

Settlement Structure and Economic Variation in the Early Bronze Age

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INTRODUCTION

The thousands of Danish burial finds dating from the Early Bronze Age constitute an exceptional source material, which for many years has formed our main basis for investigating the cultural development and for building a general picture of a dynamic age with great diversity (e.g. Kristiansen 1978, 1983 & 1987; Larsson 1986; Asingh & Rasmussen 1989, 1990). Nevertheless, our knowledge of basic aspects of this particular society

is strikingly insufficient. We need greater insight into the organisation of the primary production, a better understanding of the social behaviour and clearer evidence about the settlement structure. In other words, more knowledge about those specific living conditions which ultimately are tied to such essential problems as: how and where can a possible production surplus be made as an exchange object for the desired bronzes? Is it realistic or relevant to assume an economic surplus at all? (Larsson 1986:85).

Due to several new and important settlement excavations, some of which have already been published (e.g. Ethelberg 1987, 1993; Boas 1991, 1993), the archaeological evidence has recently improved significantly, both quantitatively as well as qualitatively. Considering the many new sites collectively and retrospectively, it is striking how varied the material is, and how few regularities there are. A well-known example is the highly unexpected environment that surrounded one of the best sites, Bjerre at Hanstholm (Bech 1991). So far only a few sites containing finds of a specific economic nature (i.e. settlements with preserved bones, plant remains, etc.) are known, yet quite a number of aspects concerning living conditions and the subsistence economy in the Early Bronze Age can be outlined.

The construction of a relative chronology based on the pottery from a selection of Early Bronze Age sites in Jutland has created a framework for a comparison of the settlements. The chronological variation and significance are in particular based on changes in the selection, character, and position of so-called specially modelled points executed on the vessel profile (Fig. 2) (M. Rasmussen 1993a:104ff.). The shape classes of the vessels as a whole do not change markedly through time, and generally speaking the pottery is not very characteristic, with undecorated, rough and relatively simple shapes. In addition to the pottery chronology, a number

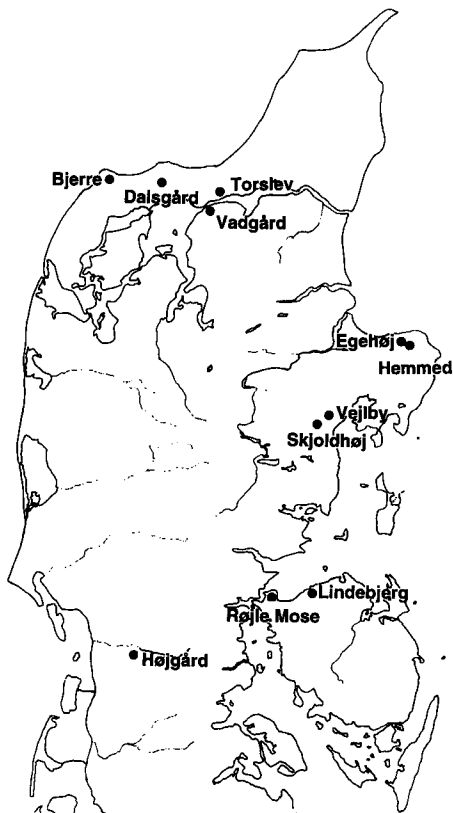


Fig. 1. Danish settlements mentioned in the text.

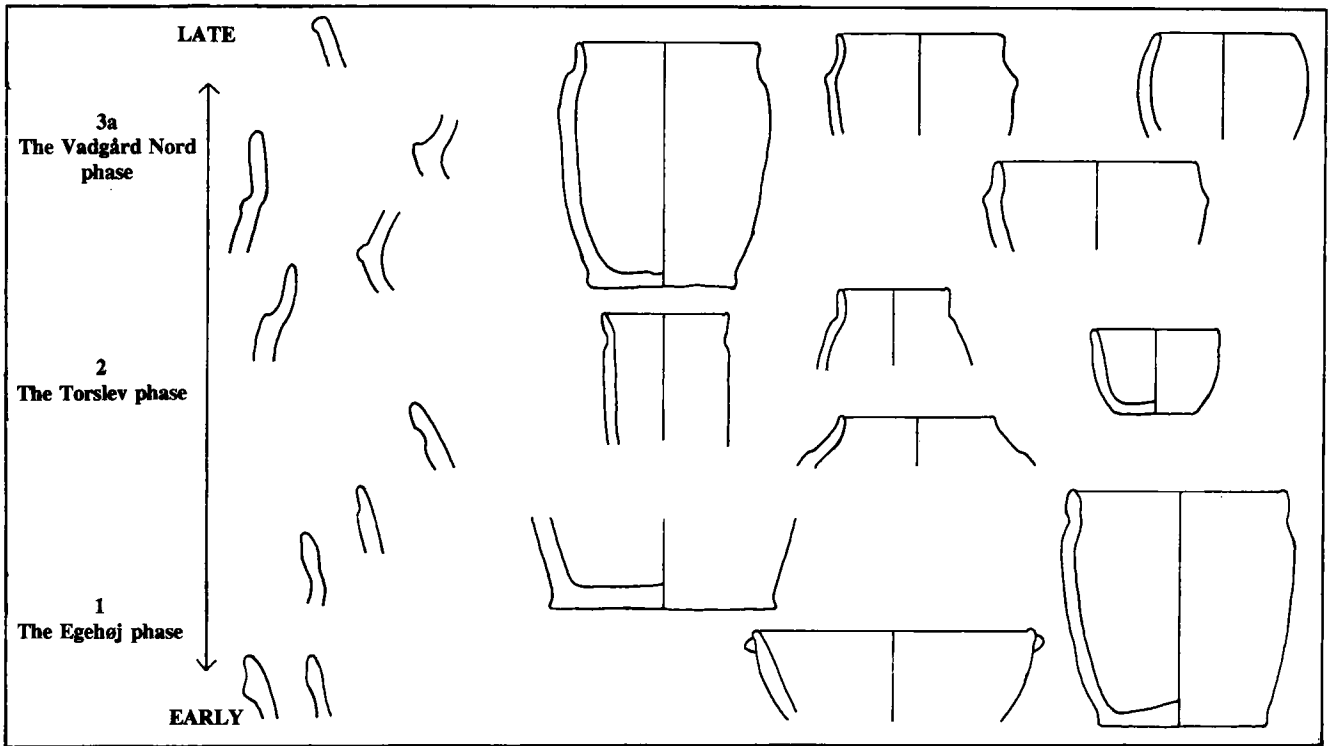


Fig. 2. Selected features of the settlement pottery, phase 1, 2 and 3a (app. period I and II). Left: specially modelled points executed on the vessel profile. Right: vessel shapes.

of radiocarbon dates are available which can supplement and elaborate discussions of the chronological order of the settlements. As is often the case, however, dates arrived at by different means can give rise to debate.

