Journal of Danish Archaeology
Publication details, including instructions for authors and subscription information:
http://www.tandfonline.com/loi/rdja19

Settlement and Land Use at the Mesolithic-Neolithic Transition in Southern Scandinavia

Kasper Lambert Johansen [a]
[a] Institut for Forhistorisk Arkæologi Aarhus Universitet , Moesgaard, DK-8270 , Højbjerg
Published online: 05 Nov 2012.

To cite this article: Kasper Lambert Johansen (2006) Settlement and Land Use at the Mesolithic-Neolithic Transition in Southern Scandinavia, Journal of Danish Archaeology, 14:1, 201-223

To link to this article: http://dx.doi.org/10.1080/0108464X.2006.10590118

Journal of Danish Archaeology vol.14, 2006, pp. 201-223

Debate

Settlement and Land Use at the Mesolithic-Neolithic Transition in Southern Scandinavia

by Kasper Lambert Johansen

ABSTRACT

This contribution is a critical survey and discussion of patterns of settlement and land use at the Mesolithic-Neolithic transition in Southern Scandinavia. The Ertebølle Culture (EBK) and the earliest stage of the Funnel Beaker Culture, early Neolithic I (EN I), are thoroughly examined, leading to a comparison between the two periods. It is found that our view on the settlement system of the EBK needs revision. In recent years, the EBK has been characterised according to the model of complex hunters. Large groups that live a sedentary life on big year-round base camps have been anticipated, whereas the smaller settlements have been perceived as seasonal extraction camps, exploited by task-groups radiating from a base camp. This model is considered here to be insufficient. Instead, it is proposed that EBK settlement comprised a number of small groups rotating between sites on a seasonal basis within a confined territory, but perhaps periodically aggregating at key localities. It is concluded that this settlement pattern has many organisational features in common with EN I. Further it is argued that the overall reorganisation of the settlement happened rapidly because of structural incompatibilities inherent in the two different ways of life. Relocating the actual living area to inland residential sites probably was the only stable hybrid between hunting and farming - a perspective with many implications. Thus in terms of settlement and land use, the Mesolithic-Neolithic transition is a mosaic of continuity and discontinuity. If research on this topic is considered in a historical perspective, however, continuity tends to have been overlooked since the transition to agriculture is also a collision of two very different research traditions. Usually the views are one-sided, either Mesolithic or Neolithic. Here both periods are taken into consideration, and the article is concluded with some overall thoughts on the transition to agriculture in Southern Scandinavia.

THE EBK SETTLEMENT

When compiling distribution maps of settlements and single finds of the EBK, it is clear that the sites concentrate along the coast and to a lesser degree in relation to the freshwater systems of the interior (Brøndsted 1957, 108; Jennbert 1984, Fig. 65; Nielsen 1981, 16; 1994, Fig. 2). The representativity of this pattern can hardly be questioned since it remains after years of systematic regional surveys. Coastal sites are found over most of Southern Scandinavia, either above or below the present sea level (Andersen 1985, 52). Inland settlements are known mainly from the Åmose lacustrine basin and along the stretches of the Gudenå (Andersen 1983; Andersen 1998a; Mathiassen 1938; 1943). It is probable that to some extent this reflects the archaeological focus on these areas. However, it must be of cultural significance that inland EBK sites are located primarily along the major freshwater systems.

The coastal settlement

The EBK sites are by no means evenly distributed along the coast. Fjords and estuaries, or most frequently a combination of both, mark the focal points of settlement (Andersen 1995, 45; Fischer 1997, Fig. 11). This is unlikely to be coincidental, since fjords with freshwater outlets are expected to have been the most productive resource spaces in the late Atlantic environment (Andersen 1995, 42ff.). Thus in terms of potential human food resources, the fjords have been characterised by

high productivity, great diversity, high overall stability and a low degree of seasonality (Paludan-Müller 1978, 124ff.).

On the open coast only few settlements are found - a fact that may be ascribed to the less favourable resource situation and to the more exposed environment. However, heavy erosion combined with a lack of investigations has certainly contributed to an under representation of sites (Skousen 1998, 60ff.). Outside the fjords narrow straits and small islands may have been common places for settlement. Thus Sejerø, off the coast of North-western Zealand, has many late EBK sites (Kempfer-Jørgensen & Liversage 1985, 27). Generally they are small though, perhaps primarily reflecting the seasonal exploitation of resources like breeding seals and birds (Paludan-Müller 1978, 131).

Based on the Bjørnsholm investigations, Andersen distinguishes between six locations of sites within a fjord: settlements on headlands, settlements at the mouth of a lagoon between opposing headlands, settlements at river outlets, settlements on islands, mainland settlements facing an island, and settlements on beach ridges facing an exposed coast (S. H. Andersen 1993, 61; 1995, 47). By emphasising the proximity of the settlements to narrow straits and stream channels, Fischer presents a similar picture of the typical distribution of sites within a fjord (Fischer 1997, 66). Thus, the pattern seemingly repeats itself regardless of which fjord system one observes (Andersen 1994, Fig. 3; Johansson 1995, Fig. 5; 1999, 58ff.; Petersen 1984, 8). To explain these topographical choices, good opportunities for stationary fishing clearly were of crucial importance (Fischer 1993a, 19ff.; Johansson 1995, 92; 1999, 60).

Regarding the size of EBK coastal settlements, estimates of site size in Roskilde Fjord and Bjørnsholm Fjord may indicate the existence of two categories of settlements. There are a large number of sites that cover less than 50x50 m, and a few sites with approximately the same width, but with a length of up to 350 m (Andersen 1995, Fig. 5). However, these two groups are not really separated. The range in settlement sizes forms a continuous spectrum with the vast majority of sites being on the smaller end of the range. Thus, the average settlement sizes in Roskilde Fjord and Bjørnsholm Fjord are 33x16 m and 59x27 m respectively (Andersen 1995, Fig. 5). The larger sites especially are characterised by the topographical features outlined above, whereas there is more variation in the position of the smaller sites (Johansson 1995, 92; 1999, 60). In Bjørnsholm Fjord, the Bjørnsholm midden is the only really large settlement, the remainder of the sites seemingly being smaller (S. H. Andersen 1993, 61). This constellation of one large and several smaller settlements has been proposed as a general model for fjord systems of comparable size (Andersen 1995, 48; 1998d, 102; Fischer 1997, 74). However, given the current state of publication, the pattern can hardly be confirmed, and some observations may point in a less clear-cut direction (Andersen 1976, 37ff.; Johansson 1995, figs. 4-5; 1999, 59ff.).

In analogy with complex hunters, the patterns in distribution, size and faunal assemblage of EBK coastal settlements have been perceived to indicate sedentism. The vast coastal sites are typically seen as a result of large corporate groups that live a steady life in the same place on a year-round basis. On the other hand, the smaller settlements are viewed as seasonal extraction satellites, exploited by task-groups radiating from a base camp (Andersen 1990, 36; 1998d, 102; Fischer 1997, 64ff.; Jennbert 1984, 97ff.; Madsen 1987, 231ff.; Rowley-Conwy 1983, 118; 1985b, 188). The base camp itself is marked by a cemetery, proclaiming the right to this important resource space through a system of lineal descent (L. Larsson 1984, 34ff.). This conception of the EBK settlement system has gained wide acceptance in recent years, and it has in many ways become the fundamental theoretical framework of all discussions on how and why agriculture was introduced in Southern Scandinavia.

Ertebølle and Bjørnsholm are among the large coastal settlements interpreted as permanently occupied base camps because their assemblages contain faunal remains from nearly every season (Bratlund 1993, 103; Rowley-Conwy 1983, 122; Madsen et al 1900, 81ff.). Upon closer inspection of the published bone material from Bjørnsholm, though, the vast majority of the terrestrial mammals seem to have been killed during the warmer half of the year. Indicators of winter settlement are for the most part limited to a number of bird species and fur animals (Bratlund 1993, 100ff.). That fur hunting was mainly an activity of the late fall and winter is highly plausible, but the occurrence of fur bearing species on summer camps has been documented (Persson 1989, 104). Shellfish were evidently gathered during the summer (Brock & Bourget 1991, 9; Jensen 1982, 10). Likewise fishing, a vital activity at both sites, seems to have been conducted in late summer or autumn, fitting the general pattern of summertime coastal fishing in the late Mesolithic (Enghoff 1983, 94; 1987, 74; 1991, 49; 1993, 116; 1994, 83ff.).

To sum up the evidence, the primary activities at Bjørnsholm and Ertebølle fall in the summer half of the year, whereas indicators of winter settlement are seemingly more sparsely represented. Other large coastal sites have also recently been demonstrated to be of a more seasonal nature – that is if we are not just witnessing the result of an effective delayed return system (Mahler 1981). Skateholm I seems to be a settlement of the cold season only, whereas the bulk of faunal remains from Tybrind Vig may be ascribed to summer and autumn (Rowley-Conwy 1998a, 198; 1998b, 90).

Nevertheless, it is a fact that several seasons are often represented in the faunal assemblages from large coastal sites

(Madsen et al 1900, 175). Still, it is considered here to be highly questionable whether this indicates regular sedentism. Large coastal EBK sites have an enormous chronological span, often encompassing up to 1000 ^{14}C years (S. H. Andersen 1992, 73; 1995, 50). As the bone material from such a long sequence is collapsed into one seasonal evaluation, it is only to be expected that the entire yearly cycle can be documented. A long-term accumulation of seasonal occupations may just as well have caused the pattern to arise.

The vast areas covered by some coastal EBK settlements have also been used to argue for a permanent year-round occupation of a large group (Rowley-Conwy 1983, 120). However, the size of the sites may instead reflect a heaping up of debris from numerous small seasonal occupations over a long period of time. Once again, the longevity of the large coastal settlements must be taken into consideration. The ^{14}C-datings from Ertebølle have a range of 6010±95–5070±90 bp (K-4318, K-4307), whereas Bjørnsholm covers the time span from 6090±100–4760±90 bp (K-5304, K-5721) (S. H. Andersen 1993, 70-76; Andersen & Johansen 1987, 59). Further, Norslund, Tybrind Vig and Dyrholmen are just a few examples of the many large coastal settlements that encompass the whole typological sequence of the EBK (Andersen 1985, 55ff.; Andersen & Malmros 1966, 93; Mathiassen et al 1942, 33ff.). Andersen believes that the occupations at Bjørnsholm were few, but extensive (S. H. Andersen 1993, 73). Hence it is characteristic that kitchenmiddens from time to time display sections of intensive accumulation inter-spaced by periods with virtually no deposition (Andersen & Johansen 1987, 49). Evaluating the rate of deposition in large kitchenmiddens is, however, extremely difficult. Most excavations have been done in sections, which makes the horizontal accumulation almost impossible to monitor. Nevertheless, there are many indications that large kitchenmiddens must be regarded as palimpsests of countless smaller shell heaps (Andersen & Johansen 1987, 45; Madsen et al 1900, 20). If these shell heaps, as suggested by the ^{14}C-sequences, have accumulated with varying intensities over a great expanse of time, the conception of kitchenmiddens as the settlements of large sedentary groups may need revision.

When the range of activities at large kitchenmiddens is examined, the stability of activities through time is remarkable. Besides typo-chronological variation, the tool assemblage remains largely the same throughout the deposits. Likewise the same animal species are found in comparable proportions from top to bottom (Andersen & Johansen 1987, 44; Enghoff 1987, 68; 1993, 113; 1994, 78). Also the fireplaces that seemingly were the focal points of all activities are regularly uncovered in stratigraphic sequences. This indicates that they were relatively fixed through centuries of exploitation (S. H. Andersen 1991, 25; 1993, 78; Andersen & Johansen 1987, 48). Collating the evidence, it is therefore obvious that large coastal settlements are products of an incredible stable settlement pattern where the same activities were carried out at the exact same localities throughout hundreds of years. In the case of Ertebølle and Bjørnsholm, emphasis was clearly placed on eel fishing and gathering of shellfish in late summer and autumn, although these activities were performed in the context of a broad-spectrum exploitation of the catchment area (Bratlund 1993, 101; Enghoff 1987, 74; 1993, 106). Winter occupations were seemingly less pronounced and the faunal remains may primarily reflect the use of the sites for hunting birds and fur animals.

The presence of cemeteries in conjunction with large coastal sites is among the discoveries that have had a great impact on the notion of sedentism in the EBK (Albrethsen & Petersen 1976; L. Larsson 1984; 1995, 96). However, this correlation is very problematic. First of all, the settlement-cemetery complexes all date to the late Kongemose/early Ertebølle transition, whereas the graves from late EBK are few, scattered, poorly furnished and give an impression of 'ad hoc' burials (Andersen 1995, 51; Nielsen & Petersen 1993, 77). Ironically, there are no burial grounds from late EBK, the period from which the largest settlement sites are known. Whether Bøgebakken and Skateholm I are cemeteries in the sense of the word has also been questioned (Meiklejohn et al 1998, 205). The burials are recognised as oblong pits in the actual settlement area, found among features like fireplaces, postholes and pits. At Vedbæk, graves are found at almost every settlement, and the correlation may be as simple as the longer the chronological span of the site, the higher the number of burials (Meiklejohn et al 1998, 205). Clearly, a formal disposal area for the dead was not set up as a demarcation of a groups' right to a site occupied on a year round basis. On the contrary, both Skateholm I and Gøngehusvej are seasonal sites (Larsson 1995, 99; Rowley-Conwy 1998a, 198). However, if the deceased were more or less buried where they died, the accumulations of burials do point to a stable pattern of settlement rotation. The nearly 80 graves excavated at Skateholm I may indicate a relatively large group. If the chronological span of the settlement is taken into consideration, though, this figure cannot account for even a family unit (Larsson 1995, 99).

The lack of dwelling structures presents another problem. If large groups lived at big coastal sites on a year-round basis, complexes of huts or houses would be expected. To pursue this matter further, the topsoil has been removed behind a number of kitchenmiddens, the result being negative in every case. If huts did indeed exist at these locales, they have left no traces (S. H. Andersen 1991, 17ff.; 1993, 65ff.; Andersen & Johansen 1987, 35ff.). In general, only a few possible dwellings are known

from the EBK, and they have been recorded at both small and large settlements (Sørensen 1995, 28). So far no complexes of structures have been discovered, but this may to some degree be attributed to the methods of excavation. If huts are indeed to be found beneath the kitchenmiddens, as was the case at Lollikhuse, larger areas will have to be exposed.

