsewhere, of a kind of cemetery or 'urn field' where there are many urns concentrated together, either in a barrow or under a flat field. This has clear links to the more extensive use of urn cemeteries in for example the northeastern part of the Netherlands at this time (Kersten & La Baume 1958, 47). This could perhaps also represent a very practical solution to the problem of a lack of space for the continued construction of barrows on these densely populated islands?

This picture of the two burial forms occurring side by side throughout several centuries, with a certain degree of variation between different areas, is consistent with the situation in the rest of Europe. With the emergence of the Urnfield culture around 1300 BC, the practice of cremation became dominant across all of central Europe and eventually also in Scandinavia. However, there are numerous examples of the synchronous application of both inhumation and cremation, and the transition from one to another is nowhere apparent as an unequivocal event (Harding 2000, 111ff). On the British Isles, the practice of cremation was widespread and dominant in the north as early as the Early Bronze Age, and in central England it became dominant at a time corresponding to period III, the so-called Deverel-Rimbury culture (Harding 2000, 15, 111ff).

Broadly speaking, the gradual introduction of cremation is not a phenomenon that applies exclusively to the North Sea region, but extends right across the area within which people shared fundamental ideas with respect to domestic architecture. The transition to the funerary practice of cremation, as reflected in cremation graves during period III, is a collective phenomenon that bears witness to shared ideas and collective ways of thinking that were prevalent across large areas.

The special period II graves, on the other hand, demonstrate a more uncompromising approach to the cremation practice than the numerous cremation graves evident in period III. It is here, in particular, that the more direct and tangible links between individuals living along the North Sea coast find expression and it is easy to imagine that these graves, in many cases, contain the remains of women and children who moved physically from one area to another. However, this early and advanced attitude to the practice of cremation also shows that these individuals were leading figures relative to an altered religious practice and perhaps also to altered religious perceptions.

The women interred in these special graves can perhaps be perceived as comparable with the many women among the first Christians to enter Scandinavia? It is therefore perfectly possible that, in life, they were important in a religious sense and this had an influence on the furnishing of their graves. The many child buri-

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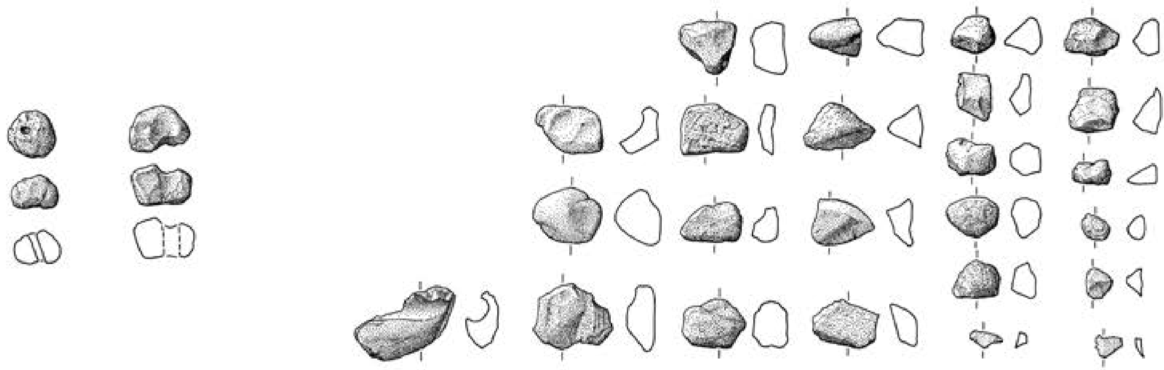

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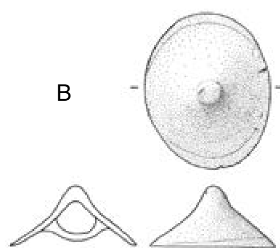
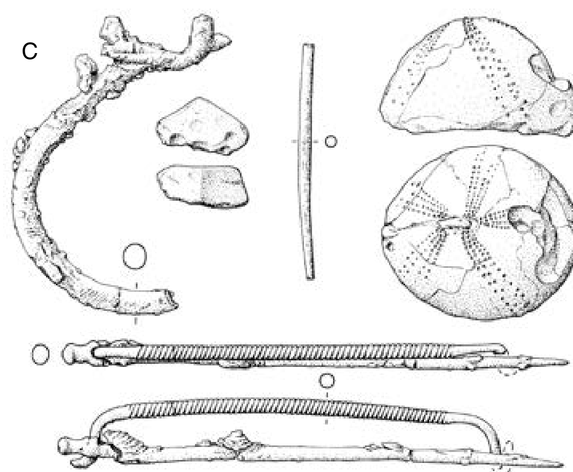
◀▼▶ *Figure 2.26. Examples of early cremation burials that appear as central burials in grave mounds (barrows). A. Egshvile, Thy, B. Villerup, Thy. C. Keitum, Sylt.*





als, together with the apparent special construction of barrows associated with the early cremation graves, indicate that we are dealing with special families or groups who were perhaps interconnected along the entire North Sea coast.

Changing international contacts during periods II and III

Early Bronze Age period II and, especially, period III can be seen as a golden age in Thy – the exponent of Nordic Bronze Age culture. At the same time, other developments took place around the transition between these two periods that are interesting in relation to the nature of trade along the North Sea coast.

The traditional view is that the predominant direction of influence shifted from west to east at a time corresponding to Bronze Age periods II and III in southern Scandinavia. In period II (BA C and D), southern Scandinavia was subject to influences in particular from the south German Tumulus culture, whereas in period III (BA D and HA A), influences came from the early Urnfield culture, defined on the basis of a number of regional groups in the eastern part of central Europe. The large European rivers have always been seen as lines of contact and routes of communication, because it was considered that travel was easier by water than by land. The change in the trade routes that occurred between periods II and III therefore also constituted a change between the River Elbe and the River Oder. Put rather simply: While influence travelled along the Elbe in period II, it followed the Oder in period III. For Thy, this resulted in significant communication with, and influences from, the eastern parts of southern Scandinavia and northern Germany, i.e. Zealand and Mecklenburg, during period III.

An important example of the predominantly eastern orientation is the relatively large number of flange-hilted swords of early ornamented and Hemigkofen types in Thy during period III, whereas these swords are absent from equivalent areas down the west coast of Jutland at this time. The period III swords, with decoration on their high flanges, were produced locally (Randsborg 1972, 14), but they indicate Thy's links with the Baltic areas (Randsborg 1972, map 2).

These eastern influences should be seen in the light of the extensive construction of barrows and the very large numbers of graves in Thy during period III. This is an archaeological period described as a time that can only be understood in terms of a subsequent and auxiliary sub-period III, shared with Mecklenburg and Bornholm (Randsborg 1972). In principle, this results in a later beginning for the Late Bronze Age than in other parts of southern Scandinavia and, in tangible terms, a large number of graves that can be dated to period III/IV.

In the areas to the north of the mouth of the Elbe, the number of graves falls from period II to period III, but on the North Frisian Islands the opposite is true. This could be because of the islands' continuing importance for communication and navigation on the North Sea. They were so densely populated that it is difficult to imagine that their communities would have been able to exist without vital contacts to the surrounding world.

All habitation on the Frisian Islands is of course located within a few kilometres of the coast. Most of the graves on the North Frisian mainland and in Steinburg and the Ditmarshes are, on the other hand, located on the geest, and the huge expanse of coastal marshes means that these have no direct association with the coast. It is clear, however, that the many large streams and rivers played a major role, as demonstrated

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for example by a number of burial sites associated with the Stör – a tributary of the Elbe – and the Eider.