In the following, the situation in Per.I and Per.II is considered, using the material from Torslev in Øster Hanherred as a starting point. The settlement at Vadgård in the northwestern part of Himmerland and a few other sites are also referred to for comparison (Fig. 1). Only 11 km separate the two sites, and – as will become evident – they display certain similarities as well as differences.

Torslev was excavated in 1982 by Ålborg Historiske Museum (Johansen 1985). The site consists of a homogeneous, c. 20 cm thick compacted culture layer sealed under a barrow. A primary burial from Per. II had partly been dug down into the culture layer (Johansen 1985:117). No traces of constructions or similar features were found, except for a dense system of ardmarks which could be traced through the culture layer down into the sub-soil, and which was obviously older than

the burial (Johansen 1985:118ff., Fig. 5). Neither the culture layer, the ploughmarks nor other features were preserved outside the area covered by the barrow. The circumstances of the excavation did not call for further investigations of a larger area. The stratigraphy of the site is simple and reflects only three major events: Accumulation of the culture layer, ploughing and construction of the barrow (Fig. 3). None of the layers were separated by visible vegetation layers, nor could a buried soil be traced under the culture layer which lay directly over the sub-soil (Johansen 1985:117). Apparently, the three events occurred very soon after each other. This fact causes the excavator to interpret the whole process as an intentional act, with the interment as the final goal (this being the reason why the culture layer as well as the ploughmarks are limited to the area of the later barrow) (Johansen 1985:120). Vast concentrations of oyster shells in the culture layer have promoted the preservation of a small sample of bones, some worked, as well as fragments of antler (Nyegaard, this volume). Additionally, large amounts of flint and pottery were found.

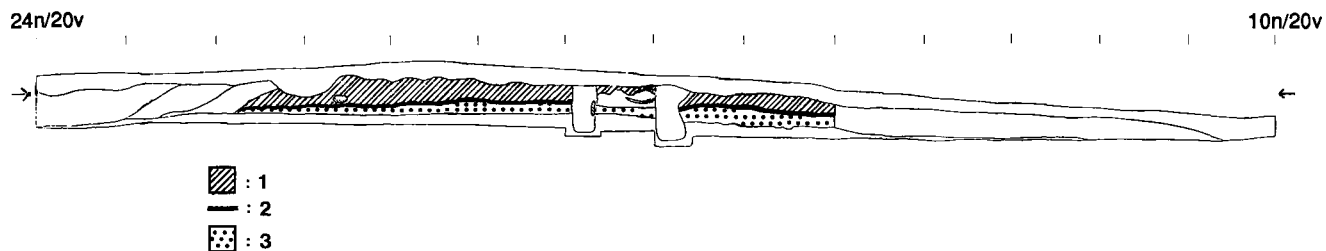
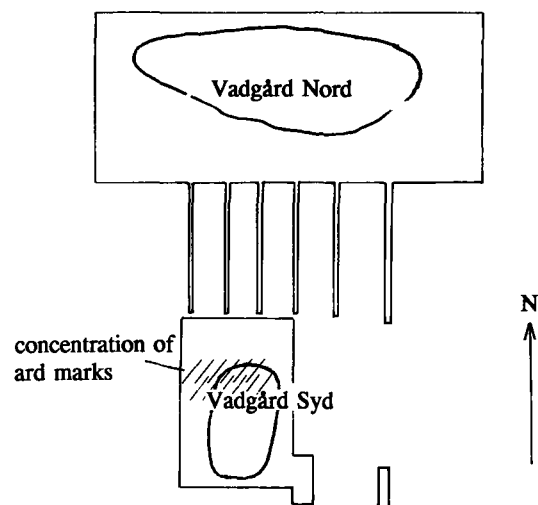


Fig. 3. N-S section through the Torslev barrow. Legend: 1) primary barrow; 2) ploughmarks; 3) culture layer.

Vadgård was excavated in 1971-76 by the late Ebbe Lomborg of the Danish National Museum (Lomborg 1973, 1976, 1980). It consists of two separate settlement units (Fig. 4) (Lomborg 1980:122): a rather large one, Vadgård Nord, which on the basis of the pottery and radiocarbon dates belongs to Per. II, and a smaller one, Vadgård Syd, which is a little older and presumably dates from the end of Per. I (M. Rasmussen 1993a:65). The settlement at Vadgård has been fully excavated and delimited; the whole area contains 15-16 dwellings or house-like constructions together with a variety of other features.



THE FINDS FROM TORSLEV

Flint

The flint material from Torslev was found scattered throughout the culture layer without particular concentrations of waste products or specific tools. Undoubtedly, the flint had been worked on the site (Johansen 1985:118). The tools found are partly made on flakes and partly by the use of pressure-flaking techniques (Fig. 5 and 6) (Johansen 1985, Fig. 2). At least a quarter of the very abundant flint debitage consists of waste products from pressure-flaking, such as thin flakes with very small striking platforms and large quantities of tiny chips. The many roughouts of daggers and sickles also testify to the presence of all stages of manufacture based on this technique. Tools made on flakes were apparently also important. Particular mention should be made of scrapers as well as flakes with partial and continuous retouch along the long edge (Fig. 5). All scrapers are

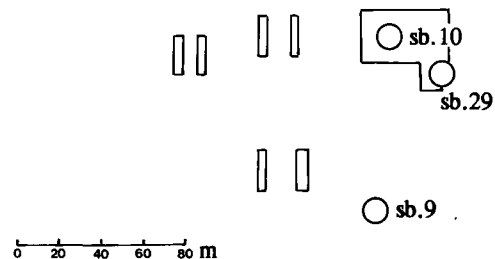


Fig. 4. Excavated areas at Vadgård with the position of the settlement units and the barrows.