To give a representative presentation of the smaller coastal sites is difficult, since the research has been focused on larger settlements (Andersen 1975a, 9; 1979, 7; Skousen 1998, 29ff.). Aggersund, Vængesø and Rønbjerg Strandvolde are small settlements, and they probably represent only one or a few episodes of occupation by a small group (Andersen 1979, 15ff.; Andersen 1975a, 14; Skousen 1998, 54). The faunal records from Aggersund and Vængesø resemble the assemblages from larger coastal sites, yet Aggersund is distinguished by a high number of whooper swans and at Vængesø many whalebones were discovered (Andersen 1975a, 44; Møhl 1979, 58). A number of other sites also contain faunal assemblages that in addition to commonly encountered species are distinguished by one or very few species figuring more prominently than is usually the case. Thus, Ølby Lyng has high frequencies of harp seal and common porpoise, and at Hjerk Nor fur animals are abundant (Hatting et al 1973, 17; Møhl 1971, 46).

All sites mentioned above are seasonal, and they have been interpreted as specialised extraction camps, exploited by task-groups living permanently at large base camps elsewhere (Andersen 1990, 36; 1998d, 102; Madsen 1987, 231ff.; Rowley-Conwy 1983). However, the tool assemblages do not differ significantly from the composition at larger sites, either in terms of the types present or with respect to their relative frequencies (Andersen 1975a, 16; 1978, 42; Petersen 1971, 8ff.; Skousen 1998, 44). Roughly identical activities and activity areas are documented, and in spite of the variations in the faunal records, all sites testify to a broad-spectrum pattern of exploitation. Hence these settlements clearly represent the day-to-day living activities of a small group and not a specialised exploitation by task-groups. Emphasis was, however, placed on one or a few species abundant at the respective localities during the given season.

The small coastal sites are considered here not to be much different from larger coastal settlements. In fact, the only real difference may be that the resources on which the sites were based were not stable through time. Probably the small coastal sites did not gain the impressive size of the larger coastal settlements situated in areas with rich and stable resources, because the resource situation did not allow resettlement for centuries.

Bridging the gap between small and large coastal settlements are sites like Norsminde (Andersen 1991; 1994). Both in terms of composition and structure, Norsminde resembles the larger kitchenmiddens. Thus the site is an accumulated settlement with a chronological span in the EBK layers of approximately 700 ^{14}C-years (Andersen 1991, 29). It has gradually gained its present appearance by the heaping of small piles of debris around fireplaces horizontally fixed through time (Andersen 1991, 21). The modest size of the site, combined with its long life span, may indicate that it was not settled by larger groups of people, although considerable portions of the midden were deposited within 2-300 ^{14}C-years. The pattern of exploitation seemingly remained fairly constant throughout the whole period of settlement. Thus, gathering of shellfish and fishing for cod and flatfish during the summer must have been among the most important activities (Andersen 1991, 22; Enghoff 1991, 45).

To conclude the coastal settlement of the EBK, it can be stated that in recent years there has been a consensus on interpreting the patterns in topography, size and character of the sites as indicating sedentism. The big coastal settlements are perceived to be the result of large groups living in the same place throughout the whole year, whereas the smaller sites are viewed as seasonal extraction camps, exploited by task-groups radiating from a base camp (Andersen 1990, 36; 1998d, 102; Fischer 1997, 64ff.; Madsen 1987, 231ff.; Rowley-Conwy 1983, 118).

In having worked through the evidence, this model is considered here to be hard to defend. Small coastal sites are numerous, even though they have rarely been subject to study. When analysed, they seem to reflect the day-to-day living activities of a small group settled seasonally in order to exploit one or two resources, however still drawing heavily on the general catchment area. In itself, this indicates that people probably did not spend all year at one locality. One cannot neglect that large coastal sites, when considered single units, generally have faunal remains from several seasons. However, their chronological span renders it impossible to say that this factor implies actual sedentism. Thus, in terms of settlement size, it is tempting to see the differences as a continuous spectrum, expressing varying degrees of accumulation in the form numerous smaller seasonal occupations over shorter or longer periods of time. Instead of an apparent gap between small and large settlements, a range of variation is noted. It extends from small seasonal sites, occupied maybe only once by a small group (Vængesø), to moderately accumulated localities like Norsminde, to the large coastal settlements such as Bjørnsholm and Ertebølle, which often span a millennium. It is argued here that the basic unit in the settlement pattern of the EBK is the small group glimpsed at sites like Rønbjerg Strandvolde. It is also found that the larger settlements exist mainly as products of a stable pattern of rotation, adapted to a very reliable resource situation. Obviously people returned

to the same spot throughout centuries to perform a relatively fixed range of activities, specifically associated with the given locality.

As mentioned, there is a strong correlation between the location of the larger coastal sites and the best areas for stationary fishing (Johansson 1995, 92; 1999, 60). Excellent conditions for fish weirs must be the basis of why some sites were utilised through such immense periods of time, thereby gaining their impressive size (Andersen 1995, 52). However, fishing at these key localities may during certain parts of the year have been productive enough for the sites to host short time aggregations of the fjord's population. Perhaps this is the reason why rapid and relatively extensive episodes of accumulation are sometimes observed in the stratigraphy of the kitchenmiddens, and such settlements may therefore have been quite important socially. In the remainder of the year, though, it is argued that dispersed settlement of several smaller groups within a fjord, rotating between sites in a very fixed pattern, are the dynamic most likely to have generated the archaeological evidence presented so far. Judging by the topography of the sites, the movements were probably somewhat related to the variable productivity of the different fishing grounds, although other seasonal resource concentrations must have been crucial (Fischer 1993a, 21ff.). However, every excavation testifies to the fact that apart from these resources determining the location of the site, a broad range of background resources was always exploited.

The inland settlement

The sites of the interior are mainly found in relation to larger freshwater systems, often in the form of lakes connected by rivers that have their outlets in fjords. The absence of sites associated with smaller streams and pools, or settlements scattered in the forest, may partly be attributed to a lack of investigations. Nevertheless, the scarcity of food resources in such areas must be the primary cause of the lack of sites. In this respect, larger freshwater systems present more favourable living conditions. This ecotone is characterised by high productivity, high overall stability and a great diversity of plant and animal species. However, there are seasonal fluctuations in the food supply and the winter may have been a relatively meager period (Paludan-Müller 1978, 127ff.).

Work in the Åmose basin and on Funen suggests that the majority of inland EBK sites date to the later half of the period (Andersen 1977, 10ff.; Fischer 1993b, 59). Even though many localities are known, the settlement is clearly less pronounced than along the coast. The sites are generally smaller and there are fewer of them (Andersen 1995, 48; Fischer 1997, 64).

The Åmose investigations offer an opportunity to study the topography of sites associated with a larger lake, presumably on a fairly representative basis. Here the settlements cluster on headlands and islets that offer access to the stream channels of the lake. Many sites are found adjacent to narrow straits, especially at the river inlet in the eastern part of the basin. In terms of soil type, slightly less than half of the sites are situated on peat, whereas the remainder of the sites are found on sand (Andersen 1983, 178ff., Fig. 17, 20 & 22). Along the Gudenå, corresponding observations have been made. Here too, the sites are found on sandy terraces close to river inlets and outlets in lakes, on promontories and islets, and at river junctions (Mathiassen 1938, 36). This pattern seems to be generally applicable to the inland settlement of the EBK.

Dimensions of inland settlements have been published for 11 sites in the Åmose basin and 6 in the Ringkloster area (Andersen 1983, 175; Andersen 1998a, 21ff.). Although conclusions cannot be drawn from such a small sample, the majority of sites seem to have a length of 10-40 m and a width of 4-10 m. A few sites have lengths of up to 120 m, yet the width remains fairly unaltered. The bulk of the smaller settlements are situated on peat, whereas the larger sites are found primarily on the sandy moraine.

Among the smaller inland settlements of the EBK, very few have been published. General surveys are found in the literature, but only selected aspects of a number of the sites have been thoroughly presented (Andersen 1983; Enghoff 1994, 85ff.; Fischer 1985; 1993b; Mathiassen 1943; Noe-Nygaard 1983; 1995; Stafford 1999). However, the localities generally resemble each other in terms of topography, tool assemblages, faunal records, seasonality and size, and a compiled description based on single observations from several sites may be generated.

The smaller settlements are generally situated on peat and the faunal remains suggest one or a few occupational episodes in the warm season (Noe-Nygaard 1995, 266ff.; Enghoff 1994, 88). Evidently a small group of people, perhaps merely an extended family, lived there during this time (Fischer 1993b, 61). Food was brought to the settlements, prepared and consumed, and there is evidence of the production and use of many different tool types (Noe-Nygaard 1995, 268; Stafford 1999, 69ff.). Dwelling structures may have been recorded, and adjacent to some sites fish weirs have been discovered (Andersen 1983, 35; Enghoff 1994, 88). The bone materials testify to the exploitation of a wide range of resources in the catchment area. Thus, at Præstelyng, hunting of large game, birds and fur animals are well documented, as is the gathering of molluscs and hazelnuts (Noe-Nygaard 1995, 77, 145, 148). Fishing must have been among the primary activities at the settlements, since the culture layers often to a high degree consist

of scales and bones from species such as pike, cyprinids and perch (Enghoff 1994, 85ff.; Fischer 1993b, 60; Noe-Nygaard 1983; 1995, 169).

To characterise the larger inland settlements situated on the moraine is difficult because practically all such localities in the Åmose and along the Gudenå are mixed. Thus Ringkloster remains the only site of interest (Andersen 1975b; 1998a). Here the living floor covers approximately 3000 m^2, the staggering amount of flint forming numerous concentrations. Chronologically, the site encompasses the whole EBK sequence, but occupational episodes of EN date are also documented. Ringkloster gradually gained its size through more than a millennium of settlement, although the locality certainly was used most intensively during late EBK. Fireplaces, pits, ditches and postholes were found in abundance, perhaps indicating the presence of dwelling structures. Investigations of the faunal assemblage have narrowed the season of occupation to the period November-May, but the site seems also to have been used sporadically at other times of year. Wild boar, pine marten and red deer were the predominant preys (Rowley-Conwy 1998b, 89ff.). Fishing was probably less important, but the discovery of a fish weir is in accordance with the location of the site to the south of a narrowing between two lake basins (Enghoff 1998, 102ff.). The pattern of exploitation appears to have remained fairly constant throughout the duration of the site (Andersen 1998a, 51).

If the inland settlement is perceived as an isolated phenomenon, a settlement pattern of small units living dispersed along the freshwater systems during the summer can be envisioned. A wide range of resources was exploited, but as witnessed in the faunal records and the positioning of the sites on the very shores of the basins, fishing was probably the most important activity. During the winter, the rising water must have forced people up on the moraine, although they were still keeping close to the shore. Hunting was probably of greater significance now. Most summer settlements are small which likely reflects their position on the peat. This surface is flooded every winter and is constantly changing appearance in the course of the overgrowing of the basins. Such factors must have made it difficult for the small group to return to the same spot on a persistent basis. However, if at least some of the larger sites on the moraine are winter camps like Ringkloster, their size and longevity point to very stable patterns of settlement and exploitation. These large sites may be products of a small group returning to the same spot throughout long periods of time, a perspective which agrees with the more fixed and confined topographical features of such locations. Nevertheless, it cannot be ruled out completely that these settlements were aggregation camps.

The relation between inland and coast

Two fundamentally different relationships between inland and coast can be perceived: the existence of two separated populations functioning in a context of contact and exchange, or one single population with seasonal movements between coast and inland (Andersen 1998a, 54ff.).

^{13}C-measuments of human bones from inland and coastal settlements would bring some clarity, but human remains have yet to be discovered at inland sites. At coastal localities, ^{13}C-values indicate that marine resources constituted the far greater part of the diet, perhaps between 70 and 90 % (Meiklejohn et al 1998, 207ff.; Tauber 1981, 332). Hence, if coastal populations exploited inland sites, resources procured here must have been of only marginal importance to subsistence, especially if the terrestrial contribution of the coastal stretches is taken into consideration (Madsen 1987, 232).

In lieu of human remains, ^{13}C-values of dog bones have been included in the discussion. Presumably such figures indirectly reflect the dietary habits of humans, since domestic dogs feed on human 'left-overs', and tooth marks from dogs are frequently encountered in the bone inventories (Noe-Nygaard 1995, 187). On the coastal sites of Sølager and Maglemosegårds Vænge, measurements show a predominantly marine diet (-14.74 & -14,70 $^{o}/_{oo}$ respectively), whereas the specimen from the inland site of Præstelyng has a terrestrial value (-21.60 $^{o}/_{oo}$). However, the correlation is far from that simple. The dog from the coastal site of Ølby Lyng has a terrestrial rating (-23.52 $^{o}/_{oo}$). Further, one of the four dogs from Ringkloster shows a marine value (-11.8 $^{o}/_{oo}$) in contrast to the other three that have lived mainly on terrestrial resources (-18.8, -20.0 & -21.3 $^{o}/_{oo}$) (Andersen 1998a, 50ff.; Noe-Nygaard 1983, 137ff.; 1988, 88ff.).

Given the lack of a clear pattern, these data sets have been seen as being of little use in the debate on the inland-coast relation (Rowley-Conwy 1998b, 92ff.). However, the fact that the results are polarised probably suggests the existence of two separated populations, where the 'overlapping finds' may be understood in the light of exchange (Noe-Nygaard 1988, 91). Caution must be taken, though, when dealing with such indirect evidence, since multiple intervening factors may be at work. For instance, the terrestrial values may be ascribed to the hunting/trapping of feral dogs for fur.

Ringkloster is of great significance in the discussion of the inland-coast relation because marine indicators have been found at this settlement: 3 bones of dolphins, 13 oyster shells, (2 amber beads) and 24 bones of marine fish species (Andersen 1998a, 46ff.; Enghoff 1998, 102ff.; Rowley-Conwy 1998b, 89). Similar observations have been made at other inland localities, but coastal indicators at such sites are very rare (Andersen

1997, 52; Petersen 1973, 87ff.).