The traditional perception of overarching cultural influences is based on detailed chronological studies aimed at illuminating contemporary and developmental dynamics across various parts of Europe. However, the latter do not necessarily provide a clear picture of how interactions between communities took place. Even though the general directions of influence changed and new impulses provide descriptions of developments, we must presume that people still moved and interacted in other directions. It all depends on the size of the brush with which the picture is painted.

'Foreign' men: Pan-European swords

There are ten graves in Thy containing pan-European sword types from period II.[16] Of these, five are octagonal-hilted swords (such as fig. 2.27C and D) and five are flange-hilted swords, type 1a (such as fig. 2.27A and B). This is fully consistent with the number of pan-European swords on the North Frisian Islands and at the mouth of the Elbe. The proportion of pan-European swords relative to local types is also uniform across the study areas. A characteristic difference is apparent in the furnishing of the other graves. While the pan-European swords are often accompanied by simple and fairly standardised grave goods (often a fibula, perhaps together with one other object), the local swords, whether solid metal-hilted or with a hilt of organic material, are found together with much more diverse grave goods. Simple grave goods should not be confused with poor furnishings. The few objects found in combination with pan-European swords can include precious items such as gold spirals. Some of the graves containing local sword types are also very richly furnished, others less so, but the variation between them is significantly greater than in the case for the foreign swords.

Two period II flange-hilted swords (Sprockhoff type Ia) found in Thy have decorated flanges (Aner *et al.* 2001, nos. 5437 and 5102). Three of the ten graves in Thy containing pan-European sword types are located on Hanstholm Knude, and represent some of the closest barrows to the Bjerre settlement (cf. Bech vol. II, chap. 11, fig. 11.28). The closest of them lies only c. 500 m from the possibly coeval site of Bjerre 6. The other pan-European swords were found evenly distributed across the central parts of Thy, consistent with the general distribution pattern for barrows. In addition to the swords from Hanstholm Knude, a further example was found very close to the North Sea coast at Agger (Aner *et al.* 2001, no. 5437). On the North Frisian Islands, graves containing octagonal-hilted and flange-hilted swords of type Ia are also more simply furnished than those containing the local sword types. Here it is abundantly clear that simple furnishings cannot be equated with poor furnishings, because gold spirals often accompany these swords. In general, the North Frisian graves are slightly richer and more extravagant than those in Thy. About half the graves with swords here also contained gold, either in the form of gold spirals or as gold foil on sword hilts or fibulas. Even though the number of graves increases overall in period III, as in Thy, the number containing swords falls markedly and no pan-European types, such as the ornamented flange-hilted and Hemigkofen swords, are in evidence on the North Frisian Islands in period III. On the other hand, among the swords are still some gold-plated solid metal-hilted examples (Aner & Kersten 1979, no. 2822). It is striking that the reduction in the number of pan-European swords coincides with evidence of greater wear on the local period III swords (see Kristiansen vol. I, chap. 3).

The North Frisian mainland has so few graves that it is difficult to detect any pattern with respect to the composition of the grave goods. There are two well-furnished graves containing octagonal-hilted swords in a barrow group located close to the Eider.

The same pattern is seen in the Steinburg area as is evident in Thy: Most of the pan-European swords are found together with simple furnishings. However, a couple are accompanied by a greater number of objects, including special items such as sheet bronze and parts of folding stools: These are located by the Elbe. All graves containing local swords are well-furnished, both with respect to the quantity and diversity of the objects and the presence of rare objects, although not so much due to gold. A similar situation is seen in the Ditmarshes, with most pan-European sword types being found either unaccompanied or in graves showing a high degree of standardisation of the furnishings, whereas graves containing the local swords are much more diversely furnished. The archaeological record for the Ditmarshes is problematic and the many unaccompanied swords could be the result of the contents of graves having been split up and the swords traded on their own. In the Ditmarshes, both local and pan-European sword types are accompanied by large quantities of gold, and all graves containing pan-European swords that have additional furnishings also have gold. A couple of the pan-European swords were found close to the Eider, but for many the find site is unknown.

Thy, the North Frisian Islands and the areas to the north of the mouth of the Elbe clearly shared some rules and conventions with regard to the deposition of both pan-European and more locally produced swords in graves. In all of these areas, pan-European types are accompanied by simpler and more standardised furnishings than local types. The repertoire comprises only a small number of types but these can

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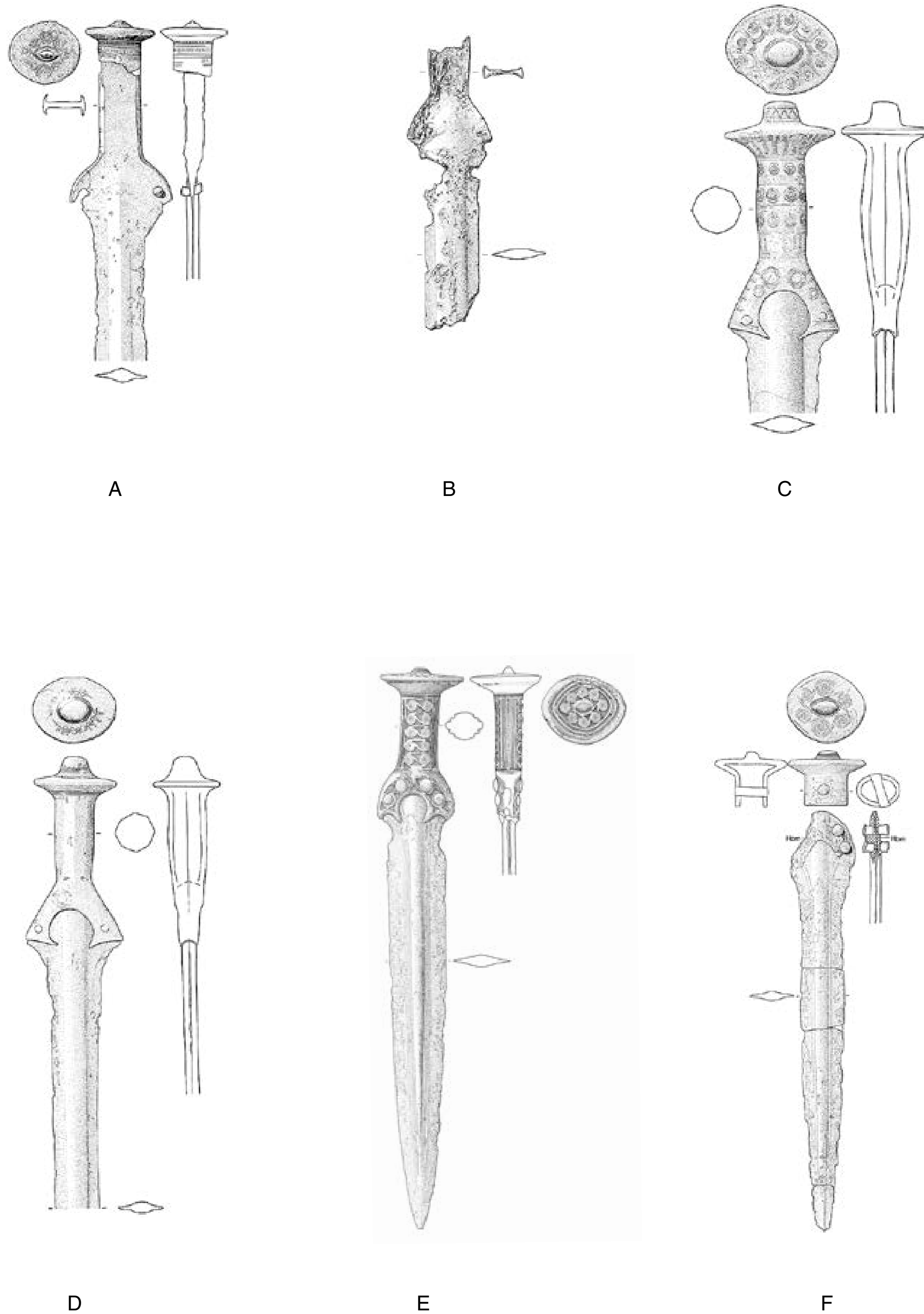

Figure 2.27. Various sword types from Early Bronze Age graves in Thy. A. Flange-hilted sword (Sprockhoff type Ia) with decoration on the high flanges. B. Flange-hilted sword (Sprockhoff type Ia). C and D. Octagonal-hilted swords. E. Solid metal-hilted sword of Nordic type. F. Sword with organic hilt and metal pommel of Nordic type. Drawings from Aner et al. (2001).