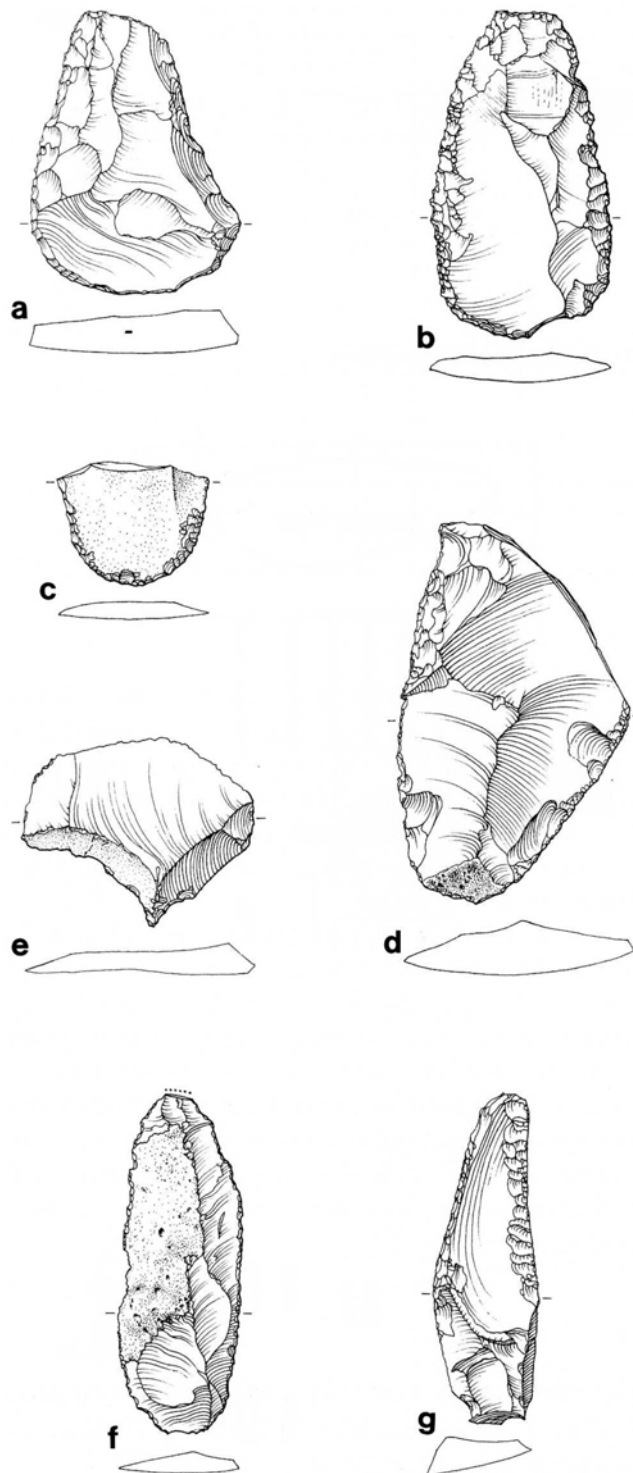


Fig. 5. Flint tools from Torslev; a), b) & c) different kind of scrapers; d) knife; e) borer; f) strike-a-light; g) flake with retouch along the long edge. Jørgen Mührmann-Lund del. 1:2.

made on flakes, but morphologically they can be divided into simple flake scrapers and hafted scrapers.

It is difficult to make comparisons with earlier published finds from the Early Bronze Age, as the categories of tools do not correspond, the criteria of the different groups may vary and the methods of calculation cannot be compared directly. Certain aspects may be mentioned, however. The relationship between tools and waste products generally corresponds to that seen at Røjle Mose and Lindebjerg (Jæger & Laursen 1983, table I), with a degree of utilisation of 7-10%, whereas at Egehøj it is only 2% (Boas 1983:95). The various types of scrapers constitute almost one fifth of the tools on most sites, which demonstrates their great significance. Only at Røjle Mose are the scrapers less frequent. A more specific variation appears when comparing Egehøj and Torslev: At Torslev the simple flake scrapers dominate, while the hafted scrapers are most common at Egehøj (Boas 1983:95). Differences among the various types of worked pieces can also be observed. Torslev and Egehøj contain a relatively large number of pieces with edge retouch, while Lindebjerg and Røjle Mose contain mostly notched or toothed flakes (Jæger & Laursen 1983, table I). This situation may however be partly due to different criteria used in categorisation. On the other hand, the categories of daggers, sickles and arrowheads are more comparable. Torslev contains a remarkable number of daggers and sickles, compared with the other sites. The comparison with Egehøj is considered reliable, because roughouts are included in the calculation. Torslev contains twice as many daggers and sickles (almost 20% of the total number of tools) as Egehøj (almost 10%). On the other hand Egehøj has an exceptionally high frequency of pressure-flaked arrowheads (about 35%) (Boas 1983:95), which are present at the other three sites at a frequency of only 3-5%.

Although the validity of certain variations cannot be confirmed, it can be concluded that the distribution of the various flint artifacts on the individual sites reflects particular needs. It is striking that the variation is primarily seen in the tools made by pressure-flaking (daggers, sickles, arrowheads), while there is a higher degree of correspondance as regards tools made on flakes. For instance, there are large numbers of scrapers, somewhat fewer borers and virtually no burins. The general characteristics of the flint material and the appearance of the individual tools show however a good measure of agreement. As regards shape, manufacturing technique

Flakes			1549
Cores, core fragments and nodules			163
Tools made on flakes:			75
Scrapers:		20	
Flake scrapers	14		
Hafted scrapers (spoonshaped: 4, pearshaped: 2)	6		
Borers		5	
Flakes with partial edge retouch		20	
Flakes, toothed or notched		11	
Flakes with continuous edge retouch:		19	
continuous retouch along one long edge	15		
continuous retouch along both long edges	4		
Pressure-flaked tools:			45
Daggers or sickles roughouts		26	
Daggers, dagger fragments, roughouts and strike-a-lights		7	
Sickles, sickle fragments and roughouts		9	
Arrowheads and arrowhead roughouts		3	
Stone tools:			7
Hammerstones		6	
Whetstone		1	

Fig. 6. Inventory of finds of flint and stone tools from Torslev.

etc., the tools from Torslev can thus easily be paralleled with those from Lindebjerg and Røjle Mose (Jæger & Laursen 1983:108ff).

Pottery

With regard to quantity, the pottery (Fig. 7) (Johansen 1985, Fig. 3) from Torslev stands out compared with other contemporaneous sites. The sherds represent at least between 29 to 41 whole vessels, including both single-, bi- and tri-segmented shapes. Both the single- and bi-segmented vessels belong mainly to a group of small, slim beakers or more plump cups: there are also a few bowl types. The tri-segmented vessels dominate and can be classified into two groups; barrel-shaped, medium-sized vessels with a highly placed transition between neck and bowl, and smaller, more open vessels with a characteristic carination, curved conical neck and rim part and a highly placed transition between neck and bowl. Generally speaking, several of the latter must be described as concave-convex vessels. The bases are very similar and the predominantly weak inclination relates them to the common barrel shape. Bases both with and without a marked foot are present. The wall thickness of the majority of the sherds (2/3) varies between 0.8-1.3 cm, but the overall range is considerable, from 0.4 to 1.8 cm. All sherds are tempered with angular grains of granite, but in terms of quantity, size, den-

sity and mixture with other materials (sand, moraine gravel and shells) the extent of the coarseness varies. There is also variation in the degree of care taken in the treatment of the surface. The most common finish is a so-called self-slip treatment, which primarily can be recognised from the protruding temper grains surrounded by a cracked surface.

The pottery is very typical of the first part of the Early Bronze Age with regard to elements of its shape, the range of shapes in the inventory and the ware. Thus it serves as a reliable basis for a general typology for Jutish settlement pottery, and has in this respect been described in detail elsewhere (M. Rasmussen 1993a:53ff.). As a result of the find conditions the pottery is quite fragmented. It is evenly distributed throughout the culture layer with no concentrations of sherds resulting from whole vessels.