There are several other interesting aspects of Ringkloster. The bone element representations of wild boar, red deer and aurochs clearly indicate that portions of meat were removed from the site. Likewise, the large number of pine marten bones is remarkable. Along with the juvenile roe deer and red deer, they may indicate specialised hunting for furs and skins (Rowley-Conwy 1998b, 94ff.). The relative frequency of tool types also differs significantly from that of coastal sites. There are many scrapers, angle burins, denticulate pieces and arrowheads, and only few borers, truncated pieces and flint axes. Antler axes are numerous, and there are many indications of antler working. On the other hand, there are only few bone tools, excluding the extraordinary number of shoulder blades from which bone rings have been cut. The amount of pottery is unusually large, and the material includes ornamented sherds resembling finds only from Norsminde Fjord and Brabrand Fjord (Andersen 1998a, 31ff.).

On the basis of these characteristics, Ringkloster has convincingly been interpreted as a specialised hunting/trapping camp, visited seasonally for shorter periods of time by hunting parties from one or several coastal areas (Andersen 1998a, 55; Rowley-Conwy 1998b, 96). However, roughly the same patterns may be generated as a result of intensive exchange (Madsen 1987, 233; Andersen 1998a, 55). In this respect, it is worth noticing that Ringkloster is among the EBK settlements in Denmark having the largest number of features on the living floor. Perhaps this indicates the presence of dwelling structures (Andersen 1998a, 26). The anthropogenic changes of the forest and the remains of a fish weir also point to more long-lived activities (Andersen 1998a, 52; Rasmussen 1998, 82). There are clear indications of tool production and use, and in spite of the export of meat, game certainly was consumed on site (Rowley-Conwy 1998b, 95). The tool inventory differs from that of coastal settlements - apparently an indication of a diverging range of activities. Nevertheless, this does not in itself imply that Ringkloster is specialised, some features of the flint assemblage being typical coast-inland differences (Stafford 1999, 121). The range and relative proportion of animal species may also agree well with the game actually available in the Ringkloster area during the cold season.

If such observations are taken into consideration, it seems obvious that Ringkloster is not just a locality visited by a hunting party for a few days every year, as has been suggested by Rowley-Conwy (1998b, 96). Given the impact on the area, people must have lived on the site for quite some time during each visit. However, whether Ringkloster is part of an inland settlement system or a site resulting from transhumance in the coast-inland trajectory during the winter remains inconclusive. If the first model is applied, the export of meat, furs, skins, bone rings and perhaps antler may be seen as an expression of exchange relations with coastal groups, through which fish, sea mammals, oysters, (amber) and perhaps ceramics were acquired. The ^{13}C-values of the dog bones agree with this model, and the site may be seen both as a settlement of an inland population and the locus of intensive contact and exchange.

The nature of the relation between inland and coast at Ringkloster cannot immediately be resolved, as is the case with the question of inland and coastal populations in general. It is evident that small groups were living along the freshwater systems during the whole summer, but elucidating what happens in the winter seems impossible. If at least some of the larger sites on the moraine are winter camps like Ringkloster, they are numerous enough for one to argue for a solitary inland population. However, even if these are winter settlements, they may still be part of a pattern of seasonal movements between coast and inland at work throughout the year.

In terms of the food supply, it may be expected that at least parts of the population living inland during the summer would leave for the coast in the cold season. On the other hand, the large stocks of wild boar and the excellent conditions for fur hunting may periodically have pulled people in the opposite direction, since most coastal fish seek deeper water in the winter. The resource asymmetry may also have constituted the foundation of exchange networks. In this case, a far more fluid relation, with diffusion of both population groups and goods between coast and inland may have existed if such movements were not conflicting territorial behaviour.

However, the discussion of inland and coastal populations may altogether be misleading. The settlement patterns have without a doubt varied regionally, being adapted specifically to the unique topography of the given area. In some regions like Northern Jutland, the late Atlantic landscape offered practically no geographic 'depth', and for that reason the sporadic evidence of hinterland exploitation may well have to be seen in relation to the pronounced coastal settlement (S. H. Andersen 1992, 71). On the other hand, in the Åmose system and along the Gudenå one can easily picture a regular inland population.

Territorial behaviour

The view presented so far on the settlement system of the EBK diverges from actual sedentism, as conceived in the model of complex hunters. However, the settlement pattern has been treated as if it operated in relative isolation within fairly limited space, a scenario strongly suggested by stylistic studies.

In terms of regional variation in material culture, there are obvious differences between Eastern and Western Denmark. West of the Great Belt, T-shaped antler axes, bone rings, bone combs, bird points, straight harpoons, heart-shaped paddles, sheaf ornamented organic implements and denticulate pieces are found. On Zealand and in Scania, Limhamn axes, curved harpoons and elliptical paddles were in use (Andersen 1981, Fig. 8; 1987, 104ff.; 1997, Fig. 23; 1998b, 19; Jensen 1994, 53ff.; Petersen 1984, 13ff.). However, taking a closer look at Scania and Zealand, there are dissimilarities in the early EBK burial custom, both in terms of the position of the body, the character of the grave goods and the treatment of the dead (Larsson 1989, 213). Likewise, the Scanian harpoons are distinguished by having ornamented barbs, and there are some differences in the ceramics from the two areas (Andersen 1997, 60; Jennbert 1984, 138). All this may imply that the greater stretches of water functioned as cultural barriers which were only occasionally crossed, or perhaps that not all influences were welcomed and incorporated in the local tradition.

Within these larger areas, stylistic variation has also been observed. Along the eastern coast of Zealand, at least three different regional groups can be discerned on the basis of flake axe morphology and technology (Petersen 1984, 16). Recently, this study has been complemented and it may now be possible through examining stone tool assemblages to distinguish no less than five regional groups on Zealand within the late EBK (Johansson 1999, 49ff.). Eastern Jutland is characterised by an abundance of ornamented organic tools from early EBK, and the Limfjord area is among other things distinguished by a diverging flint technology (S. H. Andersen 1993, 81; 1998b, 19ff.; 1998d, 104). The ornamented pottery from Ringkloster, Brabrand Fjord and Norsminde Fjord may also constitute a solitary regional group (Andersen 1998a, Fig. 39). Even local styles can be differentiated. Hence, the technological traditions at Ertebølle and Bjørnsholm clearly differ even though the sites are contemporaneous, show a similar range of activities, have roughly the same raw material supply and are located only some 8 km from each other (S. H. Andersen 1993, 80ff.; Andersen & Johansen 1987, 52).

This evidence does not in itself denote actual sedentism, but it certainly indicates that movement was confined to very small territories. The regional differences in material culture may point to limited measures of communication across territorial boundaries, or perhaps to a strong group awareness expressed in an active use of material culture for signifying identity. This perception of settlement systems operating permanently within small areas conforms to the stable patterns of exploitation at individual sites. Likewise, the incidents of violence in the anthropological material must be understood within this territorial frame of reference (Bennike 1985, 98; Persson & Persson 1984, 48).

It may be possible to consider the flake axe groups of Zealand and the ceramic group of Eastern Jutland as areas in which marital exchanges took place (Rowley-Conwy 1998a, 200ff.). It may primarily be within such isolated populations that a certain style can be maintained, although it is acknowledged here that the correlation of style and ethnicity is usually far from that simple (Hodder 1982, 187ff.). It is interesting, though, that roughly corresponding to the flake axe groups, differences in cranial metrics have been reported (Meiklejohn et al 1998, 209). This may support the idea of marital networks being expressed by stylistic differences in material culture. Ethnographic studies indicate that groups require between 500 and 1000 people to maintain themselves as biological and functional isolates, figures that may approximate the minimum number of inhabitants in such areas (Meiklejohn et al 1998, 208; Rowley-Conwy 1983, 116; 1998a, 200). However, in the case of high Atlantic Southern Scandinavia, characterised by very productive and stable resources, several smaller groups, each holding their territory, can be expected to have existed within these networks (Rowley-Conwy 1998a, 200). Perhaps this is how the stylistic differences between Ertebølle and Bjørnsholm should to be considered. It may then be reasonable to suggest that the settlement systems of the EBK unfolded primarily within individual fjords, perhaps at the size of Bjørnsholm, Norsminde and Vedbæk, where population figures of 60-80 individuals have been proposed (Petersen 1984, 16; Rowley-Conwy 1983, 116). Interaction must primarily have taken place within such areas or within the marital networks. However, the largely unified image of the EBK and the evidence of long distance trade do imply that the individual groups were far from isolated (Fischer 1983; Klassen 1999).

The settlement of EN I

The overall land use in EN I can be investigated through an examination of distribution maps of artefacts, settlements and burial structures, characteristic of the regional groups Oxie, Svenstorp, Svaleklint, Stengade II/Siggeneben Süd and Volling (M. Larsson 1984; Madsen 1994; Madsen & Petersen 1984; Nielsen 1985).

In terms of flint axes, pointed-butted axes of type I-III and thin butted axes of type I-IIIa are chronological markers of EN I, whereas the thin butted axe of type IV seemingly encompasses the whole early Neolithic period (Hernek 1988; Midgley 1992, 269; Nielsen 1977). Each regional group is characterised by a ceramic inventory. The Volling group is problematic in this respect because it clearly extends into EN

II in Northern Jutland (Madsen & Petersen 1984, 99). Further, it is troublesome that the ceramics of EN I in parts of Southwestern Denmark are relatively unknown. The Satrup group of Northern Germany may be relevant to this issue, the finds being incorrectly placed in EN II due to the vertical stripes on the belly (Kristensen 1988, 32ff.).

Burials from EN I are known in the form of non-megalithic earthen long barrows and simple inhumation graves (Ebbesen 1994; Madsen 1979; 1993). In Eastern Denmark, the non-megalithic earthen long barrows are mostly dated to EN I, whereas in Jutland they were clearly constructed through the whole EN (Kristensen 1988, 37). However, when investigating land use in EN I, it is of great help that the barrows associated with early Volling ceramics have been isolated (Kristensen 1988, map 2).

Distribution maps of these find categories are found in various publications (Brøndsted 1938, 131; Hernek 1988, figs. 4-7; Kristensen 1988, map 2; 1991, Fig. 1; Midgley 1992, Fig. 32; Nielsen 1977, figs. 7-8, 12, 16a-b; 1994, figs. 3, 6). Clearly a compilation of these maps forms a mixture of hoards, votive depositions, settlements, graves and single finds. However, the earthen long barrows in particular may be excellent indicators of settlement if they, like megalithic graves, functioned as territorial markers (Chapman 1981, 71ff.; Renfrew 1976, 198ff.). This is underlined by the fact that culture layers are regularly found during the process of excavating such structures, just as pollen analysis of the sealed soil surfaces often indicate fields and pastures (S. Th. Andersen 1993; Madsen 1979, 317). Likewise, votive depositions and hoards have been shown to occur relatively close to settlement areas (Ebbesen 1982, 60ff.; Koch 1998, 139ff.). The value of single finds can be questioned, but they nevertheless indicate human activity in the area.

Studying these distribution maps without taking notice of the geographic allocation of the different regional groups it is apparent that nearly every part of the landscape was in use. Thus on Zealand and in Scania, the coastal zone was exploited, but judging by the finds of ceramics and flint axes, the main focus was on inland areas. In Scania it is remarkable how few of the supposedly earliest pointed-butted axes (type I) that are related to the coast. Pointed-butted axes are primarily found along the freshwater systems of the interior (Hernek 1988, 219; Jennbert 1984, 111).

Jutland is much harder to evaluate. Artefacts and structures associated with the prevailing Volling tradition can for the most part only be assigned to the EN in general, and large parts of Southern Jutland are terra incognita in EN I. Mid-Jutland is probably somewhat comparable to Zealand and Scania. However, taking the location of the early Subboreal coastline into consideration, there may be a tendency towards a more coastal orientation in Northern Jutland. The pattern seems real, but it may have its genesis in an uneven research focus.

The residential sites

Skaarup's division of EN I settlements into residential sites and catching sites is considered here largely to be valid (Madsen 1982, 201ff.; Madsen & Jensen 1982, 81ff.; Nielsen 1993, 92ff.; Skaarup 1973, 11ff.). The topography of residential sites has been examined through a number of regional surveys. In Eastern Jutland, it has been demonstrated that the sites have following characteristics: they are primarily placed on sandy soil but within areas displaying a great diversity of soil types, they are situated in low lying areas relatively close to wetlands or streams, and the majority of sites are found less than 3 km from the coast (Madsen 1982, 226; Madsen & Jensen 1982, 76ff.). On Bornholm, where 65 localities are known from EN I, comparable observations have been made. Here the sites are also found on sandy soil, often focused on small hills, close to fresh water, and with a wide range of other soil types in the catchment area. The settlement concentrates around 5 km inland (Nielsen 1997, 119ff.).

In terms of topography, the Scanian sites agree completely with the Danish material (M. Larsson 1984, 194ff.; 1985, 62ff.; 1992). However, in the Southwest Scanian investigation area, the bulk of residential sites are found in the hilly landscape more than 10 km inland, a fact that may be explained by a coastal plain consisting exclusively of heavy clay. Perhaps this indicates that light soils and wetlands were parameters of greater importance than the proximity to a coastline (M. Larsson 1984, Fig. 1, 194ff.; 1985, 62ff.). In the Ystad area, some of the EN I sites are associated with a lagoon, but here the soil is sandy, permitting settlement close to the coast (Larsson 1992, 78ff.). Altogether, this corresponds to the distribution maps of artefacts and structures datable to EN I, indicating that both coastal and inland areas were settled. The close proximity of the East Jutland sites to the coast may be seen as a regional difference, but the small sample size and the uneven research focus are clearly decisive factors (Torsten Madsen, personal communication).

The average size of residential sites is difficult to determine because only few localities have been excavated in total. Generally, EN I sites are recognised as conglomerations of a few pits, postholes and fireplaces in addition to smaller areas with culture layers (Larsson 1985, 13). Mosegården is among the settlements that can be considered relatively intact. At this site the scatter of flint and ceramics covers only 5-600 m^2 (Madsen

& Petersen 1984, 71). Comparable sizes have been recorded for the other EN I sites in Eastern Jutland, and they correspond to the extent of the early Volling settlement behind the Bjørnsholm midden (S. H. Andersen 1993, 65; 1994, 17; Madsen 1982, 205; Madsen & Jensen 1982, 68). Settlement sizes have not been published for the localities on Bornholm, but here the bulk of EN I sites are referred to as 'small' (Nielsen 1997, 119). In the Ystad area, the two settlements at Mossby have an extent of 450 m^2 and 300 m^2 respectively. Kalshem has been estimated to be somewhere around 2-300 m^2, whereas Kabusa IVb covers 600 m^2 (Larsson 1992, 80ff.). In Danish material the three settlements at Skræppekærgård, each encompassing 400 m^2, and the site of Topperøgel, amounting to 600 m^2, represent localities of similar size (Hansen & Hansen 1988, 97; Kaul 1988, 105ff.).