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reflect great value, for example the gold spirals. The range of objects, and their composition and extent, is considerably greater in graves containing local sword types. The latter were probably also governed by specific rules, but from a different set of conventions.

The sword-containing graves on the North Frisian Islands and in the Ditmarshes are clearly richer than those in other areas. The quantity of gold here is impressive and not only takes the form of gold spirals; there are also special types such as broad finger rings and foil or sheet-metal coverings on other objects. A very special example is a gold-plated sun disc found in a grave in the Ditmarshes, close to the Eider (Aner & Kersten 1991, no. 9123).

The North Frisian Islands and the Ditmarshes are also the areas that lie closest to the suggested line of communication running along the North Sea coast.

It seems that it is not just the actual pan-European sword types that are uniform and standardised but also other circumstances surrounding these graves. It is not only the sword but the entire grave furnishings that refer to two different codes of practice and situations.

Do graves containing pan-European swords hold the remains of the actual travellers? Are these the graves of the key individuals involved in communication, the vectors of contact? Do these pan-European swords bear witness to the deceased's most significant deeds and achievements in life?

Dress pins (fig. 2.28)

From period II onwards, the fibula became a constant and typical component of costume accessories in southern Scandinavia. This was in contrast to the rest of Europe, where the clothing was held together using dress pins. Southern Scandinavian finds of dress pins in period II and III contexts are therefore rare elements that clearly indicate external contacts. These pins also form a fundamental part of K. Randsborg's chronological studies and the apparently extended period III in Thy (Randsborg 1972); many pins occur in particular in graves dating from periods III-IV.

There is a degree of confusion with respect to terminology for, and provenance of, these pins. H.C. Broholm writes that they are all more or less unique and must therefore have been imported (Broholm 1943, 165). According to J. Jensen, they are all of central European origin (Jensen 2002, 265), although most have extensive and imprecise patterns of distribution. K. Randsborg points out that it is difficult to distinguish too rigidly between locally produced and imported examples (Randsborg 1972, 75).

In the same way as the special sword types, dress pins are an expression of a pan-European trait, regardless of precisely where they were produced. But as they are not a part of the Scandinavian costume tradition, the background for their presence in the graves perhaps differs. As an essential part of the dress, they are often seen as a very tangible expression of the origin of the individual interred in a grave.

While the pan-European sword types in particular provide a picture of contacts during period II, the occurrence of the pins is generally later and demonstrates contacts between the Urnfield and contemporaneous cultures. In Thy, there are no records of dress pins from period II graves. A few have been found on the North Frisian Islands, whereas there are rather more from the Ditmarshes and Steinburg. This is primarily due to a greater number of finds of wheel pins from the two latter areas. Even though wheel pins have a scattered distribution across most of Jutland during period II, they are significantly absent from Thy and the North Frisian Islands. Most of the wheel pins from Steinburg and the Ditmarshes are monofacially cast Lüneburg types, but one is bifacially cast and was therefore probably introduced from the southern German Tumulus culture.

Pins have been found in 6% of the securely dated period III graves in Thy. This corresponds precisely to the situation on the North Frisian Islands and is a slightly lower proportion than seen in Steinburg and the Ditmarshes. Most of the pin types are the same across all the study areas.

A relatively common type is the Norddorf type (fig. 2.28A-E). It has been found in three graves in Thy (Aner *et al.* 2001, nos. 5214C (fig. 2.28A), 5092 (fig. 2.28B) and 5501D (fig. 2.28C)) and shows clear contacts with for example the Lower Saxony area (Randsborg 1972, 69, map 25). As the name suggests, this type also has a wide distribution across the North Frisian Islands, where it has been found in four graves. There is a single example from Steinburg and three from the Ditmarshes. The Norddorf pin links the areas of the North Sea coast together and examples have been found as far away as the Netherlands. It is seen everywhere as a relatively common piece of male equipment in cremation or urn graves and therefore follows the cremation funerary practice.

▶ *Figure 2.28. Various pin types from Early Bronze Age graves in Thy and on the Frisian Islands. A, B, C, D, E: Pins of Norddorf type. F, G, H: Pins with head shaped as a disc with flat cone above. I: Pin with small double-conical/globular head. K, L: Pins with corded neck. M, N: Pins with flattened spherical head (barrel-shaped). O, P, Q: The Plattenkopfnadlen pin type. Drawings from Aner & Kersten (1978, 1979, 1991, 1993) and Aner et al. (2001).*

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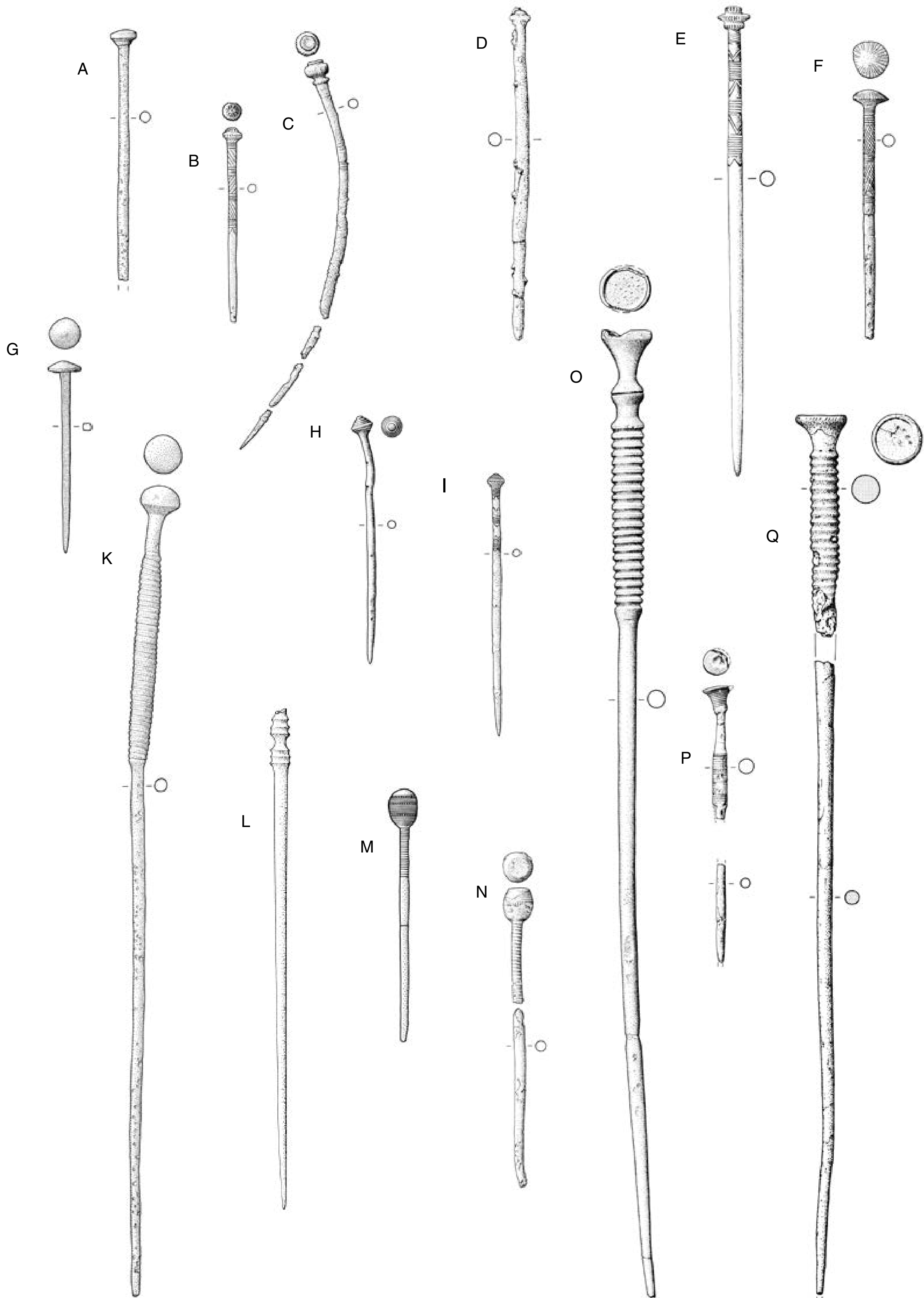