THE DATING OF THE FINDS FROM TORSLEV AND THE SETTLEMENT CHRONOLOGY AT THE BEGINNING OF THE BRONZE AGE

There are several possibilities for an archaeological dating of Torslev. A flint dagger of Lomborg's type VI points towards Per. I-II (Johansen 1983:118). This is in accordance with the stratigraphical position of the cul-

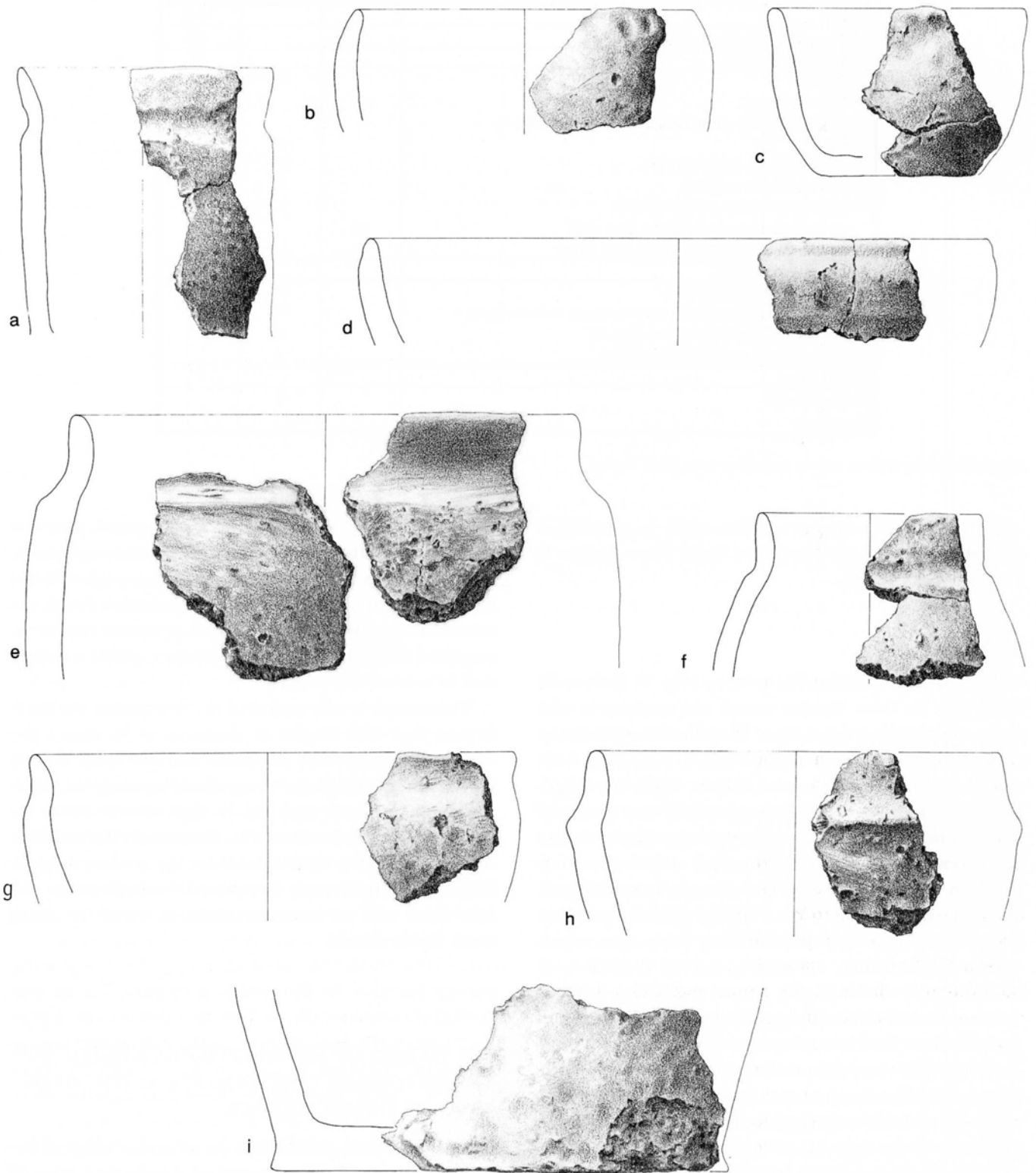


Fig. 7. Pottery from Torslev; a, b, c & d) single- and bi-segmented beakers, cups and bowls; e & f) tri-segmented barrel-shape; g & h) tri-segmented vessels with a characteristic carination and curved neck and rim part; i) base with a marked foot. Jørgen Mührmann-Lund del. 1:2.

Sample no.	Site and context	¹⁴ C years b.p.	Calibrated B.C.	± 1 std. dev. B.C.
K-4413	Vadgård N, CO, fireplace	3040 ± 80	1290-1270	1400-1130
K-2073	Vadgård N, BE, wall-ditch	3070 ± 100	1380-1320	1430-1140
K-2074	Vadgård N, BF, cooking pit	3110 ± 100	1400	1500-1230
K-2238	Egehøj, house III, posthole	3160 ± 100	1420	1520-1310
K-2602	Vadgård N, CB, pit	3180 ± 85	1430	1520-1330
K-2601	Vadgård N, CC, oven	3200 ± 85	1440	1520-1400
K-4294	Vadgård S, FD, fireplace	3230 ± 80	1510	1600-1410
K-2240	Egehøj, well II	3240 ± 100	1510	1620-1410
K-4293	Vadgård S, KB, wall-ditch	3260 ± 80	1520	1620-1430
K-4295	Vadgård S, FE, posthole	3270 ± 85	1520	1630-1430
K-2709	Vadgård S, FD, house depression	3270 ± 90	1520	1670-1430
K-2239	Egehøj, well I	3340 ± 100	1620	1740-1510
K-5756	Torslev, culture layer	3360 ± 80	1670-1640	1740-1520
K-5755	Torslev, culture layer	3390 ± 80	1680	1750-1530
K-5754	Torslev, culture layer	3420 ± 70	1730-1690	1860-1630
K-4024	Vejlby, house depression	3420 ± 80	1730-1690	1870-1620

Fig. 8a. Radiocarbon dates from Early Bronze Age settlements. Vejlbj after Jeppesen 1984:101; Egehøj after Boas 1983:101. Calibrations according to Pearson and Stuiver 1993.

ture layer, which excludes a date later than Per. II. During this period the first phase of the barrow was built, sealing the culture layer in connection with the construction of the primary burial. The pottery also indicates a date in the early part of the Early Bronze Age. It is characteristic of a ceramic phase that typologically must be placed between the pottery from the houses at Egehøj and that from the northern site at Vadgård (Fig. 2) (M. Rasmussen 1993a, Fig. 139). Consequently, an archaeological dating to Per. I or around the transition between Per. I and II is probable.

Nevertheless, three radiocarbon dates from Torslev both widen the basis for the dating and lead to further discussions of the chronology at the beginning of the Early Bronze Age as well as to considerations about Torslev's relationship to other contemporaneous sites (Fig. 8) (1). The dating based on the ceramic typology and the absolute datings apparently do not correspond. Previously, the situation was more straightforward as the radiocarbon dates from Egehøj and the northern site at Vadgård, which were virtually the only ones available, could be regarded as corresponding to Per. I and Per. II,

respectively. The new datings from Torslev, together with the analysis of the pottery, undeniably reveal a somewhat more complex situation.