On the basis of this group of unmixed settlements, 500 m^2 is considered here to be the average size of residential sites in EN I. However, there are several larger settlements and some scholars imply two categories of residential sites (Skaarup 1982, 42). Havnelev covers 20.000 m^2, Stengade II 1.300 m^2, 'Stengade vest' 5.500 m^2, Oxie maybe 10.000 m^2 and Svenstorp more than 1.600 m^2 (Nielsen 1994, 297; Skaarup 1985, 348; Larsson 1985, 88). Likewise Lindebjerg, Värby, Hyby and Barkær are fairly large settlements (Liversage 1981, 145; 1992, 29ff.; Larsson 1985, 88). The implications of such sites are almost impossible to evaluate. Do they represent an accumulation of smaller occupations over many years? Are we monitoring a long-lived permanent settlement of a small group? Or do the sites indicate a short-term settlement of a large group? Certainly some of the sites are mixed, but generally the bulk of material dates to EN I. On the other hand, EN I encompasses more than half a millennium, so the chronological resolution is clearly insufficient. However, given the existence of a relatively homogeneous group of unmixed settlements measuring 500 m^2, the far more heterogeneous large settlements are considered here to be accumulations of smaller sites. Perhaps Lindebjerg exemplifies this, since stylistic differences in the ceramics have been observed between different areas of the site (Liversage 1981, 130). This may be perceived as being of chronological significance, thus pointing to several episodes of occupation.

Based on Barkær (and Stengade II), the residential sites of EN I have been viewed as villages with around fifty families living collectively in two long houses (Glob 1949, 11; 1976, 19; Skaarup 1975). Later these structures have convincingly been reinterpreted as long barrows, leaving open the question of houses in the early Neolithic (Madsen 1979, 306ff.; Liversage 1992, 17ff.). Only recently, a regular house type from this period has been discovered. It is recognised as a 10-18 m long, 4-6 m wide, oval/rectangular structure with a single row of 3-8 roof supporting posts, and a wall construction of wattle-and-daub (Eriksen 1993, 11ff.; Kaul 1988, 105; Larsson 1992, 67). The number of inhabitants in such houses, covering on average around 70 m^2, can be estimated to be somewhere between 7 and 12 on the basis of Naroll's, Casselbury's and Cook & Heizers' formulas (Casselbury 1974; Cook & Heizer 1968; Naroll 1962). These figures are clearly of a theoretical nature, however they do indicate that one should probably consider an extended family as the realistic social unit. Further, Mossby, Karlshem, Skræppekærgård and Topperøgel suggest that only one, or perhaps two, such houses are to be expected at settlements in the order of 500 m^2 (Hansen & Hansen 1988, 97; Kaul 1988, 105ff.; Larsson 1992, 60ff., 66ff.).

The duration of occupation presents another problem. Based on the quantity of ceramics and an estimated group size of 15 individuals, a range of 3-10 years has been suggested for Mosegården (Madsen & Jensen 1982, 69). Again these calculations are speculative, and multiple intervening factors may be at work. However, they do imply that the individual occupations generally only lasted a few years.

The topography of the residential sites is difficult to grasp if hunting, gathering and fishing were the primary activities. On the contrary, the sandy soil must have offered dry conditions for settlement and a surface easily worked for agricultural purposes. Likewise the forest may have been more open than on heavier soils, making clearance a manageable task (Larsson 1985, 62ff.). The agricultural activities at the residential sites are illustrated through the presence of charred grain, grain impressions in ceramics, grinding stones and sickles (Nielsen 1985, 110; Hjelmqvist 1975, 211ff.; Larsson 1985, 90; Skaarup 1975, 140). The crops seem primarily to have been naked barley and emmer, but einkorn, chaff barley, club wheat and bread wheat were also grown (Robinson 1994, 22ff.). Ard marks beneath burial mounds have thus far only been documented from EN II and onwards (Thrane 1991, 118).

As for the scope of agriculture, it presumably was not large at this early stage. The finds of sickles are few, and their use wear is light compared to later periods of the TRB (Jensen 1994, 149ff.). Pollen analysis also points in this direction. From the ^{14}C-dated sequences, it is evident that Iversen's Landnam roughly coincides with the beginning of EN II, leaving, besides the elm decline, next to no indication of agricultural activities in the regional diagrams of EN I (Göransson 1994, 174; Madsen 1990, 29ff.). The elm decline is considered here to be a primary consequence of elm disease, although human influences may have had a triggering effect, at least in some areas (Göransson 1994, 172; Madsen 1990, 28; Rasmussen 1998, 80).

Clearances in EN I have been indicated via in-situ pollen diagrams of fossil soil surfaces sealed beneath the earthen

long-barrows of Bjørnsholm, Rude and Bygholm Nørremark (S. Th. Andersen 1992; 1993, 161ff.). They testify to an opening of the primeval forest, with or without the use of fire, followed by an interval of intensive grazing. Likewise burning of secondary birch forest with the aim of growing cereals has been documented. These two strategies probably formed the elements in an integrated system of land use, combining grazing/browsing and swidden agriculture in a cycle running over a number years (Jensen 1994, 95). However, since this pattern of exploitation had hardly any impact on the general composition of the forest, the clearances must have been local and of small scale (S. Th. Andersen 1993, 171).

Herding of domesticated animals at residential sites is documented in faunal remains preserved at a few localities (Møhl 1975, 207ff.; Nielsen 1997b, 237; Nielsen 1985, 110; 1994, 297ff.). Cattle, pig and sheep/goat are present, but the small samples lend no indication as to their relative importance. Hardly any wild animals are found in the assemblages, emphasising that husbandry and agriculture were the primary activities at the residential sites. Husbandry is generally held to have been of greater importance than agriculture – a plausible statement given the few indications of cereal growing (Madsen & Jensen 1982, 82).

As for the topography of the residential sites, the more open vegetation on the sandy soil may have benefited the grazing of cattle and sheep/goat. Likewise the extensive areas of wetland must have met the significant demand of drinking water associated with husbandry (Skaarup 1985, 349). From an ecological point of view, pigs may be expected to have been of greatest importance among the domesticated animals, because this species is naturally adapted to a forest environment. Thus in the low-lying areas dominated by oak, pigs probably could have been raised with minimal effort (Madsen 1982, 222ff.). However, the location of residential sites at junctions of a wide range of soil types must also have presented excellent opportunities for drawing on natural resources. At the juncture of such different ecosystems, the diversity and density of wild plants and animals may have been quite high (Larsson 1985, 68).

The catching sites

Although possibilities of hunting, gathering and in some cases maybe even fishing were present in the general vicinity of many residential sites, catching sites clearly figure as an integrated part of the settlement system in EN I. These sites are situated on the beaches along the coast and on the banks of the inland freshwater systems (Madsen 1982, 203). The faunal assemblages are completely dominated by wild animals, and shellfish seem to have been important in some areas (Skaarup 1973, 118).

In Eastern Jutland it has been shown that the coastal catching sites are found mainly at narrow straits or close to the stream channels of the fjords (Madsen 1982, 203ff.; Madsen & Jensen 1982, 81ff.). In Norsminde Fjord, the EN I catching localities are all situated along the deepest channel, either on sandy headlands jutting out from the northern shore, or on Kalvø bordering up to the stream channel from the south (Andersen 1976, 42). The catching sites in Bjørnsholm Fjord are found close to the mouth of the fjord where the water is more nutrient (S. H. Andersen 1993, 61). Altogether, this indicates that the topography of the EN I coastal catching sites corresponds closely to the pattern of EBK coastal settlement. Most EN I coastal catching localities are in fact stratified sites with lower EBK layers capped by sequences of Neolithic occupations. The EBK sites probably were formed as a result of people settling in areas having excellent opportunities for fish weirs and the exploitation of other marine resources. Clearly the same applies to the EN I coastal catching sites.

The average size of the sites is almost impossible to determine. The impression is that most EN I coastal catching localities are small, and the layers are noticeable thinner than the corresponding EBK horizons (S. H. Andersen 1991, 15; 1992, 73; Madsen 1982, 204; Madsen et al 1900, 176). However, sites like Bjørnsholm and Visborg have EN I layers stretching over more than a hundred or several hundred meters respectively, reflecting a high degree of variability (S. H. Andersen 1993, 69; 1998c, 12).

Among the coastal catching sites, only kitchenmiddens have been thoroughly investigated. Generally, the layers have a composition markedly different from EBK middens. There are fewer shellfish, and the dominating species are cardium and common mussel. The amount of oysters has in most areas decreased substantially by EN I compared to the EBK layers (S. H. Andersen 1992, 75). Instead, the Neolithic horizons are made up of large amounts of fire cracked stones, ashes, charcoal, dark sand, burnt flint and a burnt as well as crushed shell matrix (S. H. Andersen 1991, 23; Madsen et al 1900, 137, 176). These are the components of numerous inter-stratified thin, yet relatively extensive layers. Features and structural remains are few, and even the fireplaces are rather diffuse. Thus only rarely have the activities been organised around fireplaces fixed in space through time. Micro-debitage indicating in-situ flintknapping is seldomly encountered, and the density of flint is generally very low. Instead, a large amount of pottery is a characteristic feature of EN I kitchenmiddens (S. H. Andersen 1991, 23; 1993, 73).

These observations emphasise that the kitchenmiddens

are probably no longer settlements in the actual sense of the word. What we see may only to a small degree be day-to-day living activities. Rather, the bulk of evidence points towards an extraction strategy based on batch exploitation of resources available in the vicinity of the site during the given season. Thus, the omni-presence of fire and the many potsherds may be perceived as evidence of conserving fish, shellfish and perhaps other resources (Madsen 1987, 235; 1991, 491).

When the faunal remains from stratified coastal sites are examined, it is evident that roughly the same composition of species is found in the Mesolithic and the Neolithic horizons. In the EN I layer at Sølager, swans and different species of ducks dominate, whereas roe deer, red deer and wild boar respectively are the most common terrestrial mammals. Among the few fish bones, flatfish and cod are represented. This corresponds closely to the range and relative frequency of species in the EBK layer (Skaarup 1973, 77). In the small sample from the EN I horizon at Bjørnsholm, roe deer, red deer and wild boar are dominant, just as swans and fur animals are documented (Bratlund 1993, 103). In terms of fish species, eel prevails and altogether this agrees well with the faunal assemblage from the EBK strata (Enghoff 1993, 107).

There are two important differences, though. First of all, domesticated animals are present at the EN I catching sites. However, at no locality do they constitute more than merely a fraction of the total number of identified fragments, and they may be interpreted as provisions brought to the sites from elsewhere (Koch 1998, 152; Skaarup 1973, 117). A more interesting observation is the general lack of fish bones at Neolithic coastal catching sites (S. H. Andersen 1992, 77; Madsen et al 1900, 147). Whereas the composition of species at such localities may give the impression of a general broad-spectrum pattern of exploitation, some activities were clearly more essential than others. Judging by the topography of the sites, stationary fishing may be expected to have been far more important than the hunting of terrestrial mammals. This agrees with the significant number of Neolithic fish weirs that have been discovered in recent years (Pedersen 1997, 142). In the EBK horizons at Bjørnsholm, Ertebølle and Norsminde, the amounts of fish bones are staggering. However, in the Neolithic shell-layer at Bjørnsholm, fish bones are relatively rare, and at Norsminde only a single specimen has been documented (Enghoff 1991, 45; 1993, 117). In the Mesolithic strata at Bjørnsholm, Norsminde and Ertebølle, fish bones are usually found in patches around fireplaces, a phenomenon probably related to episodes of cooking. This has yet to be observed in Neolithic layers (Andersen 1991, 23; Andersen & Johansen 1987, 47). Since the Neolithic shell-layers are found closer to the surface, the scarcity of fish bones may be attributed to a higher degree of taphonomic loss. However, the significance of differences in preservation between the EBK layers and the EN I layers has been questioned with respect to the fish bone assemblages (Enghoff 1991, 48; 1993, 117). A general decline in fishing at the Neolithic coastal catching sites has therefore been anticipated (S. H. Andersen 1992, 77; 1995, 52). However, this makes the topography of such localities hard to grasp. There seems to be no logical reason to move to these sites in order to hunt terrestrial game. In terms of the catchment area, the hunting of land mammals would seem to be a background activity compared to the exploitation of marine resources, fish in particular. Thus, the lack of fish bones may with caution be seen in relation to the extraction attributes of the coastal catching sites in general, the fish being caught, conserved and brought somewhere else for consumption.

The EN I catching sites of the inland freshwater systems have often been documented in the form of Neolithic elements at EBK localities (Andersen 1983, 133ff.). Therefore the topography of the settlements resembles that of inland EBK sites. People settled on headlands and islets close to narrow straits and stream channels. Settlements were situated on peat and sandy moraine areas, the peat localities perhaps being dominant due to the closing up of the basins (Andersen 1983, 182).

In terms of settlement size, sites situated on peat generally seem to be small, rarely covering more than 100-200 m^2 (Fisher 1985, 173ff.; 1993b, 62ff.; Skaarup 1973, 118ff.). The EN I components at the larger mixed sites on the moraine are more difficult to evaluate. However, Neolithic elements at such settlements generally seem to be few and scattered (Andersen 1998a, 48; Mathiassen 1943, 35ff.).

Muldbjerg I is practically the only published inland catching site from EN I, and it may be considered a representative example only with a great deal of caution. It was situated on a peat islet, and the size and character of the assemblage suggest one or a few episodes of occupation (Troels-Smith 1954, 27). The faunal remains indicate that the locality was used in the months between April and September (Noe-Nygaard 1995, 264ff.). Roe deer and red deer prevail among the terrestrial game, whereas only few bones of wild boar were found. Beaver, otter and water vole are well represented, and ducks, swans, coots and storks were commonly hunted. In the large fish bone sample, pike dominates, and shellfish, berries and nuts were gathered in the vicinity of the site. Domesticated animals comprise only 2 % of the faunal assemblage and such remains may be viewed as provisions brought to the site from elsewhere (Noe-Nygaard 1995, 76, 145ff., 168).