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Two pin types, one with its head in the form of a disc with a flat cone and the other with various forms of small biconical/globular heads (fig. 2.28F-I), are found in both male and female graves in all the study areas. However, pins with a disc-shaped head, as well as the most common type with a small biconical head, occur primarily in Thy and on the North Frisian Islands. One of the Thy examples comes from a particularly well-furnished female grave containing an imported neck collar (Aner *et al.* 2001, no. 5054B) (fig. 2.28I).

All areas have pins that are only represented by very few finds. A pin found as a votive find in Thy has a ribbed neck and probably belongs to the large mixed group of pins with large spherical heads that originates in the northwestern part of southern Germany (Aner *et al.* 2001, no. 5471) (fig. 2.28K). It has a single possible parallel on Zealand (Aner & Kersten 1976, no. 1141II) and is also comparable with a pin found in a grave at Amrum (Aner & Kersten 1979, no. 2608B) (fig. 2.28L); the latter was also located far out in the dunes to the west. In Steinburg and the Ditmarshes, on the other hand, there are a couple of types that do not occur in Thy: pins with a flattened spherical head (Aner & Kersten 1991, no. 9316, 1993, no. 9434Ba) from period III graves, and trumpet-shaped *Plattenkopfnadeln* (Aner & Kersten 1991, no. 9226D (fig. 2.28O), 1993, no. 9407G (fig. 2.28P)) from period II graves. The latter has parallels in the eastern part of Schleswig-Holstein (Aner & Kersten 1978, no. 2338A) (fig. 2.28Q) and from a grave in Schafstallberg, Wardböhmen in Lüneburg (Bergerbrant 2007, 78f).

The pins found in Thy are distributed within the central barrow distribution area; only one (of unidentified type) is from the Hanstholm area (Aner *et al.* 2001, no. 5070). The latter was, however, found in a very European-oriented male grave containing a Hemigkofen sword. Other graves located close to the present Jutish west coast are grave 5447 (Nissum Bredning), which contained a pin with a small biconical head, and graves 5092 and 5501, which contained Norddorf pins – the very pin types specifically associated with the North Frisian Islands. Another interesting location is that of grave 5529 at Kollerup in Vester Hanherred, which contained a pin with a disc-shaped head with a flat cone. Until around the birth of Christ, there was a navigable passage at Kollerup leading into the Limfjord from the Skagerrak (Andersen & Sjørring 1992).

Many pin types are so unusual that it is risky to ascribe too much significance to their occurrence. However, the distribution of the Norddorf pins for example is a clear indicator of the contacts running along the North Sea coast. Some pins, including those with a small biconical head, are very simple and unornamented. Their similarity to the Hvidegård pin has occasionally led to them being interpreted as pins used to fasten leather pouches that are linked by some scholars with travel activity as they provided an opportunity to carry items such as fire flint, iron pyrites, toiletries and amulets (Bergerbrant 2007, 85). It is striking that, while these pins occur in both Thy and on the North Frisian Islands, they are not seen on 'the mainland' or for example in Lüneburg (Bergerbrant 2007, 85).

Regardless of type, the close link between pins and costumes indicates that people travelled far and wide. In this respect, it is remarkable that the pin type associated primarily with women, i.e. the wheel pin, is not found in Thy or the North Frisian Islands, and that all the pins ever recorded on the North Frisian Islands were found in male graves. Furthermore, only five of the 19 graves in Thy containing pins are female graves and, of these, four are from the late horizon dated to period III/IV. In other words, the travellers who passed through Thy and the North Frisian Islands in period II and most of period III were very probably men.

More 'foreign' women: Female ornaments and glass beads

In Steinburg, numerous wheel pins and a couple of other pin types are seen in female graves from period II. In period III, on the other hand, only a single female grave contains a pin: The remarkable barrow at Itzehoe that contains several special graves with contents including unusual pin types. The (few) other graves containing pins are all of men.

The absence of wheel pins in Thy in period II suggests that contact with the Lower Saxony area at this time was not extensive on the female side. This impression is further confirmed by the large female ornaments evident in the graves of women. Only two period II graves contain unusual objects of possible foreign origin, although one does contain a belt plate with hammered bosses that indicate a Lower Saxony/ Lüneburg influence (Aner *et al.* 2001, no. 4955C). In both of these graves, it is only the actual belt plate that appears foreign. For example, daggers in female graves are a characteristic Nordic custom. One of the period III female graves contains a special neck collar, together with one of the few pins found in this context (Aner *et al.* 2001, no. 5054B). The grave is very well furnished with several neck rings and bracelets, and the neck collar indicates a connection with the Mecklenburg area consistent with the aforementioned eastern contacts during period III.

Mention should also be made of three female graves containing glass beads, which were exotic objects, but they cannot be associated unequivocally with contact to specific foreign areas. J. Jensen believes that because they occur so rarely, and almost always singly, they must be perceived as amulets rather than actual ornaments (2002, 241). However, they are also found in composite

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ornaments, together with, in particular, amber beads and small bronze tubes. Bracelets and necklaces comprised of glass beads and bronze spiral tubes are relatively common in Lüneburg. At Egshvile, there was an urn grave from period II containing female equipment that included a bracelet with six round glass beads, ten small bronze spirals and a bead of deer antler (Olsen 1992, 141; Aner *et al.* 2001, no. 5115B). There was also an arm ring, which has a parallel in a grave on Sylt (Olsen 1992, 146f; Aner & Kersten 1979, no. 2705). Another particularly well-furnished female grave – also a cremation burial, but dating from period III – contained 11 glass beads; these lay in a belt box together with bronze spiral tubes (Bech 1981; Aner *et al.* 2001, no. 5231B). Grave 5497, a female grave dating from period III, contained one very unusual glass bead.

Despite the absence of wheel pins, there are a few female graves in Thy that indicate foreign contacts. The two graves containing belt plates, together with the evident use of composite bracelets, indicate a connection with Lower Saxony, while in period III there is a single obvious link to Mecklenburg. In the case of all the graves mentioned above, however, the foreign elements were integrated into a Nordic female burial tradition, as illustrated by the presence of daggers. It can therefore be difficult to determine whether those interred were individuals who had migrated and become integrated or people of local origin who, for other reasons, had incorporated foreign objects into their universe. These graves, and what they represent, are the exceptions: The one female grave from period III containing a foreign element represents 0.5% of the total number of graves from period III!