According to the classification and chronology worked out for the pottery from Early Bronze Age settlements (M. Rasmussen 1993a), Torslev and the southern site at Vadgård belong to ceramic phase 2, while Egehøj and Vejlbj (Jeppesen 1984) must be placed in phase 1 (Fig. 2). However, the radiocarbon dates from the southern site at Vadgård correspond with the dates from Egehøj (K.L. Rasmussen 1993:157), while the dates from Torslev are even older (Fig. 8). Not just the pottery, but also the flint artifacts separate Torslev and Egehøj chronologically, as Torslev only contains a type VI-dagger, while Egehøj contains the well-known combination of miniature daggers of type V and VI (Boas 1983:99f.). Only Vejlbj, from phase 1, has earlier dates than Torslev. Vejlbj contains pottery of the same appearance as that at Egehøj, and collectively the radiocarbon dates from these sites could suggest a very long duration of the Egehøj-type pottery. However the situation is not so simple. Firstly, the question is whether the

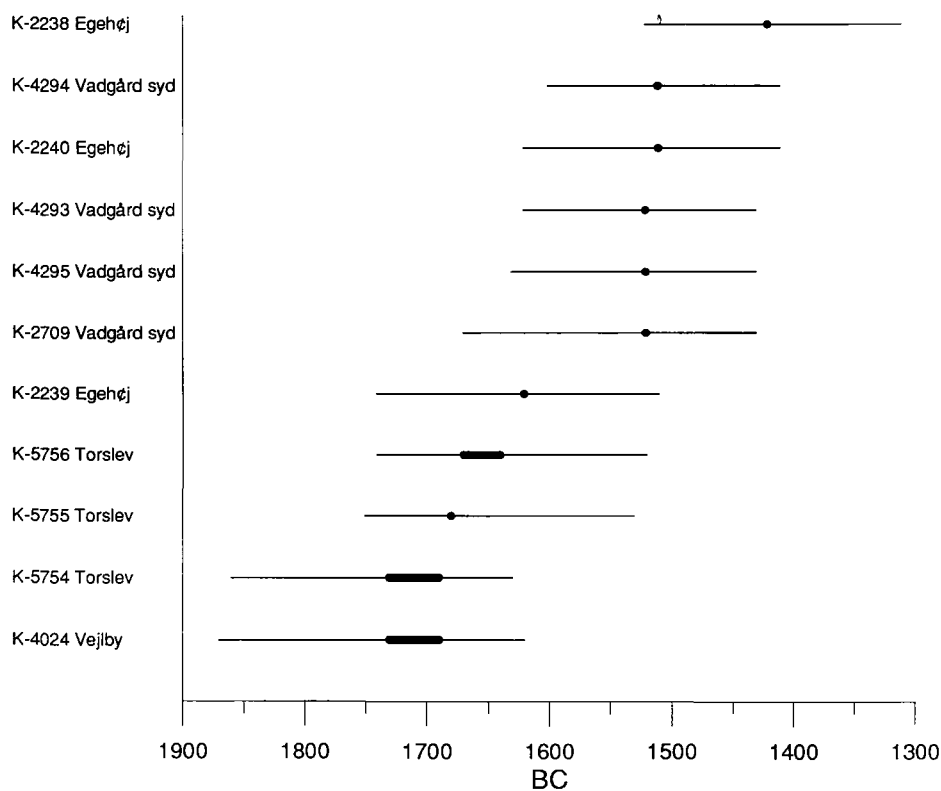


Fig. 8b. Radiocarbon dates with ± 1 standard deviation.

radiocarbon dates from Egehøj actually represent the same settlement phase as the main part of the pottery. The site certainly includes elements from the Late Bronze Age, but also other secondary elements from the Early Bronze Age (M. Rasmussen 1993a:121). Secondly, the dating from Vejlbjby cannot be regarded as absolutely reliable, as it is a small site with a dating from a structure that may contain other, secondary elements. With regard to both the ceramic typology and the radiocarbon dates, Torslev is definitely older than the northern site at Vadgård. Compared to the southern site at Vadgård, Torslev is contemporaneous with regard to ceramic typology, while the radiocarbon dates are older. This may either indicate that the pottery typical of Torslev also covers a long time-span, or that the southern site at Vadgård must be viewed as a transition between Torslev and the northern site at Vadgård. This question cannot be resolved, due to the small amount of pottery from the southern site at Vadgård.

So far, the pottery as well as the radiocarbon dates from Torslev and Egehøj form the most important basis for discussions of chronology at the beginning of the

Early Bronze Age. The discrepancies and the lack of correlation may suggest regional differences in the development of the pottery, but without further evidence and analyses this hypothesis cannot be proved. It is clear, however, that the radiocarbon dates from Egehøj are not without problems, and they may not just represent Per. I. They may be too young, just as the datings from Torslev may be too old. The lack of correspondence between, on the one hand, the pottery and the house types at Egehøj and, on the other, the fairly young dates, is also emphasized by the fact that contemporaneous dates from other sites are connected with a possibly later, three-aisled house-type (Højgård, house I, Ethelberg 1993, Fig. 18).

TOPOGRAPHY AND ECONOMY

Though both are located fairly close to the Limfjord, Torslev and Vadgård each represent parts of the large diversity which characterizes the settlements from the Early Bronze Age with regard to the surrounding topo-

graphy. Torslev is situated in the middle of a plateau, about 35 m above sea-level, and with clear views in all directions. The ridge is located on an approximately 3 km wide and very hilly moraine tongue, which slopes down towards the Limfjord, surrounded by a raised sea floor (Johansen 1985:115). The topographical factors of its location form the basis for an evaluation of the resource potentials of the site. Despite the rather short distance to the Limfjord, the location faces inland and has traditional connections with areas suitable for arable agriculture (Fig. 9). This is apparent in particular from the local, hilly, well-drained landscape inside the 1 km zone. There is however no major watercourse here. With regard to the resource area inside a 2 km zone, a stream, Pallisvad Å, is reached to the west, and simultaneously the proportion of meadow or raised sea floor increases to 1/3 of the resource area. It is difficult to determine the importance of these wetland areas for the economic basis of the settlement, as we do not know the exact sea level in the Bronze Age. The banks of Pallisvad Å have offered potential grazing, but the hinterland to the north and west (approx. 2/3 of the area) is characterized by large, well-drained inland areas with good arable potential. In conclusion, the factors of location point to a position which is ideal for agriculture, but at the same time provides easy access to the fish and shellfish resources of the fjord. The distance across the channel of the Limfjord nowhere exceeds 4 km in this area, a fact that offers splendid possibilities for passage and communication.