The composition of species at Muldbjerg I closely resembles that of Præstelyng (EBK) and a host of other similar localities in the area (Enghoff 1994, 86). Further, the pattern of marrow fracturing is roughly identical at the two settlements, and the

flint tool assemblage at Muldbjerg I hardly deviates from that of other transition-aged sites in the Åmose basin (Noe-Nygaard 1995, 282; Stafford 1999, 111). A fish weir and a dwelling structure were discovered (Troels-Smith 1957, 25ff.). Combined with the evidence of tool production and food consumption, this may simply reflect day-to-day living activities at Muldbjerg I (Noe-Nygaard 1995, 268). Thus, Noe-Nygaard makes no mention of resources being procured, processed and brought away from the locality.

As to the seasonality of EN I catching sites, Skaarup considered the coastal localities mainly to be winter camps, whereas the inland sites were perceived as having been visited only during the summer (Skaarup 1973, 133ff.). Combining the evidence from Bjørnsholm, Norsminde and Sølager, though, it is clear that coastal sites were in use throughout the year (Andersen 1991, 37; Bratlund 1993, 103; Skaarup 1973, 117). The peat localities, found in relation to the freshwater basins, were obviously only visited during the summer. Nevertheless, if the EN I horizon at Ringkloster is to be comprehended as a continuation of the EBK pattern of exploitation, this site may have been used primarily during the cold season. The same goes for other inland settlements situated on the moraine, and therefore the catching sites of EN I were probably exploited occasionally throughout the year.

Towards a settlement pattern in EN I

The exact nature of the relation between catching sites and residential sites is difficult to determine. However, the few domesticated animals at catching localities and the discovery of seal bones at Havnelev clearly indicate that the two categories of sites functioned within the same overall system (Nielsen 1994, 301).

As argued above, the coastal catching sites may be perceived mainly as extraction camps where resources were procured, conserved and brought to the residential sites (Madsen 1991, 491). Thus, at the residential sites one could expect to find a mixed faunal assemblage, consisting of both domesticated and wild species. This does not seem to be the case, though. Here the lack of wild animals is striking enough for Koch to imagine an ideological boundary between the wild and the domesticated (Koch 1998, 153). Such symbolism may have led to the disposal of wild animal remains at places other than the residential site. However, the lack of wild animals may also be attributed to the insignificant amount of faunal remains that have so far been recovered from these settlements. Likewise, one has to consider which products could have been transferred from the coastal catching sites to the residential sites. It has been argued that there is no logic in moving to the coast in order to hunt terrestrial game given that the populations were not depleted in the vicinity of the residential sites due to over-exploitation. The clearances around the residential sites may in fact have benefited the two deer species, and wild boars must have roamed the low grounds close to the settlements. The terrestrial mammals at the coastal catching sites may thus be seen only as a bonus, at least partly consumed on the spot, whereas the extraction strategies seem to have targeted fish, sea mammals, birds and shellfish. However, if conserved fish was the main resource brought back from the coastal catching sites, it is quite evident why catching activities are typically not found at the residential sites. Fish bones at this type of site stand absolutely no chance of preservation (Pedersen 1997, 141).

Because the faunal remains, due to uneven chances of preservation, provide little insight into the relative importance of the two categories of sites, ^{13}C-measurements have to be relied upon. In this respect, it is remarkable how terrestrial the EN I readings are, even though relatively few results are available from the centuries around the transition (Tauber 1981, 332ff.; 1993, 41). If these values do in fact reflect reality, the contribution from the coastal catching sites must have been fairly limited. Thus, the coastal catching sites may be seen primarily as a result of episodic exploitations of predictable seasonal resource concentrations. This agrees well with the general character of the EN I coastal catching sites. Most of them are small and have thin culture layers, and the larger sites may be regarded as accumulations of smaller occupations.

The contribution of husbandry and agriculture versus terrestrial game, freshwater fish and wild plants is impossible to evaluate. One could imagine that hunting, trapping and freshwater fishing would have gained greater importance as a consequence of the settlement spreading over the interior parts of the landscape. In this respect, however, it is remarkable how few wild animals have been found at the residential sites, if the faunal assemblages from these locales can at all be considered significant. However, it is not unthinkable that a few wild boars are concealed among the bones of domesticated pigs, given the difficulties of differentiating between the two species. Expectations of finding domesticated pigs at localities having topographical parameters of residential sites may to some degree have biased the results. The same applies to the relationship between aurochs and domesticated ox in areas where the former is still present during early Sub-boreal time (Rowley-Conwy 1985a, 77).

Nevertheless, Muldbjerg I clearly indicates that terrestrial game and freshwater fish were exploited. However, it apparently also shows that large portions of these resources were consumed at the catching locality. It may be that life in this case

consisted of a more continuous fluctuation between catching locality and residential site, both places pointing to day-to-day living activities (Noe-Nygaard 1995, 268). This pattern diverges from the relationship thought to have existed between coastal catching sites and residential sites.

In spite of these peculiarities, however, there can be little doubt that the residential sites were the actual living areas during EN I, whereas the catching localities generally have the characteristics of satellites. Husbandry and agriculture probably did not permit the abandonment of the residential sites for long, and perhaps only fractions of the population went to the catching localities (Madsen & Jensen 1982, 84).

Another aspect of this discussion is the geographic relation between the two categories of sites. In the course of excavating areas behind the kitchenmiddens of Bjørnsholm and Norsminde, small EN I culture layers were discovered (S. H. Andersen 1991, 17ff.; 1993, 65ff.). Based on these observations, one locality consisting of a coastal midden/activity area (a coastal catching site) and an upper residential area (a small residential site) has been perceived as the rule of settlement in the earliest Neolithic (Andersen 1994, 34ff.; Andersen & Johansen 1992, 54). However here, a few years have been considered to be the realistic lifespan of small EN I residential sites, and this does not correspond to the several hundred years of exploitation reflected in the Neolithic shell layers (S. H. Andersen 1991, 29; 1993, 75). Certainly a residential site and a coastal catching site sometimes merged into one locality when the characteristics of landscape allowed the existence of the two sites in the immediate proximity to each other. However, given the mobility of EN I residential sites and the fact that most residential sites and burial mounds are found further inland (Madsen 1987, 234), it may have been the exception rather than the rule.

In general, the catching sites may be regarded as fixed in space, their location being determined by an optimal resource supply (Madsen 1991, 492). On the other hand, the residential sites have a more mobile character, the settlement frequently being relocated over shorter or longer distances. Clarifying whether such movements were made on a linear basis or if the individual sites rotated within a given territory is almost impossible. However, it may be of importance that settlement debris and pollen-indications of fields and pastures are common findings when EN I burial mounds are excavated (S. Th. Andersen 1993, 161ff.; Madsen 1979, 317). If the earthen long barrows, like megalithic graves, functioned as territorial markers, they may indicate that the residential sites rotated within a marked out territory the rights to which were exclusively in the hands of the local group(s) (Chapman 1981, 71ff.; Renfrew 1976, 198ff.). In a 0.6 km^2 area by Sturup in South-western Scania, 7 Oxie residential sites have been discovered (Larsson 1985, 99). One settlements moving around within a confined territory may have generated this pattern. In the Ystad area, the two EN I sites at Mossby were found within 50 m, and the two residential sites at Kabusa were discovered only 350 m from each other (Larsson 1992, 30ff., 44). In Danish material, the three Svaleklint settlements at Skræppekærgård, observed with internal distances of 25 m, closely parallel the Swedish observations (Kaul 1988, 105). Perhaps it is also within this framework that the larger EN I sites are to be comprehended. Certainly they may be products of cyclic movements within a territory - a pattern of mobility that agrees with slash-and-burn as the primary agricultural technology. In this perspective the votive depositions in bogs are interesting. There is a high degree of continuity at the respective offering localities, and sometimes regular platforms were erected. These are observations that may indirectly suggest settlement stability (Koch 1998, 143ff., 161ff.).

In concluding the discussion on the EN I settlement pattern, it may be reasonable to state that the residential sites rotated within confined and demarcated territories (Larsson 1992, 77). On the other hand, only few burial mounds are directly associated with coastal catching localities - a fact that has been taken to indicate general accessibility (Madsen & Jensen 1982, 81, 84). Hence, the seasonal extraction activities may at some sites have been performed as a corporate effort of several neighbouring groups, rendering such localities important institutions of social integration during a time when the settlement was quite dispersed. A similar level of social significance probably cannot be attached to the smaller inland catching sites that seemingly show signs of another exploitation strategy. Perhaps these sites were more centrally located in the territories and merely used on a day-to-day basis by the local group.

Settlement and land use across the Mesolithic-Neolithic transition

To monitor settlement and land use across the Mesolithic-Neolithic transition is a difficult task for many reasons. From a culture-historical perspective, it is evident that marked changes at this point happen rapidly, and this makes the actual transition period almost invisible in the archaeological record (Madsen 1987, 235). However, the archaeological research tradition also contributes significantly to these obstacles. The continuum of time is divided into periods according to the rate of change, producing a comprehensible past that allows research to take place. These periods, which are really archaeological constructs, are for the most part studied in a relatively isolated

manner by researchers specialising in a particular interval of time. This no doubt enhances our knowledge of the respective periods. On the other hand, it also makes the transition from one period, studied by one group of experts, to another period, studied by another group of experts, exceedingly hard to grasp. Little information flows across the chronological boundaries, thereby rendering results incompatible and blurring correspondences that may in fact exist. Clearly, lines are drawn where marked cultural changes take place, but this research methodology certainly highlights the differences even further (Petersson 2000, 10ff.). Hence, in terms of the transition to agriculture in Southern Scandinavia, most research has been undertaken from either a Mesolithic or a Neolithic point of view (Klassen 2000, 4). Here an attempt will be made to trace patterns of settlement and land use across this partly culture-historical and partly research-historical boundary.

In terms of the coastal settlement, both similarities and differences are apparent. First of all, there is a marked degree of topographical continuity. The same localities were chosen in both the EBK and in EN I, most EN I coastal catching sites having been discovered in the course of excavating EBK settlements. The similarity in site topography points to an exploitation of a similar range of resources at the respective localities, a fact supported in the faunal assemblages. Hence, if the same localities were chosen for the exploitation of a comparable range of resources, the procurement technology probably also remained identical. However, the coastal catching sites of EN I are generally smaller and there are fewer of them. Thus in EN I, the intensity of coastal settlement is reduced compared to the EBK. Likewise, the treatment of the resources is different in EN I, pointing to a significant shift in the character of the sites. We probably no longer observe the remnants of base camps. Rather, the evidence seem to denote an extraction strategy based on batch exploitation of seasonal resource concentrations, the resources being processed and brought to the residential sites for consumption (Madsen 1991, 491).

It is difficult to evaluate the settlement related to the freshwater systems of the interior, since only few sites have been published. It is clear, though, that here too, there is a high degree of topographical continuity across the transition (Andersen 1983, 193ff.). If transition aged sites in the Åmose are compared, they are located identically in the landscape, and they have roughly the same flint tool assemblages (Stafford 1999, 111). Præstelyng and Muldbjerg I are both short-term localities, perhaps only occupied for a single season by a small group. The faunal records indicate occupations from April to September and the compositions of species are fairly similar. The patterns of marrow fracturing are almost identical at the two sites, and large parts of the consumption probably took place at the site locale. In sum, no major changes in the activities or the general character of these settlements seem to have occurred. Thus, if the few sites available for study can be considered representative, there truly is a high degree of continuity across the Mesolithic-Neolithic transition in terms of exploiting the inland freshwater systems.

However, some differences are apparent. First of all, the intensity of settlement seems to decrease through time (Andersen 1983, 202). Another peculiar observation is that the votive depositions are often closely associated with EN I catching localities, perhaps pointing to a changed significance of this type of resource exploitation (Koch 1998, 142ff.). There are a few discoveries that have been taken to indicate a late Mesolithic offering tradition related to the inland freshwater systems, but generally they do not seem very convincing (Karsten 1994, 166ff.; Koch 1998, 157ff.). No doubt, the genesis of a regular offering tradition in the freshwater systems coincides with the transition to agriculture. Still, it is remarkable how many of the earliest votive depositions that have been found in proximity to EN I inland catching localities - sites that are obviously deeply rooted in the Mesolithic tradition. Perhaps this reflects a changed line of thought where the offerings are to be viewed as attempts to 'domesticate' natural resources (Koch 1998, 148). Nevertheless, the spatial association of inland catching sites and votive depositions clearly does not prove that the two phenomena are related.

Based on the decreased settlement density at the coast and along the freshwater systems, it comes as no surprise that a new category of sites appears with the outset of EN I. It may seem that the few and generally small residential sites of the earliest Neolithic are unable to compensate for the significant reduction of activity in the EBK core areas. In dealing with the question of where all the hunters went, however, the small residential sites must be the answer. The distribution maps of artefacts, sites and structures associated with EN I clearly show that the gravity of settlement, at least on Zealand and in Scania, rapidly shifted to the interior parts. That relatively few EN I residential sites are known today must be attributed to the fact that the sites are small and contain few artefacts, just as the settlement probably was quite dispersed. Further, the topography of the sites makes them much harder to locate than the predictable EBK settlements, and they are very exposed to the destructive forces of cultivation. Thus, methodologically, EN I residential sites are extremely difficult to detect, especially if ceramics are not preserved, and they may be expected to be highly under represented.

In Northern Jutland there probably is a tendency for diagnostic EN I finds to be located closer to the coast than on Zealand. Perhaps this trend has its origin in the pronounced coastal orientation of the EBK in this area, and the coast may have remained fairly important throughout EN I. Nevertheless,

the picture may originate from the long tradition of investigating coastal sites in Jutland, whereas research on Zealand has been directed more towards the interior parts due to peat cutting and the excellent conditions of preservation.