The other study areas show a very similar pattern to that evident in Thy. On the North Frisian Islands, there is a female grave containing a small, unornamented belt plate as well as two graves with neck collars with hammered bosses from period II – all three of these are Lüneburg objects (Aner & Kersten 1979, nos. 2952C, 2635 and 2748B). The belt plate is combined with a dagger and the grave is therefore yet another representative of a mixed burial tradition. There are no finds of glass beads from the North Frisian Islands.

In the Steinburg area, the role of the glass beads as amulets is clearly apparent, because they occur only singly and in both male and female graves. Three graves contain foreign ornaments: One has a Lüneburg belt plate with hammered bosses and two have unusually formed neck collars (Aner & Kersten 1993, nos. 9423, 9363A and 9396B). The presence of daggers and fibulas is an expression of a Nordic tradition, but several graves also display influences from the Tumulus culture in the conventions relating to the composition of their furnishings – for example, a number of graves contain ankle rings.

In the Ditmarshes, there is a very spectacular female grave containing three glass beads, a neck collar, sheet metal bands with small hammered bosses and a wheel pin combined with a dagger (Aner & Kersten 1991, no. 9005B) (fig. 2.29). This represents almost the very essence of these mixed female graves during period II. As in Thy, the Ditmarshes also have a couple of female graves from period III containing neck collars of Mecklenburg type (Aner & Kersten 1991, nos. 9235A-B). Both are cremation graves and were located in the same barrow, though with insufficient evidence on which to ascertain their relative stratigraphy and to determine whether they represent coeval burials. One contains extensive grave goods, including three neck rings, five arm rings, four ankle rings and so on, and this appears to be a rather exaggerated assemblage relative a single individual.

Broadly speaking, Thy, the Frisian Islands and the areas north of the mouth of the Elbe share the same traits when it comes to the relationship between local and foreign elements in the female graves. In period II, influences from Lüneburg can be traced, although these are clearest around the mouth of the Elbe due to the absence of wheel pins in Thy and on the North Frisian Islands. In period III, minor influences are evident from Mecklenburg. The most surprising aspect is that this influence, regardless of its insignificance, is uniform at both ends of the North Sea coast.

International contacts: The role of 'foreign' women and men

The results of this study indicate several levels of communication and ways in which contact took place. Behind all of them are, of course, the movements of various individuals. Some general observations are possible:

Male graves

1. In period II, across the entire study area, there are a number of male graves that comply with a particular standard with the objects in them – in particular the pan-European sword types – being selected according to the same rules. These graves may contain individuals who returned home from foreign parts or foreign individuals who were buried far away from their homeland. Whatever their provenance, they appear to belong to a common group or category of people.
2. In period III, a number of male graves in Thy containing pan-European swords appear to be oriented eastwards rather than towards the North Sea coast.

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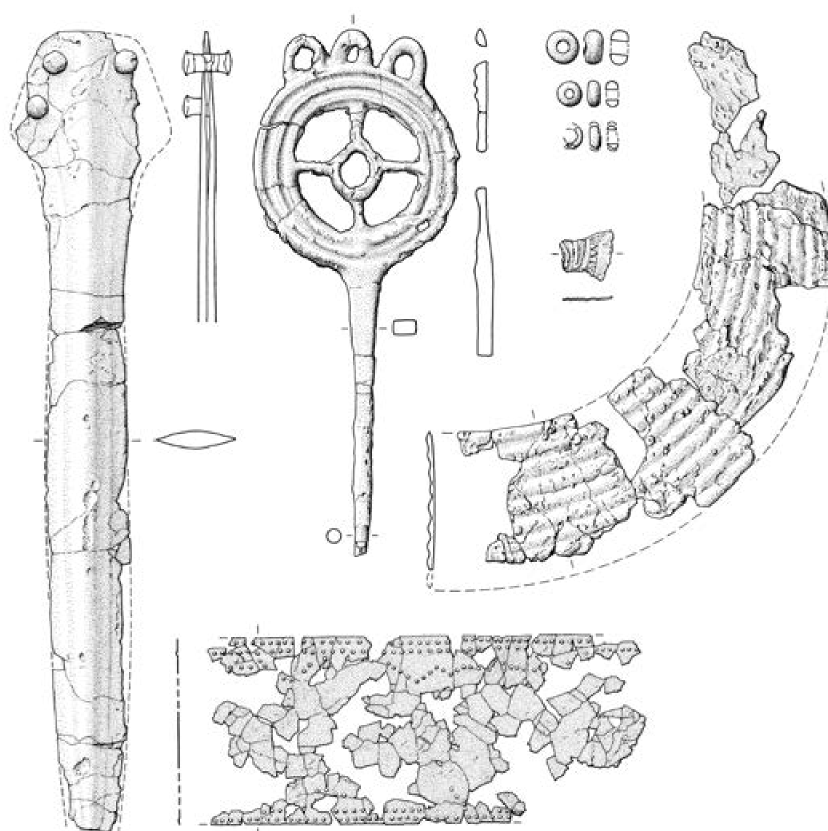

Figure 2.29. A female grave in the Ditmarshes with mixed grave goods. After Aner & Kersten (1991, no. 9005B).

3. In period III, there are a number of male graves across all the study areas that contain pins. Examples of Norddorf type and those with a small biconical head are especially associated with coastal stretches and they link Thy with the North Frisian Islands. However, they are nowhere near as numerous as the pan-European swords in period II and can, given the link between pins and costumes, perhaps mean that the men buried here had actually travelled between Thy, the North Frisian Islands and further on into central Europe, perhaps taking leather pouches with them as travelling kit?

Female graves

4. In period II, there are a number of female graves containing wheel pins and pins of other types (e.g. *Plattenkopfnadeln*) in the Elbe area and southern and central Jutland. These graves indicate major contacts with Lüneburg that apparently did not travel via the lines of communication along the North Sea coast.
5. In period II, a few female graves in the study area contain a single ornament of foreign origin. These objects originated from Lower Saxony and ended up in various regions along the North Sea coast. As a rule, however, they were integrated into the local burial tradition and this makes it difficult to determine whether the individual was of local or foreign origin or perhaps lived in several places in the course of their life.
6. In period III, very few female graves contain objects of foreign origin. They indicate contact with Mecklenburg and not down along the North Sea coast. Immediately to the north of the Elbe there are also several female graves said to be of Lüneburg origin (Bergerbrant 2007, 98).

A few graves are so unusual that it is tempting to interpret them as representing individuals who were buried in an area that was foreign to them: The female grave at Egshvile – the only truly southwest-oriented female grave in Thy; the female grave at Visby – which contained a pin and a Mecklenburg neck collar (Aner *et al.* 2001, no. 5054B); the very European-oriented male grave at Hansted, c. 8 km west of Bjerre – which contained a pin and a Hemigkofen sword (Aner *et al.* 2001, no. 5070); the special barrow at Itzehoe that contained no less than 12 graves, of which several are female graves and/or contained glass, amber, wheel pins and unusual ornaments and rare pin types (Aner & Kersten 1993, no. 9407); a low-lying barrow in the Ditmarshes – located

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close to the Eider – with two cremation graves containing female furnishings and Mecklenburg neck collars (Aner & Kersten 1991, no. 9235). And probably many more.

Female graves in a foreign context have generally been seen as representing women who moved due to marriage and/or as a consequence of alliances. One study takes issue with this passive view of the movement of women and proposes that there were various kinds of networks and movement of individuals in which both men and women took part in their own way (Bergerbrant 2007, 118ff).