Vadgård, on the other hand, is situated only 10-15 m above sea level, on top of a Littorina slope, which delimits the site to the north, and which falls steeply towards a wetland area bordering the present-day Limfjord. There can be no doubt that the original location was coastal (Fig. 10). Only about 1/3 of the area inside the 1 km zone can be characterized as suitable for arable agriculture. On the other hand, this area is well-drained and rises evenly to the south. The remaining 2/3 of the area at present consists of raised sea floor and was either open sea or a water meadow in the Bronze Age. However, a distinction must be made between the wetland to the north and that to the west of the site. The area of Vesterkær is sheltered by Højrimmen which is a rather large gravel bank (2). It may be that this area was an enclosed water meadow, while the area of Nørrekær, which at present still must be heavily drained in order for it to remain dry land, was perhaps open sea and thus

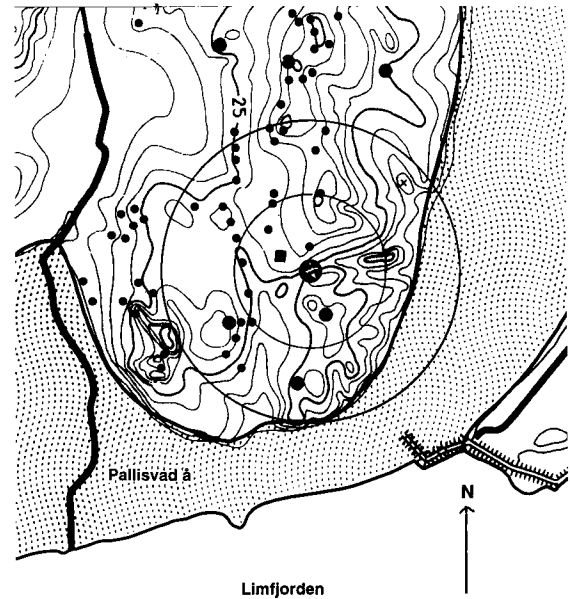


Fig. 9. Geomorphological map showing the location of the Torslev site. The larger dots indicate barrows dated to the Early Bronze Age. The square dot indicates the position of a ploughed over settlement site, sb.88. 1:50,000.

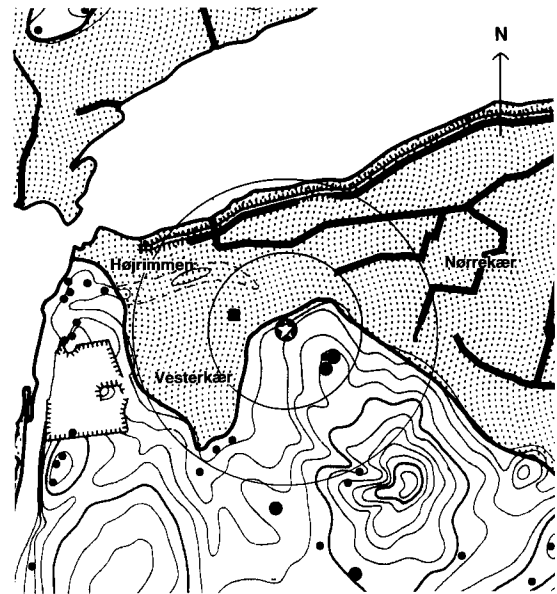


Fig. 10. Geomorphological map showing the location of the Vadgård site. The larger dots indicate barrows dated to the Early Bronze Age. The square dot indicates the findspot of the flint dagger, sb.36. 1:50,000.

the inner shallow part of the fjord. A flint dagger of type VI was collected in the Vesterkær area in 1976, in connection with a dark, oblong structure. Lomborg proposed that this structure could be an inhumation grave below ground level dating from the Early Bronze Age (3). If this interpretation is correct, then Vesterkær must have been dry land in the Bronze Age. Inside the 2 km zone, approximately the same relation exists between dry arable areas and wetlands, including meadows and the fjord. The narrow channel of the fjord, with a depth of more than 8 m, is reached at the far end of the zone. Before this point the fjord is fairly shallow. The broad, shallow section between Vadgård and the channel must have offered good opportunities for gathering shellfish and fishing for, for instance, flatfish and eel. The various factors reflect a location which primarily has attached importance to the access to the Limfjord both with regard to the exploitation of its resources and passage across, as well as access to large grazing areas. The sizes of the wetlands cannot be calculated exactly without better knowledge of the sea level in the Bronze Age. If arable areas had been the primary factors of location one would expect a differently located settlement.

The soil at each site consists mainly of moraine sand. The almost classical "Early Bronze Age location" of Torslev is confirmed by a dense distribution of other barrows in the neighbourhood (Fig. 9). However, only a few have been excavated and consequently dated. Inside the 2 km zone, there are six other barrows containing burials from the Early Bronze Age, but none are with certainty contemporaneous with Torslev. One is definitely considerably younger, as it dates from Per. III. At Vadgård the picture differs (Fig. 10). Apart from three located just south of the site (Fig. 4), the barrows in the vicinity are very scattered. Only two other barrows from the Bronze Age are present inside the 2 km zone. To this the aforementioned inhumation grave and the three barrows must be added. It was tempting to imagine a relationship between the three barrows and the settlement. For this reason they were investigated during the settlement campaign, but unfortunately none of them contained finds which can be related to the settlement in a chronologically convincing way (M. Rasmussen 1993b:178).

The finds from Torslev reflect a broad economic spectrum, mainly due to the excellent conditions for preservation for the time period in question. The gathe-

ring of oysters must have been important judging from the concentrations of shells. The preserved bones include examples from flatfish, cattle, sheep/goats, pigs, dogs and red deer – the latter are also represented by antler fragments (Nyegaard, this volume). Although the sample is small, it reflects a broad spectrum of species, and it is evident that the occupants of the site had all the common domestic animals, in addition to which they hunted as well as fished and gathered shellfish in the fjord. Agricultural activities are revealed by the presence of pressure-flaked sickles, impressions of cereal-grains inside vessels and ardmarks.

At first glance the ardmarks appear only to originate from a single criss-cross ploughing together with another ploughing direction to the north and west (Johansen 1985, Fig. 5). The latter was related to other finds with circular delimiting ardmarks, interpreted as ritual ploughing in connection with the construction of barrows (Johansen 1985:120). According to this hypothesis, the purpose of the ploughing was primarily to delimit the area of the subsequent barrow, and thus the fact that they could not be traced outside the barrow was explained. However, it appears on closer inspection that other parts of the area also contain traces running in the same direction as the northwestern ones. Likewise, the northeastern corner contains traces that cross the outline left by a delimiting ploughing direction: thus it does not delimit all existing traces. As the ardmarks thus represent two different directions in two different systems, the possibility exists that they originate from two different ploughings, which means that the area had been ploughed during at least two seasons (Thrane 1991:115). The ploughmarks in the northwestern corner are straight and cross each other at right angles. They do not form a neatly rounded circle, as can be observed at the suggested ritual ploughings (Wiell 1976, Fig. 8). This must mean that they originate from a real criss-cross ploughing, which normally is related to practical agricultural activities (Thrane 1991:116). Obviously, a congruent direction of all traces cannot be expected in order to suggest that they originate from the same system. At Gadbjerg, a stratigraphical documentation of two systems shows a deviation of 22.5 degrees between them (Thrane 1967:41). Subsequently, if we allow for a deflection of 10 degrees to each side of the main direction of the system, the proposed number of existing systems is not exaggerated. Especially not when compared with the small deflections, which are