The small residential sites of EN I are clearly without predecessors in the EBK settlement system. However, there is evidence in the EBK of anthropogenic influences on the composition of the forest, and the large amounts of hazel sticks used for fish weirs must be the products of coppice woods (Christensen 1997, 155; Rasmussen 1997, 222; 1998, 77ff.). The pollen diagrams testify to periodic burnings and limited openings in the forest, perhaps established in order to attract game by boosting the undergrowth (Göransson 1994, 168ff.). Several times agriculture and husbandry have been proclaimed in EBK context, yet nowhere is the evidence unambiguous. The finds of cereal pollen in most cases can be interpreted as species of wild grasses (Welinder 1998, 168). Likewise, the complexity of differentiating between aurochs/domestic ox and wild boar/domestic pig has been touched upon earlier (Rowley-Conwy 1985b, 198ff.). Far more convincing are the finds of grain impressions in EBK ceramics at Löddesborg and Vik (Jennbert 1984, 93). However, these do not necessarily imply agriculture in late EBK. First of all, it has been proposed that EBK ceramics in Scania could have been produced during the beginning of the early Neolithic, and the finds really date to Neolithic time (Welinder 1998, 167ff.). On the other hand, it is perhaps more likely that the grain impressions, as suggested by Jennbert herself, ought to be viewed in the context of exchange with continental farmers (Fischer 1983; Jennbert 1984, 157; Klassen 1999). A few domesticated animals and very small amounts of grain may thus have figured within the late EBK as exchange objects of social and symbolic importance, or perhaps even in the context of experimentation on an extremely small scale. According to Jennbert, the settlements of Löddesborg type therefore demonstrate a gradual transition to Neolithic way of life (Jennbert 1984, 153ff.). However, taking into consideration the stratigraphic observations from recent Danish kitchenmidden investigations, the notion of a relatively long transition period can hardly be defended (S. H. Andersen 1991, 22; 1993, 74). Like elsewhere, the Löddesborg sites are considered here to be redeposited and mixed (Koch 1998, 50; Madsen 1987, 235ff.). Obviously the transition happened very fast, resulting in an abrupt drop in ^{13}C-values, a rapid spread of settlement over the entire landscape, and the introduction of a completely new type of settlement.

From what has been outlined above, it is apparent that the transition to agriculture in Southern Scandinavia is an era of change in terms of settlement and land use. However, there are also obvious correspondences between the EBK and EN I, similarities that have been overlooked in the collision of two different research traditions having little intercommunication. In 1960 when J. Troels-Smith gave his vivid picture of the late Mesolithic population, it was characterised as a few small groups always on the move in order to secure a sufficient food supply. The total number of inhabitants in Denmark was thought to approximate 30 individuals at the beginning of the EBK, though growing somewhat through the course of time (Troels-Smith 1960, 102, 113). A completely different situation was perceived in EN I. Based on the excavation of the Barkær structures, Glob envisioned regular villages where around fifty families were living communally in long houses while clearing the surrounding forests for fields and pastures (Glob 1949, 11; 1976, 19). No wonder it had to take an immigration of continental agriculturists in order to convert these primitive hunters to farmers, given the diffusionist theoretical frame of reference that characterised the culture-historical tradition of archaeology in Southern Scandinavia (Becker 1948, 259). However in the 1960's, new theoretical currents became apparent. In the field of social anthropology, works by Sahlins, Service and Lee & DeVore were published, emphasising that certainly not all hunter-gatherers can be considered primitive (see Koch 1998, 34ff for a discussion). This perspective was welcomed by a new generation of archaeologists, and it reached Scandinavia as an integrated part of processualism. Here the discovery of late Mesolithic cemeteries and the evidence of year-round exploitation at the large kitchenmiddens justified a new perception of the EBK. Through analogical reasoning, the EBK is now characterised according to the model of complex hunters (Rowley-Conwy 1983). Instead of small mobile units, large corporate groups living a sedentary life on big year-round base camps are anticipated. This mode of organisation closely resembles that of primitive agriculturists, thus supposedly resulting in a smooth transition to farming (Jennbert 1984, 99ff.; Mahler 1981, 56).

However, while these theoretical reorientations took place in the late Mesolithic field of research, the view on EN I settlement changed. Based on a number of regional surveys, the sites and social units of EN I are now found to be small, just as the overall settlement is dispersed over the landscape (Madsen 1982, 205; Madsen & Jensen 1982, 68; Larsson 1992, 77). Thus, Mesolithic and Neolithic research have drifted past each other, resulting in an inverted situation of incompatibility. Given the model of complex hunters, hardly any similarities are found in the context of EN I. One has to look further into EN II for a centralised organisation of the settlement to reappear in the form of causewayed enclosures and the construction of megalithic graves (Larsson 1995, 95ff.). Hence, the settlement pattern goes from centralised to dispersed and then back to centralised – an evolutionary trend that does not seem to make the transition to agriculture smooth and easy to grasp.

Certainly the idea of complex hunters has benefited late Mesolithic research in Southern Scandinavia by broadening the traditional view on hunter-gatherers. However, whereas some aspects of this general model clearly applies to prehistoric reality, it has commonly been used blindly, thus becoming a straitjacket in understanding the particular cultural context. Throughout this article, an attempt has been made to argue that EBK settlement did not involve large groups living a sedentary life at big year-round coastal sites. Instead large coastal settlements are seen here as products of territorial stability, due to a stable, rich and predictable resource situation (Andersen 1995, 48). Clearly people returned to the same spot at roughly the same time(s) of year throughout centuries in order to perform a specific range of activities. Whereas some segments of the large coastal sites may represent population aggregations, most localities are probably accumulations of smaller settlements separated in time, perhaps extended families that stayed for a few weeks or months. In all probability, it is this particular group that is expressed in the small seasonal sites of Aggersund, Vængesø and Rønbjerg Strandvolde. They are considered here not to be extraction camps exploited by task-groups living permanently at base camps elsewhere. Instead they are viewed as regular settlements, allowing a glimpse of the basic social unit on its seasonal rotation within the territory. Disregarding regional differences in settlement pattern, the general settlement probably consisted of a number of such groups living dispersed within a territory encompassing a small fjord, or even just parts of a fjord, the groups only periodically aggregating when resource concentrations occurred at key localities.

Given this perspective on the late Mesolithic, settlement and land use in EN I becomes significantly easier to comprehend. Here it also seems plausible that a number of small social units were rotating within a confined territory. However, the sites were clearly not relocated on a seasonal basis, and the general settlement was placed further inland and somewhat more dispersed. Hence, the principal organisation of the settlement pattern may largely have been preserved, and the size of the social unit probably remained the same. The idea that the larger coastal catching sites of EN I may have played a role in social integration has been discussed earlier (Madsen & Jensen 1982, 83ff.). If this is in fact the case, the practice may have its origin in periodic aggregations of EBK groups at such localities.

The question of why the settlement was reorganised so rapidly still remains. In this respect, part of the explanation probably lies in an incompatibility of the two patterns of land use. If people in the EBK moved around within a fjord on a seasonal basis, it certainly would be hard to grow grain and keep livestock. Likewise, it was probably not always possible to herd animals and practice agriculture in close proximity to productive fishing grounds.

Another aspect is the agricultural technology. Pollen analysis suggests that slash-and-burn was the prevailing mean of establishing fields, a system of land management not allowing continued exploitation of the exact same locality. This mode of cultivation would inevitably have disrupted the extremely stable pattern of seasonal settlement rotation that characterizes the EBK. Choosing to adopt elements of the Neolithic economy rapidly rendered only one possible solution: husbandry and agriculture were the factors that determined the location of the residential site, whereas hunting, gathering and fishing were activities performed at satellite catching sites corresponding to the old EBK localities. This is not to imply that husbandry and agriculture in the beginning were of greater importance to subsistence than hunting, gathering and fishing. Even a modest practise of Neolithic economy probably would have made the old settlement system collapse, since such activities did not conform to the existing patterns of mobility. However, in course of the settlement being displaced to inland areas, the labour investment of keeping up coastal fishing activities may rapidly have risen to unacceptable heights. This probably led to a more exclusive focus on husbandry, agriculture and other terrestrial resources – a situation indicated by the marked drop in ^{13}C-values.

In all probability, the exploitation of coastal catching sites was mainly reduced to seasonal visits when predictable resource concentrations occurred. As mentioned, such visits may also have been of social importance if the episodes of bulk extraction were performed as a corporate effort of population groups from several settlement areas. Certainly the enormous fish weirs known from the Danish early Neolithic would have yielded much more than a supplement to the local group during for instance the eel run (Pedersen 1997). However, in the long term it may be realistic to suppose that some of the productive coastal catching sites were monopolised by groups living adjacent to the localities, the products thus forming the basis of exchange networks.

Accompanying this overall restructuring of the settlement pattern, the division of labour must have undergone fundamental changes. In terms of husbandry and agriculture, the busiest time of year was probably late summer and autumn when harvesting and collecting of leaf-fodder were essential tasks. This collides with a very productive season in terms of hunting, gathering and fishing, and perhaps this resulted in a scheduling crisis that accelerated the economic substitution process (Zvelebil & Rowley-Conwy 1984, 112). In all probability, new activities could only be introduced in place of existing ones. That is, if an effective reorganisation of the internal, often gender based, division of labour did not compensate,

as is sometimes observed in half agrarian societies (Hastrup & Ovesen 1985, 158ff.). Due to the demands of childcare, women were probably assigned to activities in proximity to the residential site, and it may not be unrealistic to argue that agriculture, husbandry and food gathering were their primary tasks in EN I (Jennbert 1998, 33). On the other hand, a mobile activity like hunting may primarily have been attended to by men (Hastrup & Ovesen 1985, 158ff.). If these patterns are back-tracked into the late Mesolithic, the labour tasks of men may have remained relatively unaltered by the introduction of domesticates. However in the late Mesolithic, fishing and gathering were probably among the more stationary activities, and if these were assigned mainly to women, their role must have changed fundamentally in course of the Mesolithic-Neolithic transition. Summing up these considerations, what largely happened was that husbandry and agriculture substituted fishing. Obviously, this is exaggerated since fishing continued throughout the Neolithic. Judging by the ^{13}C-evidence, however, fishing clearly became marginalized in the early Neolithic and it no longer constituted the dietary stable (Torsten Madsen, lecture at Moesgård).

Concluding remarks

This paper has presented an alternative view on settlement and land use at the Mesolithic-Neolithic transition in Southern Scandinavia. Hopefully it will result in a discussion on the topic, a primary intention of this article. Since the late 1980's the debate on the Mesolithic-Neolithic transition has been one of relatively low activity. As a prescription for this stagnation, it has been proposed that Scandinavian archaeologists should once again adopt a broader geographical perspective. The transition to agriculture in Southern Scandinavia is part of a much larger phenomenon and, consequently, we have to pay more attention to the big picture (Klassen 2000). Surely this is true. However, not everything can be explained in terms of external influences and, as demonstrated here, it may also be important to take a step back and question what we know, or what we think we know, about the local context in which this transition took place. Certainly too much has been taken for granted for too long.

The question of why agriculture was adopted has not yet been addressed in this paper. However, in closing it may be stated that nothing in the settlement patterns suggests an immigration. Continuity obviously overshadows discontinuity and the changes that do occur may easily be accounted for in the local context. Thus, explanations are found in the form of either ecologically determined perspectives (Rowley-Conwy 1984; 1985b; Zvelebil & Rowley-Conwy 1984) or theories emphasising social aspects as the driving force (Jennbert 1984; Price 1995; Stafford 1999). Perhaps none of these models can single-handedly explain what happens in Southern Scandinavia. Apparently the transition to agriculture in this area coincides with a deterioration of the marine ecosystem upon which people were obviously heavily reliant. This is indicated in the molluscan fauna and by the fact that many fjords were cut off by beach-ridge formations due to sea-level fluctuations (S. H. Andersen 1992, 69, 75). Likewise, population growth may be expected during the EBK, since both the number of sites and their size seem to increase (Andersen 1995, 48). Perhaps these factors indicate a resource crisis, yet no indication of a such is seen in either the archaeological or the anthropological records (Meiklejohn et al 1998, 206ff.; Price & Gebauer 1992, 106ff.). The changing resource situation may have rendered some adjustments in the settlement pattern necessary, but seriously doubts are justified that this in itself would have resulted in a collapse.

Meanwhile, however, the archaeological record testifies to a growing interest in new way of life that is gradually moving closer (Fischer 1983; Jennbert 1984, 141ff.; Klassen 1999). The social pull of Neolithic living may have been so strong that the minor alterations needed to adapt the settlement system to the changed resource situation were ignored on behalf of an alternative mode of existence (Koch 1998, 179ff.). Thus, it is defended here that the primary motivation for introducing domesticates in Southern Scandinavia was probably social and part of a much larger ideological phenomenon, whereas the changes in the marine ecosystem may only have triggered something that was already on its way. Many researchers therefore perceive the transition to agriculture as a gradual long-term social transformation (Jennbert 1984, 153ff.; Petersson 2000; Stafford 1999, 136). However, it is argued here that from the point where, for whatever reason, domesticated plants and animals were chosen to be introduced, a primary requirement was the restructuring of settlement and land use that this article has attempted to outline.

Kasper Lambert Johansen
Institut for Forhistorisk Arkæologi
Aarhus Universitet
Moesgaard
DK - 8270 Højbjerg

Manuscript submitted October 1999

Acknowledgements

I wish to thank Søren H. Andersen, Berit Valentin Eriksen, Helle Juel Jensen, Niels Nørkjær Johannsen, Torsten Madsen and Michael Stafford for comments on earlier versions of this paper. I sincerely appreciated Torsten Madsen's guidance and support, and Michael Stafford's help with my English translation. All errors, however, are mine alone.

References

Albrethsen, Svend Erik & Erik Brinch Petersen 1976: Excavation of a Mesolithic Cemetery at Vedbæk, Denmark. Acta Archaeologica 47, pp. 1-28.

Andersen, Knud 1983: Stenalderbebyggelsen i den vestsjællandske Åmose. København, Fredningsstyrelsen.

Andersen, Svend Th. 1992: Pollen Spectra from two Early Neolithic Lugged Jars in the Long Barrow at Bjørnsholm, Denmark. Journal of Danish Archaeology 9, 1990, pp. 59-63.

- 1993: Early- and Middle-Neolithic agriculture in Denmark: pollen spectra from soils in burial mounds of the Funnel Beaker Culture. Journal of European Archaeology 1, pp. 153-80.

Andersen, Søren H. 1975a: En Ertebølleboplads ved Vængesø/ Helgenæs. Hikuin 2, pp. 9-48.