There is no doubt that, regardless of the over-arching developmental impulses during the course of the period, there was continual contact along the North Sea coast. In this respect, it is interesting that Thy and the North Frisian Islands share several elements that are not evident in the Steinburg and Ditmarshes areas north of the mouth of the Elbe. This could suggest that the latter did not play such an active role with regard to communication in the form of a contact route. Their location on the geest also means that they oriented themselves towards the traditional land routes that are reflected in the lines of barrows running up through Schleswig and Jutland, while the North Sea coast route ran from Thy, via the North Frisian Islands and then into the Elbe itself.

If the distributions of the artefacts mentioned above can be taken as representing the various forms of contact, travelling activity and movements of people, then there were apparently differences in the roles of men and women. A group of individuals can be identified among the male graves for whom the journey and the foreign contacts were important, whereas foreign elements in female graves constitute, to a greater degree, a subset of the total characteristics of the individual. It seems that men who travelled out into the world also made the return journey, while the women either moved more permanently or stayed at home and received foreign artefacts as an expression of an area's interconnectedness with foreign parts.

Trade and shipping

As demonstrated in the previous sections, contact, communication and the movement of objects and people in the Bronze Age cannot be questioned. However, little is known of the more tangible aspects of trade and shipping.

Amber

The role of amber as a trading commodity has often been brought into this debate. The strange contradiction between the rich potential for collection of amber in southern Scandinavia (fig. 2.30) and its very scarce appearance in the graves of the Nordic Bronze Age is well known. Whereas amber played an important role as grave goods in the Neolithic, this situation appears to have changed completely with the emergence of the Bronze Age. It has been traditionally explained as the result of amber being exchanged for bronze, because Baltic amber is found as valued grave goods in central Europe and as far away as in Greece. It has also been suggested that the role of amber changed between the Neolithic and the Bronze Age. Instead of simply being a material for ornaments, it became used for magical purposes (Jensen 2002, 239). Bronze Age people assigned magical properties to amber and it was used as a talisman in the same way as individual glass beads. Strong arguments in favour of this view are provided by the presence of unworked amber, together with other kinds of strange objects and talismans, in a purse in the Hvidegård grave, as well as a small bronze handle with an amber disc representing a sun symbol (Jensen 2002, 281). Another find in this category could be the small amber house found in a barrow at Sejstrup near Ribe (Asingh 1990).

There can be no doubt that amber was collected along the coast, and in significant quantities. The largest ever find of raw amber from Danish prehistory is securely dated to period II of the Early Bronze Age, as it was found in a pot with two neck collars. At Understed, near Sæby in Vendsyssel, 3.3 kg of amber was found buried in a pot. The purpose of this deposition is unknown, but the find demonstrates that the collection and storage of large quantities of amber took place. A similar situation is perhaps demonstrated by an undated find of 2.5 kg of unworked amber at Janderupholm, southeast of Oksbøl (Ploug 2000, 37).

Finds of amber are very rare from settlements although this situation can, to some extent, be related to preservation conditions. There are nevertheless a couple of remarkable examples from Thy. An amber bead and 153 pieces of unworked amber (in total 353 g) were found associated with houses dating from Bronze Age periods II-III at Bjerre 6, with some of the amber being located in a small sub-floor cache. The latter was tightly packed together and may originally have been held within a small bag (Earle vol. II, chap. 24). Other pieces were found scattered around in cultural deposits and as minor concentrations in the fill of some of the features. The house at Bjerre 7, dating from Late Bronze Age period V, had an even larger quantity of unworked amber associated with it, 1795 pieces (1832.6 g) in all; these lay partly inside and partly outside the house. The greatest concentration was found in and around a pottery vessel buried on the presumed wall line of the house, but small caches were also found associated with buried vessels outside the house (Earle vol. II, chap. 24). The occurrence of

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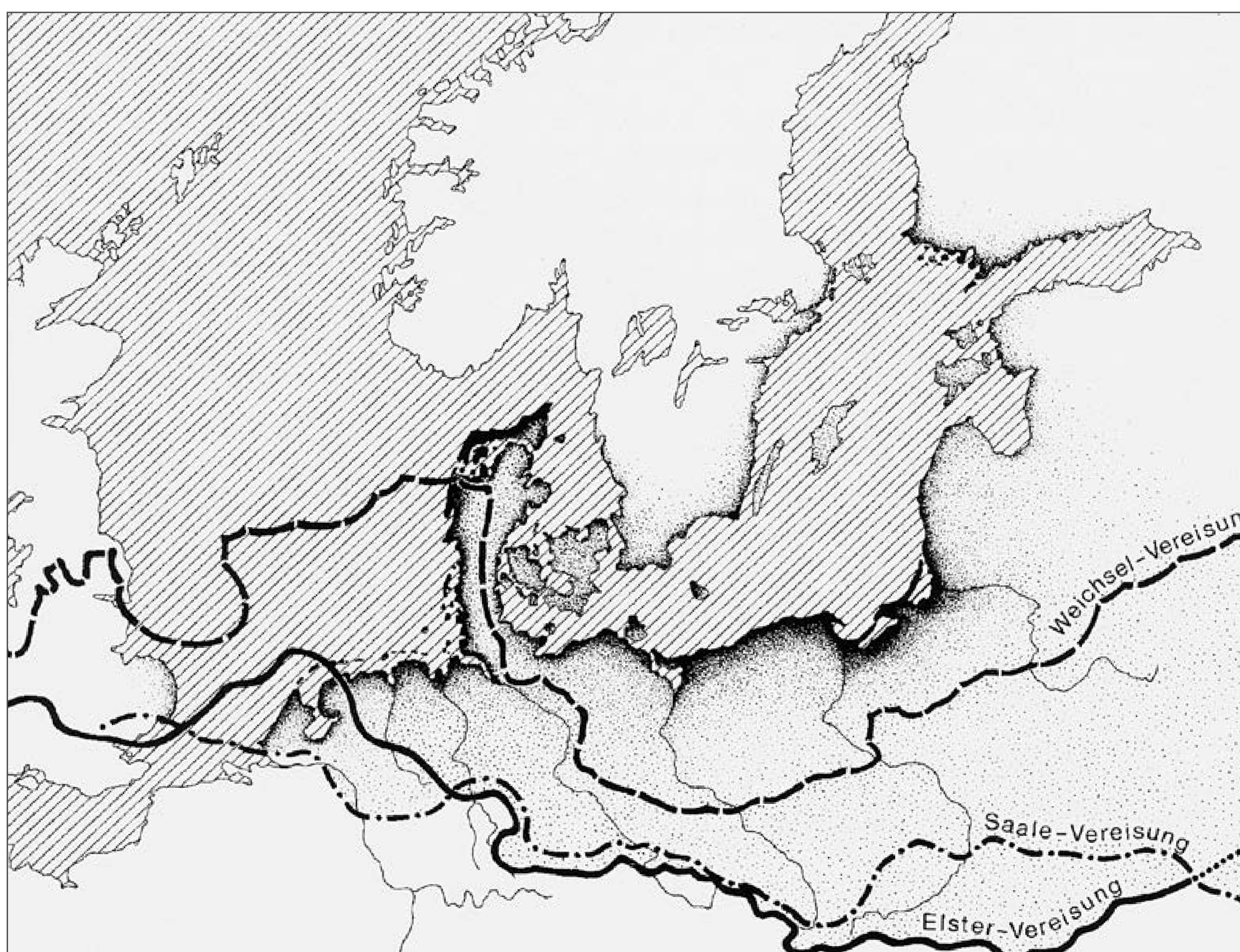

Figure 2.30. The distribution of Baltic amber in relation to the maximum extent of glaciations during the Pleistocene. After Bismark (1987).

amber at Bjerre 6 is unusual relative to general situation for Early Bronze Age habitations in Thy. There are though a few more examples from Late Bronze Age settlements (Earle vol. II, chap. 24). There is a recent find from the settlement of Fårtoft and a much older one from the period V settlement of Troldting, located near Bulbjerg Knude, only 20 km from Bjerre, where 66 largely unworked pieces of amber were recovered; a few pieces showed some signs of working (Jensen 1965, 48, 2002, 434; Earle vol. II, chap. 24).