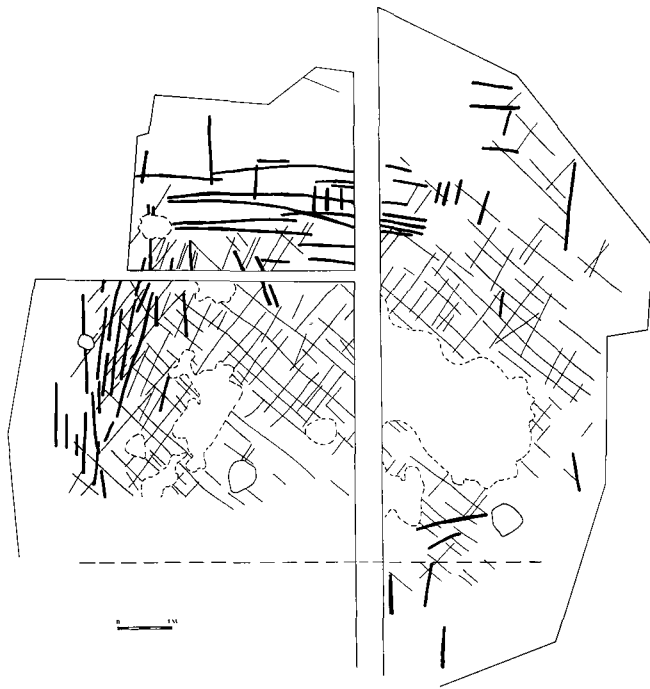


Fig. 11. The possible two ploughing systems at Torslev. Redrawn after Johansen 1985, fig.5.

used elsewhere as a basis for isolating several systems (Fowler 1983, Fig. 44). Fig. 11 illustrates the two ploughing systems, that might be isolated at Torslev. Due to the lack of stratigraphical evidence, the chronological relationship between the two systems cannot be determined. At Gadbjerg, the younger system could be traced everywhere in the deeper layers together with the older system, despite a difference in the first observable level of 1 cm (Thrane 1967:41). Accordingly, the least well-preserved system at the level of the natural sub-soil is not necessarily the youngest/last created, and conversely the best preserved one is not necessarily the youngest, destroying the oldest. It may be a matter of different degrees of intensity in ploughing. It has often been proposed that a distinction must be made between several kinds of ploughing. Deep ploughing, which cuts through the former top soil and leaves traces in the sub-soil, perhaps represents a special kind of ploughing, different from that used in tilling the soil (Reynolds 1981:99ff.; Pedersen 1987:172; Thrane 1990:485).

The area under the barrow at Torslev may have been cultivated for several seasons prior to the primary burial

and the construction of the barrow. Although this influences the estimation of the exact time span over which events took place, it cannot change the impression that it all took place very rapidly. If we discount the significance of the other small and scattered traces of a similar orientation, another possibility could be that the special orientation of the ploughing in the northwestern corner represents the remains of a field boundary. Field boundaries have been observed in a few cases (Thrane 1990, Abb.3 & 4; Bech 1991, Fig.6). This suggestion also implies, however, that cultivation took place over a longer period of time. The evidence for cultivation demonstrates the importance of agriculture as a part of the broad economic strategy on the site. The arguments in favour of ritual ploughing must be rejected no matter which of the above interpretations is correct. The cultivation of the area was not confined to a single, isolated ploughing, and the proposed delimitation is not consistent: it does not have the right shape, neither does it delimit all traces and it can readily be regarded as either another ploughing system or a field boundary. The conditions of preservation may explain why the ploughmarks are only visible inside the area of the barrow. The original suggestion that there had been ritual ploughing in connection with the later interment was founded on the missing vegetation layers between the sub-soil and the culture layer and the culture layer and the mound fill, respectively (Johansen 1985:117ff.). There may be other reasons for this phenomenon, such as the deliberate removal of the turf for other purposes or sand drift in connection with cultivation (M. Rasmussen 1993b:179ff.). All things considered, the period of cultivation may have lasted longer than previously suggested, especially if not all ploughing episodes have left traces in the soil. We know far too little about the preservation of ardmaks (Thrane 1991:112). In spite of this it still seems likely that all the events which took place on the site belong in the same cultural context.

The economic evidence from Vadgård is dominated by agricultural elements. In several areas ardmaks were observed during the excavation, which clearly indicates the integration of fields in the settlement area (Fig. 4). The ardmaks are not documented in the form of photographs or drawings, however, which means that the description is based solely on the information in the report. The report states that the main orientations were north-south and east-west, but also that various other orientations and varying distances between furrows

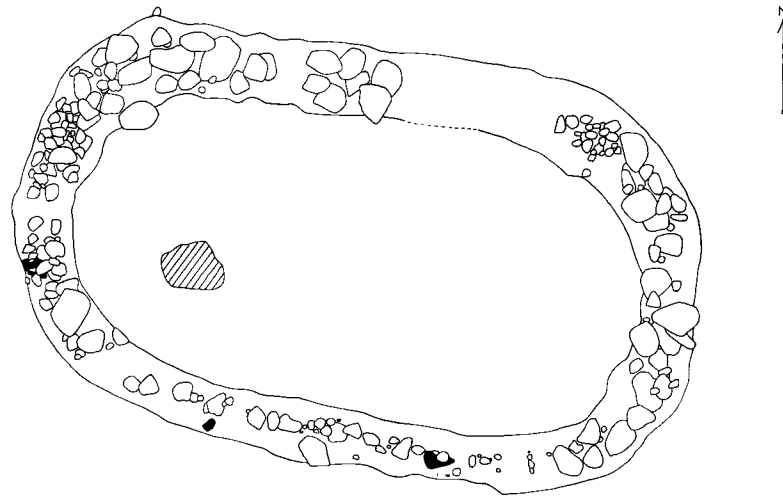


Fig. 12a. Vadgård Nord, turf-construction BJ. 1:100.