- 1975b: Ringkloster. En indlandsboplads med Ertebøllekultur. Kuml 1973-74, pp. 11-94.
- 1976: Norsminde Fjord undersøgelsen. In Henrik Thrane (ed.): Bebyggelsesarkæologi. Beretning fra et symposium d. 7-8 nov. 1975 afholdt af Odense universitet. Skrifter fra Institut for historie og samfundsvidenskab Nr. 17, pp. 18-62.
- 1977: Ertebøllekultur på Vestfyn. En oversigt. Fynske Minder, pp. 7-36.
- 1979: Aggersund, en Ertebølleboplads ved Limfjorden. Kuml 1978, pp. 7-56.
- 1981: Ertebøllekunst. Nye østjyske fund af mønstrede Ertebølleoldsager. Kuml 1980, pp. 7-59.
- 1987: Mesolithic Dug-Outs and Paddles from Tybrind Vig, Denmark. Acta Archaeologica 57, pp. 87-106.
- 1985: Tybrind Vig. A preliminary Report on a Submerged Ertebølle Settlement on the West Coast of Fyn. Journal of Danish Archaeology 4, 1985, pp. 52-69.
- 1990: Limfjordens forhistorie – en oversigt. In Limfjordsprojektet. Rapport nr. 1: Limfjordsegnens kultur- og naturhistorie, pp. 29-65. Århus.
- 1991: Norsminde: A 'Køkkenmødding' with Late Mesolithic and Early Neolithic Occupation. Journal of Danish Archaeology 8, 1989, pp. 13-40.
- 1992: Marin udnyttelse af Limfjorden i stenalderen. In Limfjordsprojektet. Rapport nr. 4: Limfjordsfiskeri i fortid og nutid, pp. 65-96. Århus.
- 1993: Bjørnsholm. A Stratified Køkkenmødding on the Central Limfjord, North Jutland. Journal of Danish Archaeology 10, 1991, pp. 59-96.
- 1994: Norsminde, ein Muschelhaufen mit später Ertebølle- und früher Trichterbecherkultur. Vorläufiger Bericht. In Jürgen Hoika & Jutta Meurers-Balke (eds.): Beitrage zur frühneolithischen Trichterbecherkultur im westlichen Ostseegebiet. 1. Internationales Trichterbechersymposium in Schleswig vom 4. Bis 7. März 1985, pp. 11-49. Neumünster, Wachholz Verlag.
- 1995: Coastal adaptation and marine exploitation in Late Mesolithic Denmark – with special emphasis on the Limfjord region. In Anders Fischer (ed.): Man and sea in the Mesolithic. Coastal settlement above and below present sea level. Proceedings of the International Symposium, Kalundborg, Denmark 1993. Oxbow Monograph 53, pp. 41-66.
- 1997: Ertebølleharpuner og spækhuggertænder. Aspekter af marin fangst i Ertebølletid. Kuml 1995-96, pp. 45-99.
- 1998a: Ringkloster. Ertebølle trappers and wild boar hunters in Eastern Jutland. A survey. Journal of Danish Archaeology 8, 1994-95, pp. 13-59.
- 1998b: En mønstret pragtøkse fra ældre Ertebølletid. Kuml 1997-1998, pp. 9-28.
- 1998c: The Stone Age Coast. Maritime Archaeology Newsletter from Roskilde, Denmark, Nr. 11, December 1998, pp. 11-13.
- 1998d: Erhvervsspecialisering og ressourceudnyttelse i Limfjordsområdet i forhistorisk tid. In Limfjordsprojektet. Rapport nr. 8: Variation og enhed omkring Limfjorden, pp. 97-139. Århus.

Andersen, Søren H. & Claus Malmros 1966: Norslund. En kystboplads fra ældre stenalder. Kuml 1965, pp. 35-114.

Andersen, Søren H. & Erik Johansen 1987: Ertebølle Revisited. Journal of Danish Archaeology 5, 1986, pp. 31-61.

- 1992: An Early Neolithic Grave at Bjørnsholm, North Jutland. Journal of Danish Archaeology 9, 1990, pp. 38-58.

Becker, Carl Johan 1948: Mosefundne Lerkar fra yngre Stenalder. Aarbøger for Nordisk Oldkyndighed og Historie 1947.

Bennike, Pia 1985: Palaeopathology of Danish Skeletons. A Comparative Study of Demography, Disease and Injury. København, Akademisk Forlag.

Bratlund, Bodil 1993: The Bone Remains of Mammals and

Birds from the Bjørnsholm Shell-Mound. Journal of Danish Archaeology 10, 1991, pp. 97-104.

Brock, Vibeke & Bourget Edwin 1991: Analyses of Shell Increment and Microgrowth Band Formation to Establish Seasonality of Mesolithic Shellfish collection. Journal of Danish Archaeology 8, 1989, pp. 7- 12.

Brøndsted, Johannes 1938: Danmarks Oldtid I. 1. udgave, København.

- 1957: Danmarks Oldtid I. 2. udgave, København.

Casselbury, S. E. 1974: Further refinement of the Formulae for determining Population from Floor areas. World Archaeology 6.

Chapman, R. 1981: The emergence of formal disposal areas and the "problem" of megalithic tombs in prehistoric Europe. In R. Chapman, Ian Kinnes & Klavs Randsborg (eds.): The Archaeology of Death, pp. 71-81. London.

Christensen, Kjeld 1997: Træ fra fiskegærder – skovbrug i stenalderen. In Lisbeth Pedersen, Anders Fischer & Bent Aaby (eds.): Storebælt i 10.000 år. Mennesket, havet og skoven. Storebælt publikationerne, pp. 147-156.

Cook, S. F. & R. F. Heizer 1968: Relationships among Houses, Settlement Areas and Population in Aboriginal California. In K. C. Chang (ed.): Settlement Archaeology. Palo Alto.

Ebbesen, Klaus 1982: Yngre stenalders depotfund som bebyggelseshistorisk kildemateriale. In Henrik Thrane (ed.): Om yngre stenalders bebyggelseshistorie. Beretning fra et symposium. Odense 30. april – 1. Maj 1981. Skrifter fra Historisk Institut, Odense Universitet, nr. 30, pp. 60-79.

- 1994: Simple, tidligneolitiske grave. Aarbøger for Nordisk Oldkyndighed og Historie 1992, pp. 47-112.

Enghoff., Inge Bødger 1983: Size distribution of Cod (Gadus Morhua L.) and Whiting (Merlangius Merlangus (L.)) (Pisces Gadidae) from a Mesolithic Settlement at Vedbæk, North Zealand, Denmark. Videnskabelige Meddelelser fra Dansk Naturhistorisk Forening 144, pp. 83-97.

- 1987: Freshwater fishing from a Sea-Coast Settlement – the Ertebølle locus classicus Revisited. Journal of Danish Archaeology 5, 1986, pp. 62-76.
- 1991: Fishing from the Stone Age Settlement Norsminde. Journal of Danish Archaeology 8, 1989, pp. 41-50.
- 1993: Mesolithic Eel-fishing at Bjørnsholm, Denmark, Spiced with Exotic Species. Journal of Danish Archaeology 10, 1991, pp. 105-118.
- 1994: Fishing in Denmark During the Ertebølle Period. International Journal of Osteoarchaeology 4, pp. 65-96.
- 1998: Freshwater fishing at Ringkloster, with a supplement of marine fishes. Journal of Danish Archaeology 12, 1994-95, pp. 99-106.

Eriksen, Lars Buus 1993: Ornehus på Stevns – en tidligneolitisk hustomt. Aarbøger for Nordisk Oldkyndighed og Historie 1991, pp. 7-19.

Fischer, Anders 1983: Handel med skolæstøkser og landbrugets indførelse i Danmark. Aarbøger for Nordisk Oldkyndighed og Historie 1981, pp. 5-16.

- 1985: Den vestsjællandske Åmose som natur- og kulturhistorisk reservat. Antikvariske studier 7, pp. 170-176.
- 1993a: Stenalderbopladser i Smålandsfarvandet. En teori afprøvet ved dykkerbesigtigelse. København, Miljøministeriet, Skov- og Naturstyrelsen.
- 1993b: Mesolitisk indlandsbosættelse. In Steen Hvass & Birger Storgaard (eds.): Da Klinger i Muld... 25 års arkæologi i Danmark, pp. 58-63. Århus, Århus Universitetsforlag.
- 1997: Mennesket og Havet – bosættelse og fiskeri ved jæger-stenalderens kyster. In Lisbeth Pedersen, Anders Fischer & Bent Aaby (eds.): Storebælt i 10.000 år. Mennesket, havet og skoven. Storebælt publikationerne, pp. 63-77.

Glob, Peter V. 1949: Barkær. Danmarks ældste landsby. Nationalmuseets Arbejdsmark 1949, pp. 5-16.

- 1976: Barkær, en landsby med rækkehuse fra tidligneolitisk tid. Iskos 1, pp. 19.

Göransson, Hans 1994: Comments on 'Neolithic Farming Practice – An Archaeological Response to Göransson Hypothesis'. Fornvännen 89, pp. 168-184.

Hansen, Kjeld Møller & Steffen Stummann Hansen 1988: Topperøgel. Arkæologiske Udgravninger i Danmark 1987, pp. 97.

Hastrup, K. & J. Ovesen 1985: Etnografisk Grundbog. København, Gyldendahl.

Hatting, Tove, E. Holm & Knud Rosenlund 1973: En pelsjægerboplads fra stenalderen. Kaskelot 1973 (10), pp. 13-20.

Hernek, Robert 1988: Den spetsnackiga yxan av flinta. Fornvännen 83, pp. 218-223.

Hjelmquist, H. 1975: Getreidearten und andere Nutzplanzen aus der frühneolitischen Zeit von Langeland. In Jørgen Skaarup (ed.): Stengade. Ein langeländischer wohnplatz mit Hausresten aus der früneolitischen Zeit. Meddelelser fra Langelands Museum, pp. 211-219.

Hodder, Ian 1982: Symbols in Action. Etnoarchaeological studies of material culture. Cambridge, Cambridge University Press.

Jennbert, Kristina 1984: Den produktiva gåvan. Tradition och innovation i Sydskandinavien för omkring 5300 år sedan. Acta Archaeologica Lundensia Series in 4°. no. 16.

- 1998: 'From the Inside': A Contribution to the Debate about the Introduction of Agriculture in Southern Scandinavia. In Marek Zvelebil, Lucyna Domanska & Robin Dennell (eds.): Harvesting the Sea, Farming the

Forest. The Emergence of Neolithic Societies in the Baltic Region, pp. 31-35. Sheffield, Sheffield Academic Press.

Jensen, Hanne S. 1982: Skaldyrssæson. Skalk 1982, nr. 3, pp. 9-10.

Jensen, Helle Juel 1994: Flint tools and plant working – hidden traces of stone age technology. Aarhus, Aarhus University Press.

Johansson, Axel Degn 1995: The Ertebølle Culture in South Zealand, Denmark. In Anders Fischer (ed.): Man and sea in the Mesolithic. Coastal settlement above and below present sea level. Proceedings of the International Symposium, Kalundborg, Denmark 1993. Oxbow Monograph 53, pp. 87-94.

- 1999: Ertebøllekulturen i Sydsjælland. Aarbøger for Nordisk Oldkyndighed og Historie 1997, pp. 7-88.

Karsten, Per 1994: Att kasta yxan i sjön. En studie över rituell tradition och förändring utilfrån skånska neolitiska offerfynd. Acta Archaeologica Lundensia. Series in 8°. no. 23.

Kaul, Flemming 1988: Skræppekærgård. Arkæologiske Udgravninger i Danmark 1987, pp. 105-106.

Kempfer-Jørgensen, Lars & David Liversage 1985: Mere om Sejerøs forhistorie. En stenalderboplads, et kulthus og et flintværksted. Fra Holbæk Amt, pp. 7-27.

Klassen, Lutz 1999: Prestigeøkser af sjældne alpine bjergarter. En glemt og overset fundgruppe fra ældre stenalders slutning i Danmark. Kuml 1999, pp. 11-50.

- 2000: The debate on the Mesolithic-Neolithic transition in the western Baltic: a central European perspective. Journal of Danish Archaeology 13, 1996-97, pp. ???.

Koch, Eva 1998: Neolithic Bog Pots from Zealand, Møn, Lolland and Falster. Nordiske Fortidsminder. Serie B. Vol. 16.

Kristensen, Inge Kjær 1988: Tidlig-neolitiske jordgrave i Jylland. En bearbejdning af de jyske tidlig-neolitiske jordgraves morfologi, kronologi og anvendelse. Unpublished thesis from Århus University, January 1988.

- 1991: Storgård IV. An Early Neolithic Long Barrow near Fjelsø, North Jutland. Journal of Danish Archaeology 8, 1989, pp. 72-87.

Larsson, Lars 1984: The Skateholm Project. A Late Mesolithic Settlement and Cemetery Complex at a Southern Swedish Bay. Meddelanden från Lunds universitets historiska museum 1983-1984, pp. 5-38.

- 1989: Ethnicity and traditions in Mesolithic mortuary practices of Southern Scandinavia. In Stephen Shennan (ed.): Archaeological Approaches to Cultural Identity, pp. 210-218. London, Unwin Wyman.

- 1995: Man and sea in Southern Scandinavia during the Late Mesolithic. The role of cemeteries in the view of society. In Anders Fischer (ed.): Man and sea in the Mesolithic. Coastal settlement above and below present sea level. Proceedings of the International Symposium, Kalundborg, Denmark 1993. Oxbow Monograph 53, pp. 95-104.

Larsson, Mats 1984: Tidigneolitikum i Sydvästskåne. Kronologi og bosätningsmönster. Acta Archaeologica Lundensia. Series in 4°. No. 17.

- 1985: The Early Neolithic Funnel-Beaker Culture in Southwest Scania, Sweden. BAR International Series 264.

- 1992: The Early and Middle Neolithic Funnel Beaker Culture in the Ystad Area (Southern Scania). Economic and Social Change, 3100-2300 BC. In Lars Larsson, Johan Callmer & Berta Stjernquist (eds.): The Archaeology of the Cultural Landscape. Acta Archaeologica Lundensia Series in 4°. No. 19, pp. 17-90.

Liversage, David 1981: Neolithic Monuments at Lindebjerg, Northwest Zealand. Acta Archaeologica 51, pp. 85-152.