It seems obvious to interpret these exceptional finds as an expression of the systematic collection, storage and occasional working of amber, regardless of the possible end purpose. Even though amber may, at the time, have been ascribed magical properties, it is also very possible that it had a value relative to some system of exchange. It would have had a value both in worked and unworked form – whether or not this was the same is difficult to say as the few worked beads all occur in circumstances where they can be perceived as either ornaments or amulets.

What is the occurrence of amber in graves within the study area? Are there differences in this respect between Thy and the area around the mouth of the Elbe? And is it to the same modest extent as for example glass beads?

The amber finds are rather difficult to deal with statistically. Small unremarkable beads, and especially small unworked pieces, have often been lost from the many older finds assemblages. This is clearly evident from the amber found in graves in Thy: Amber is noted by Aner *et al.* (2001) in 11 cases, but there is precise information from only three graves. In the majority of cases, the amber was simply not recovered or has since disappeared and is only recorded in terms such as remnants, splinters, occasional pieces and so on. However, it seems that most amber occurs as small unworked pieces, as shown by the three well-documented examples: two graves at Egshvile (Aner *et al.* 2001, nos. 5115A and B) and a period I grave at Langvad (Aner *et al.* 2001, no. 5540). However, grave 5115A also contained one and half beads, accompanied by no less

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than 20 small pieces of unworked amber, while 5115B had an amber bead set in resin, probably intended as an inlay and ornamentation on another object (Olsen 1992). The two graves at Egshvile, respectively a child grave and a female grave, are both urn burials dating from period II (cf. above; Olsen 1992). There are also records of finds of, respectively, one and six amber beads, in a couple of graves at Stagstrup (Aner *et al.* 2001, nos. 5018 and 5019B).

The North Frisian Islands have slightly more graves containing amber (a total of 13), mostly of early date – periods I and II. The period I graves contain large numbers of amber beads that possibly derive from composite ornaments, but these are few in number. The four securely dated period II graves containing amber comprise three female graves (examples are Aner & Kersten 1979, nos. 2592C and 2748B) and a child grave, with some very large but coarsely-made beads. All the graves have rather special furnishings accompanied either by a few beads or unworked amber pieces and both inhumation and cremation burials are represented. The undated graves containing amber also include a child burial and two of the child amber graves on Amrum are located far out in what today is the dune zone.

The Steinburg area, on the mainland between the Eider and the Elbe, has a greater number of graves containing amber than Thy (a total of 12) and, with one exception, the amber takes the form of beads. Most of the graves date from periods I and II, but there is also one from period III, containing four large very special beads, located in the remarkable barrow at Itzehoe (Aner & Kersten 1993, no. 9407L). The period I graves contain between five and 12 worked beads that may, accordingly, represent composite ornaments. In period II, single beads, a few beads together and amber buttons, in addition to unworked amber pieces, are found in both male and female graves. In one instance, these may have been part of an ornament (Aner & Kersten 1993, no. 9381C) comprised of amber beads and bronze spiral tubes. It is striking that the few amber-containing graves are concentrated in only a few barrows (such as Egshvile), or within the same few barrow groups. No child graves containing amber have been found in Steinburg, whereas in the Ditmarshes, the find circumstances are so difficult that this, in itself, could be the reason that so few finds have been recorded. There is one child grave (Aner & Kersten 1991, no. 9251) with an unworked piece of amber, but otherwise most of the amber-containing graves are apparently those of men; both single beads and unworked pieces of amber have been recorded.

Amber was clearly collected systematically and stored in caches at settlements in Thy close to the North Sea coast, a situation that is, as yet, unique to this area. The role of amber relative to graves appears, however, to have been the same as in the rest of the study area. Most of the graves containing a single bead, or several beads together, date from period I when burial practices were perhaps more bound up with those of the Neolithic, and amber beads were an integral part of the ornaments. From period II onwards, the use of amber in graves clearly changed and unworked pieces and beads now appear on an equal footing, often as single pieces. In period III, the use of amber as grave goods largely ceased; it occurs with a rarity corresponding to that of exotic glass beads. This suggests that an interpretation of amber as an amulet, when found in graves, could be correct. In this respect, it is intriguing that amber often occurs in specially furnished graves and in graves that, in other aspects, appear slightly foreign to their local context (e.g. Egshvile and the barrow at Itzehoe). Amber occurs in both male and female graves but is found particularly associated with child graves. Is this perhaps an indication that it was children, in the first instance, who gathered the amber? It is unknown whether these child graves were special graves. None of the six to eight child graves identified at Lustrupholm, Ribe, was found to contain amber (Feveile & Bennike 2002), but this could be because it was included on the funeral pyre and has been destroyed, as was the case for several other of the grave goods (see above). No child grave found within the study area contained as many pieces (20) of unworked amber as that located at Egshvile.

Thy as a transit station?

Amber could have played a role in Thy's prosperity and extensive contacts during the Early Bronze Age, although it is unlikely to have been a decisive element (Earle vol. II, chap. 24).

In order to visualise Thy's role in the extensive network of links and contacts at that time, it is worth noting the great similarity both in the way in which foreign and pan-European objects occur in graves in Thy and on the North Frisian Islands (see previous section), and in the very dense settlement. Both areas differ in several respects from for example the 'mainland' area north of the mouth of the Elbe. Could Thy and the North Frisian Islands have been involved in the contact network in the same way, i.e. as important transit stations with respect to links and communication along the entire North Sea coast, from the Netherlands to Norway?

Karmøy, Jæren and Lista, in southwest Norway, have convenient locations with respect to links along the North Sea coast and there is no doubting the importance of Thy's role relative to the Norwegian Bronze Age (cf. above and Kvalø 2004, 150f, 2007, 27ff). For ex-

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ample, it has been suggested that Norwegian products such as furs and other goods resulting from hunting could have contributed to the prosperity evident in Thy (Solberg 1994, 123). Due to the lack of woodland in these areas, the opportunities for local hunting were limited, so the Norwegian products could also be used locally. However, several of the bronze finds from Norwegian graves show that Thy was not the sole contact for these areas of Norway (Hornstrup 2011).

Even though there was a great concentration of both barrows and wealth in Thy, especially during period III, with clear evidence of contacts to Mecklenburg and perhaps as far as east-central Europe, there are also some missing elements in this respect from period III onwards. A good example is provided by repoussé bronze cups and vessels. The only example of these from the entire study area is a fragment of repoussé bronze with bosses found in an unknown barrow in Steinburg (Aner & Kersten 1993, no. 9433).

Thy and the world around: Some conclusions

A northern maritime world

There is little doubt that contacts took place by water. Numerous rock carvings and engravings on razors and other artefacts (Kaul 1998) demonstrate the great symbolic importance of the ship in the Bronze Age. In stark contrast to this stands the remarkable lack of actual finds of Bronze Age boats. Only a couple of dug-out boats found in southern Scandinavia have been dated to this period (Berntsson 2005, 243) and their use must have been primarily confined to smaller water bodies, rivers and the like, and possibly mostly for fishing. However, A. Berntsson (2005, 242) maintains that these vessels were constructed in a different way from earlier dug-out boats – using a technique that bears witness to knowledge of other vessel types, such as the boat found at Dover in southern England (Clark 2004). The latter is a sewn-plank vessel and is dated to 1575-1520 cal BC (Clark 2004, 2), i.e. synchronous with the end of period I. The Dover boat was both built and used for travel on the open sea and must therefore be perceived as the result of a long tradition of boats, boat-building technology and navigation.