- 1992: Barkær. Long Barrows and Settlements. Arkæologiske studier. Vol. IX.

Madsen, A. P., Sophus Müller, Carl Neergaard, C. G. Joh. Petersen, E. Rostrup, K. J. V. Steenstrup & Herluf Winge 1900: Affaldsdynger fra Stenalderen i Danmark. København, C. A. Reitzel.

Madsen, Torsten 1979: Earthen Long Barrows and Timber Structures: Aspects of Early Neolithic Mortuary Practice in Denmark. Proceedings of the Prehistoric Society 45, pp. 301-320.

- 1982: Settlements Systems of Early Agricultural Societies in East Jutland, Denmark: A Regional Study of Change. Journal of Anthropological Archaeology 1, pp. 197-239.

- 1987: Where did all the Hunters go? An Assessment of an Epoch-Making Episode in Danish Prehistory. Journal of Danish Archaeology 5, 1986, pp. 229-239.

- 1990: Changing patterns of land use in the TRB culture of South Scandinavia. In Dobrochana Jankowska (ed.): Die Trichterbecherkultur. Neue Forschungen und Hypothesen. Material des Internationalen Symposium Dymaczewo, 20.-24. September 1988, pp. 27-41. Poznan.

- 1991: The social structure of Early Neolithic society in South Scandinavia. In Jan Lichardus (ed.): Die Kupferzeit als historische Epoche; Symposium Saarbrücken und Otzenhausen 6.-13.11.1988. Saarbrücken Beitrage zur Altertumskunde 55, pp. 489-95.

- 1993: Høje med træbyggede grave. In Steen Hvass & Birger Storgaard (eds.): Da Klinger i Muld... 25 års arkæologi i Danmark, pp. 96-99. Århus, Århus Universitetsforlag.

- 1994: Die Gruppenbildung im frühesten Neolitikum Dänemarks und ihre Bedeutung. In Jürgen Hoika & Jutta Meuers-Balke (eds.): Beitrage zur frühneolithischen Trichterbecherkultur im westlichen Ostseegebiet, 1. Internation-

ales Trichterbechersymposium in Schleswig vom 4. Bis 7. März 1985, pp. 227-237. Neumünster, Wacholz Verlag.

Madsen, Torsten & Helle Juel Jensen 1982: Settlement and land use in Early Neolithic Denmark. Analecta Praehistorica Leidensia 15, pp. 64-86.

Madsen, Torsten & Jens E. Petersen 1984: Tidligneolitiske anlæg ved Mosegården: Regionale og kronologiske forskelle i tidligneolitikum. Kuml 1982-83, pp. 78-123.

Mahler, Ditlev Laurentius 1981: Hunter's Storage – Farmer's Birth. Kontaktstencil 19, pp. 51-61.

Mathiassen, Therkel 1938: Gudenåkulturen. En mesolitisk indlandsbebyggelse i Jylland. Aarbøger for Nordisk Oldkyndighed og Historie 1937, pp. 1-186.

- 1943: Stenalderbopladser i Åmosen. København, Nordisk Forlag.

Mathiassen, Therkel, Magnus Degerbøl & Jørgen Troels-Smith 1942: Dyrholmen. En stenalderboplads på Djursland. Det kongelige danske videnskabernes selskab. Arkæologisk-kunsthistoriske Skrifter I, 1. København.

Meiklejohn, Christopher, Erik Brinch Petersen & Verner Alexandersen 1998: The Later Mesolithic Population of Sjælland, Denmark, and the Neolithic Transition. In Marek Zvelebil, Lucyna Domanska & Robin Dennell (eds.): Harvesting the Sea, Farming the Forest. The Emergence of Neolithic Societies in the Baltic Region, pp. 203-212. Sheffield, Sheffield Academic Press.

Midgley, Magdalena S. 1992: TRB CULTURE. The First Farmers of the North European Plain. Edinburgh, Edinburgh University Press.

Møhl, Ulrik 1971: Oversigt over dyreknoglerne fra Ølby Lyng. En østsjællandsk kystboplads med Ertebøllekultur. Aarbøger for Nordisk Oldkyndighed og Historie 1971, pp. 43-77.

- 1975: Die älstesten Haustierspuren in Dänemark. Knochenfunde aus dem frühen Neolithikum auf Langeland. In Jørgen Skaarup (ed.): Stengade. Ein langeländischer wohnplatz mit Hausresten aus der früneolitischen Zeit. Meddelelser fra Langelands Museum, pp. 207-210.
- 1979: Aggersund-bopladsen zoologisk belyst. Svanejagt som årsag til bosættelse? Kuml 1978, pp. 67-76.

Naroll, R. 1962: Floor Area and Settlement Pattern. American Antiquity 27.

Nielsen, Bjarne Henning 1997: De første bønder på Sprogø. In Lisbeth Pedersen, Anders Fischer & Bent Aaby (eds.): Storebælt i 10.000 år. Mennesket, havet og skoven. Storebælt publikationerne, pp. 228-244.

Nielsen, Esben Kannegaard & Erik Brinch Petersen 1993: Grave, mennesker og hunde. In Steen Hvass & Birger Storgaard (eds.): Da Klinger i Muld... 25 års arkæologi i Danmark, pp. 76-81. Århus, Århus Universitetsforlag.

Nielsen, Finn Ole 1997: The Neolithic Settlement on Bornholm. In Danuta Król (ed.): The Built Environment of Coast Areas during the Stone Age. The Baltic Sea-Coast Landscapes Seminar. Session No. 1, pp. 119-126. Gdansk.

Nielsen, Poul Otto 1977: Die Flintbeile der frühen Trichterbecherkultur in Dänemark. Acta Archaeologica 48, pp. 61-138.

- 1981: Bondestenalderen. Sesams Danmarkshistorie bd. II. København, Sesam.
- 1985: De første bønder. Nye fund fra den tidligste Tragtbægerkultur ved Sigersted. Aarbøger for Nordisk Oldkyndighed og Historie 1984, pp. 96-126.
- 1993: Bosættelsen. In Steen Hvass & Birger Storgaard (eds.): Da Klinger i Muld... 25 års arkæologi i Danmark, pp. 92-95. Århus, Århus Universitetsforlag.
- 1994: Sigersted und Havnelev. Zwei Siedlungen der frühen Trichterbecherkultur auf Seeland. In Jürgen Hoika & Jutta Meuers-Balke (eds.): Beitrage zur frühneolithischen Trichterbecherkultur im westlichen Ostseegebiet, 1. Internationales Trichterbechersymposium in Schleswig vom 4. Bis 7. März 1985, pp. 289-324. Neumünster, Wacholz Verlag.

Noe-Nygaard, Nanna 1983: The importance of aquatic resources to Mesolithic man at inland sites in Denmark. In Caroline Grigson & Juliet Clutton-Brook (eds.): Animals and Archaeology: 2. Shell Middens, Fisches and Birds. BAR International Series 183, pp. 125-142.

- 1988: $d^{13}C$-values of dog bones reveal the nature of changes in man's food resources at the Mesolithic-Neolithic transition, Denmark. Chemical Geology 73 (Isotope Geoscience Section), pp. 87-96.
- 1995: Ecological, sedimentary, and geochemical evolution of the late-glacial to postglacial Åmose lacustrine basin, Denmark. Fossils and Strata no. 37, 8th June 1995.

Paludan-Müller, Carsten 1978: High Atlantic Food Gathering in Northwestern Zealand, Ecological Conditions and Spatial Representation. In Kristian Kristiansen & Carsten Paludan-Müller (eds.): New Directions in Scandinavian Archaeology. Studies in Scandinavian Prehistory and Early History 1, pp. 120-157. Copenhagen, The National Museum of Denmark.

Pedersen, Lisbeth 1997: De satte hegn i havet. In Lisbeth Pedersen, Anders Fischer & Bent Aaby (eds.): Storebælt i 10.000 år. Mennesket, havet og skoven. Storebælt publikationerne, pp. 124-143.

Persson, Ove & Evy Persson 1984: Anthropological report on the Mesolithic graves from Skateholm, Southern Sweden. I. Excavation Seasons 1980-1982. University of Lund. Institute of Archaeology. Report Series No. 21.

Persson, Per 1989: Bofasthet under Mesolitikum? Kontaktstencil 30-31, pp. 98-115.

Petersen, Erik Brinch 1971: Ølby Lyng. En østsjællandsk kystboplads med Ertebøllekultur. Aarbøger for Nordisk Oldkyndighed og Historie 1971, pp. 5-42.
- 1973: A Survey of the Late Palaeolithic and Mesolithic of Denmark. In S. K. Kozlowski (ed.): The Mesolithic in Europe. Papers read at the international Archaeological Symposium of the Mesolithic in Europe. Warsaw, May, 7-12, 1973, pp. 77-128. Warsaw, Warsaw University Press.

Petersen, Peter Vagn 1984: Chronological and Regional Variation in the Late Mesolithic of Eastern Denmark. Journal of Danish Archaeology 3, 1984, pp. 7-18.

Petersson, Håkan 2000: Where did all the farmers come from? Journal of Danish Archaeology 13, 1996-97, pp. ???.

Price, T. Douglas 1995: Social Inequality at the Origins of Agriculture. In T. Douglas Price & Gary M. Feinman (eds.): Foundations of Social Inequality, pp. 129-151. New York, Plenum Press.

Price, T. Douglas & Anne Birgitte Gebauer 1992: The Final Frontier: Foragers to Farmers in Southern Scandinavia. In Anne Birgitte Gebauer & T. Douglas Price (eds.): Transitions to Agriculture in Prehistory. Monographs in World Archaeology 4, pp. 97-116.

Rasmussen, Peter 1997: Skov og landbrug på Sprogø i oldtiden. In Lisbeth Pedersen, Anders Fischer & Bent Aaby (eds.): Storebælt i 10.000 år. Mennesket, havet og skoven. Storebælt publikationerne, pp. 219-227.
- 1998: Mid-holocene Vegetation Development at the Inland Ertebølle Settlement of Ringkloster, Eastern Jutland. Journal of Danish Archaeology 12, 1994-95, pp. 65-86.

Renfrew, Colin 1976: Megaliths, territories and population. In Sigfried J. de Laet (ed.): Acculturation and Continuity in Atlantic Europe during the Neolithic Period and Bronze Age, pp. 178-204. IV Atlantic Colloquium. Ghent.

Robinson, David E. 1994: Dyrkede planter fra Danmarks forhistorie. Arkæologiske udgravninger i Danmark 1993, pp. 20-35.

Rowley-Conwy, Peter: 1983: Sedentary hunters: the Ertebølle example. In Geoff Bailey (ed.): Hunter-Gatherer Economy in Prehistory: A European Perspective, pp. 111-126. Cambridge, Cambridge University Press.
- 1984: The Laziness of the Short-Distance Hunter: The Origin of Agriculture in Western Denmark. Journal of Anthropological Archaeology 3, pp. 300-324.
- 1985a: Mellemneolitisk økonomi i Danmark og Sydengland. Knoglefundene fra Fannerup. Kuml 1984, pp. 77-111.
- 1985b: The Origin of Agriculture: A Review of some Theories. Journal of Danish Archaeology 4, 1985, pp.188-195.
- 1998a: Cemetaries, Seasonality and Complexity in the Ertebølle of Southern Scandinavia. In Marek Zvelebil, Lucyna Domanska & Robin Dennell (eds.): Harvesting the Sea, Farming the Forest. The Emergence of Neolithic Societies in the Baltic Region, pp. 193-202. Sheffield, Sheffield Academic Press.
- 1998b: Meat, Furs and Skins: Mesolithic Animal Bones from Ringkloster, a Seasonal Hunting Camp in Jutland. Journal of Danish Archaeology 8, 1994-95, pp. 87-98.

Skaarup, Jørgen 1973: Hesselø – Sølager. Jagdstationen der Südskandinavischen Trichterbecherkultur. Arkæologiske Studier Vol. I.
- 1975: Stengade. Ein langeländischer Wohnplatz mit Hausresten aus der früneolitischen Zeit. Meddelelser fra Langelands Museum.
- 1982: Siedlungs- und Wirtschaftsstrukturen der Trichterbecherkultur in Dänemark. Offa 39, pp. 39-52.
- 1985: Yngre stenalder på øerne syd for Fyn. Meddelelser fra Langelands Museum.

Skousen, Henrik 1998: Rønbjerg Strandvolde – en kystboplads ved Limfjorden. Kuml 1997-1998, pp. 29-73.

Stafford, Michael 1999: From Forager to Farmer in Flint. A Lithic Analysis of the Prehistoric Transition to Agriculture in Southern Scandinavia. Aahus, Aarhus University Press.

Sørensen, Søren A. 1995: Lollikhuse – a Dwelling Site under a Kitchen Midden. Journal of Danish Archaeology 11, 1992-93, pp. 19-29.

Tauber, Henrik 1981: ^{13}C Evidence for Dietary Habits of Prehistoric Man in Denmark. Nature 292, pp. 332-333.
- 1993: Dateringsmetoder. In Steen Hvass & Birger Storgaard (eds.): Da Klinger i Muld... 25 års arkæologi i Danmark, pp. 40-43. Århus, Århus Universitetsforlag.

Thrane, Henrik 1991: Danish Plough-Marks from the Neolithic and Bronze Age. Journal of Danish Archaeology 8, 1989, s. 111-125.

Troels-Smith, Jørgen 1954: Ertebøllekultur – Bondekultur. Aarbøger for Nordisk Oldkyndighed og Historie 1953, pp. 5-62.
- 1957: Muldbjerg-bopladsen. Naturens Verden, Juli 1957, pp. 1-33.
- 1960: Ertebølletidens fangstfolk og bønder. Nationalmuseets Arbejdsmark 1960, pp. 95-119.

Welinder, Stig 1998: Pre-Neolithic Farming in the Scandinavian Peninsula. In Marek Zvelebil, Lucyna Domanska & Robin Dennell (eds.): Harvesting the Sea, Farming the Forest. The Emergence of Neolihic Societies in the Baltic Region, pp. 165-173. Sheffield, Sheffield Academic Press.

Zvelebil, Marek & Peter Rowley-Conwy 1984: Transition to Farming in Northern Europe: A Hunter-Gatherer Perspective. Norwegian Archaeological Review 17, pp. 104-128.