The next question is: Who travelled in these boats? Through comparisons between the graves found within the study area, it is perhaps possible to identify particular individuals as 'travellers'. It is obvious that not everyone in a Bronze Age community would have been able to travel. As in all other communities and societies, actual travel was perhaps restricted to people with a particular role, of a particular age or in possession of some other qualifying factor. A certain body of knowledge would also have been required in order to pilot the vessels, to communicate with foreigners on arrival and generally to deal with the situations that arose underway. Recent research has indicated that it could have been part of a status conferring 'rite of passage' for young men, analogous with Telemachus' travels in Homer's Odyssey or the 'Grand Tour' of historical times. The journey itself, and the knowledge of foreign parts acquired in the process, were both essential to a man's status (Kristiansen & Larsson 2005, 371). These contacts should be seen as something different from, and more than, a means for the simple exchange of various objects. There is a difference between trade and travel (Kvalø 2007, 16) and the material culture of the Bronze Age has a huge wealth of tangible and symbolic evidence suggesting that travel was an integral part of society's perception of the world and its constitution of social structures (Kvalø 2007, 117). In the evidence examined here, travel activity is associated with the male sphere, but the situation was probably much more complex: Perhaps it was not just men who travelled and acquired status in this way (Bergerbrant 2007, 129).

The Dover boat has been linked with travel across the English Channel and, in support of this, a series of similarities have been identified between southern England and northwestern France that corroborate the idea of direct communication between these two areas (Clark 2004, 6ff). It is impressive that people were able to cross the Channel and this was clearly an essential prerequisite for the English Bronze Age. The voyage is, however, 'only' 35 km, whereas the shortest route from northern Jutland to southern Norway is about three times this distance. Under optimal conditions, it would take about 24 hours for an able crew to paddle from southwest Norway to Thy (Kvalø 2007, 62). The numerous examples of contacts between these areas clearly show that people did cross the Skagerrak (Marstrander 1950, 1977; Løken 1989; Kvalø 2007). Conversely, it is doubtful that people crossed the North Sea, from the west coast of Denmark to eastern England.

Conclusion

From the mid-2nd to the mid-1st millennium BC, the entire North Sea region experienced the same changes in climate and had, consequently, the same challenges with respect to social development and adaptation. A large number of common traits are evident in the development of these regional societies, but different solutions were also arrived at in response to the various challenges. In general, the areas on both sides of the North Sea share a dynamism and adaptive form of land-use management, whereby new situations were regulated through the incorporation or abandonment of areas, presumably as a result of intentional

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strategies. The entire North Sea region also displays a shared general development in burial practices, from inhumation to cremation, and is thereby party to overarching pan-European Bronze Age developments.

On a lower level, clear similarities are evident between the areas for which contact of a very direct character can also be documented. Settlement structure and house architecture reveal great similarities between the areas where it is presumed there was direct and personal communication. It seems very likely that the Bronze Age community established at Bjerre Enge had direct knowledge of, and communication with, population groups on the southwest coast of Norway, the North Frisian Islands and as far away as the mouth of the Elbe. On the other hand, they probably had no direct contact whatsoever with communities on the opposite side of the North Sea, other than that they were exposed to the similar conditions and were a part of the same pan-European Bronze Age culture.

Notes

1. The main author of first half of this chapter (p. 25-64) is J.-H. Bech (completed 2011, revised January 2015), while M. Rasmussen is main author of the second half (p. 64-87) (completed 2008, revised September 2013).

2. J.-H. Bech: I am very grateful for assistance and help received from a number of colleagues during work with my part of chapter 2. This ranged from practical help during stays in Stavanger, Wilhelmshaven and Amersfoort, to putting unpublished data at my disposal and commenting on drafts of this paper. I especially want to thank (in alphabetical order) Stijn Arnoldussen, Per Ethelberg, Olle Hemdorff, Steffen Terp Laursen, Trond Løken, Anne-Louise Haack Olsen, Martin Egelund Poulsen, Liesbeth Theunissen and Haio Zimmermann. Also, financial support from the Farumgaard Foundation, Queen Margrethe II Archaeological Foundation and Erik Westerby's travel scholarship is gratefully acknowledged.

3. The large number of Bronze Age houses excavated during the 1980s and 90s in the northwestern part of Jutland formed the background for the publication *Bronzealderens bopladser i Midt- og Nordvestjylland* (Bronze Age settlements in central and northwest Jutland) (Bertelsen *et al.* 1996). This book presented a useful and much-needed overview, in Danish, aimed mainly at a Scandinavian audience. All sites with houses were described with 'situation plans' accompanied by summary articles on the settlement structure (Simonsen 1996; Bertelsen 1996; Mikkelsen 1996a) and houses (Mikkelsen 1996b). However, dating of the houses was in many cases difficult due to the lack of pottery and other finds, resulting in many broad and somewhat uncertain dates. Only one radiocarbon-dated house was presented in the book (Simonsen 1996, 95).

4. Sites in Thy with houses from LN-EBA I (sites in alphabetic order with minimum number of houses): Bjergene 2, THY 2756, site no. 110112-262 (one house); Bjergene 6, THY 2758, site no. 110112-259 (three houses); Ginnerup, THY 5056, site no. 110505-128 (three houses); Høghs Høj II, THY 3881, site no. 110310-70 (one house); Ingersminde, THY 3862, site no. 110104-98 (two houses); Kallerup, THY 5035, site no. 110303-99 (two houses); Klostergård, THY 2578, site no. 110313-125 (three houses); Nørre Nordentoft, THY 2456, site no. 110305-263 (eight houses); Oddershedegård, THY 5053, site no. 110202-96 (one house); Tinggård, THY 3471, site no. 110305-264 (three houses). Minimum number of houses in all: 27.

   The following house sites from LN-EBA I, being located less than 1 km from each other, are regarded as belonging to the same habitation area in the context of figure 2.5: Bjergene 2, site no. 110112-262 and Bjergene 6, site no. 110112-259.

   Sites in Thy with houses from BA II-VI (sites in alphabetic order with minimum number of houses): Ambygård, THY 3740 + 3839, site no. 110114-146 (eight houses); Bjerre, THY 2728 + 2999 + 3718, site no. 110211-32 (10 houses); Brydbjerg, THY 2494, site no. 110101-196 (eight houses); Brydevig, THY 2354, site no. 110307-128 (nine houses); Drengshøj, THY 3970, site no. 110309-82 (two houses); Frydenshøj, THY 2462, site no. 110310-62 (two houses); Fårtoft 1-6, THY 3750 + 3887 + 5011 + 5032 + 6004 + 6081, site nos. 110309-71,-78,-83,-84,-85,-87 (35 houses); Ginnerup, THY 5056, site no. 110605-128 (six houses); Hedelund, THY 1539, site no. 110101-80 (nine houses); Hejrhøjvej, THY 2341, site no. 110309-65 (10 houses); Heltborg, THY 1690, site no. 110605-105 (one house); Højgård II, THY 5030, site no. 110606-100 (two houses); Ingersminde, THY 3862, site no. 110104-98 (three houses); Kallerup, THY 5035, site no. 110303-99 (one house); Klostergård, THY 2578, site no. 110313-125 (six houses); Koldbyvang, THY 3991, site no. 110106-223 (one house); Landlyst, THY 3971, site no. 110309-80 (six houses); Legaard, THY 3414, site no. 110112-279 (nine houses); Munkholm I, THY 2715, site no. 110106-189 (one house); Munkholm II, THY 2716, site no. 110106-