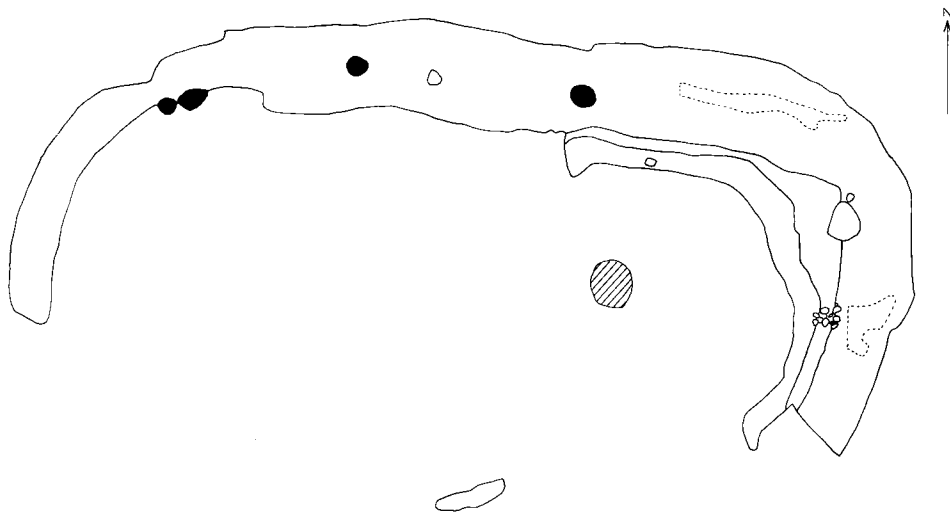


Fig. 12b. Vadgård Nord, turf-construction BG. 1:100.

could also be observed, indicating several different systems of ploughing. Other evidence of agriculture was present in the form of impressions of cereal grains in pottery vessels, pressure-flaked sickles and large amounts of quernstones. Of primary importance is the find of carbonised cereal grains, particularly of Spelt, but also of Naked and Hulled Barley as well as weed seeds from species common on arable land (Jørgensen

1979:136f.). The clear indications of agriculture from the finds at Vadgård are almost in contradiction to the locational indications with regard to the exploitation of resources. This is just as thought-provoking as the impression that the finds from Torslev, which is situated in a typical agricultural environment, reflect a broad economic spectrum.

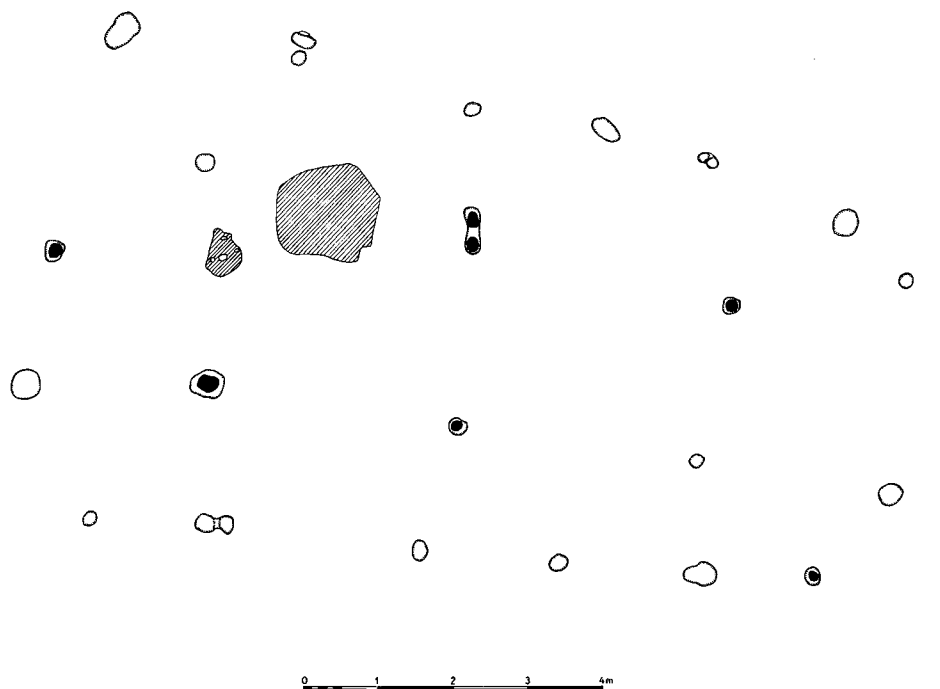


Fig. 12c. Vadgård Nord, post-built house BL. 1:100.

SETTLEMENT STRUCTURE

In addition to the specific finds, the sites also provide other kinds of information concerning the activities and way of life. At Vadgård the house constructions form the most distinctive evidence. At Vadgård Nord there is a total of five houses or huts with thick, turf walls (Fig. 12). They only measure between 7-12 m long by 4-5 m broad, and occur in two versions: One, an oval construction totally enclosed by turf walls is generally a little older than the other, which has had a southern wall of a lighter construction (M. Rasmussen 1993a:69). None of the houses have internal roof-bearing constructions and only a few have a hearth.

Only a few parallels to these special house types are known. The very use of turf as a building material is a phenomenon well-known from historical times, which, in the case of the Islandic farms for example, must be due to the resources available. Whether this also applies to turf buildings from the Iron Age will not be discussed here, but with regard to both of these examples, each turf building represents a single farm-unit. Thus, they have presumably had a different function from the turf

buildings at Vadgård. It is not certain that the archaeologically visible part of the construction – the buried wall-trench containing pieces of turf – necessarily represents the entire construction of the original wall. It may represent a buried foundation for a supplementary material which is no longer preserved. Stabilization of wooden walls with a base of earth or turf is known from, for instance, Hemmed Church, house I (Boas 1991:90). However, this is in the form of a footing placed on the surface to support the wall, not a buried foundation. At the same time it is difficult to imagine which supplementary material other than turf could have constituted the wall without leaving a single trace.

Rather than the actual building material, parallels to outline and size should be sought. Small, so-called U-shaped houses with a buried wall of earth or turf are known from sites in Rogaland in Norway (Løken 1989:143). So far, the oldest dated example of this house-type is from 3360 ± 70 bp, but the type is apparently present throughout the Bronze Age and into the Pre-Roman Iron Age (Løken 1989:143f.). Some of the houses, for example, the house from Sandve, Ognå (Skjølsvold 1970, Fig. 3), are very similar to the ones at

Vadgård, where the buried walls enclose the whole house and where there is no internal roof-bearing construction. Others differ in that the buried turf wall has apparently only constituted one of the gables, while the other is not preserved, together with the fact that they contain internal roof-bearing posts. An example of this is a house from Forsand (Løken 1989, Fig. 3). From Denmark, the closest parallels are seen at Røjle Mose. They belong to the category without systematically placed internal roof-bearing posts and are dated to the Early Bronze Age (Jæger & Laursen 1983, Figs. 7, 9 and 12). That other examples must also be present, however, is demonstrated by a hitherto unnoticed Danish site, Skjoldhøj, which has a small building measuring 10.5 by 7 m. This house was constructed with a northern turf wall, an eastern turf gable, and more "normal" wall trenches to the south and west. Alongside the walls some posts were found, but an internal, systematic roof-bearing construction was lacking. This house did however contain a hearth. On the basis of the pottery, the house must be dated to the Early Bronze Age (4).

These constructions differ markedly from the two- and three-aisled longhouses of the Bronze Age and may have had special functions in connection with special economic conditions. Recently, a number of sites have revealed the presence of house types and constructions

over and above the three-aisled longhouses (Boas 1993:123f.; Ethelberg 1993:147). They represent several different types, which may have had specific functions, but which are often just designated "economy buildings". The actual function of the turf buildings is difficult to determine. Together with an ordinary longhouse, a Dutch Hilversum-Culture settlement at Nijnsel in northern Brabant contained some small horseshoe-shaped trenches (Beex & Hulst 1968, Fig. 4). They are interpreted as the possible remains of pits for storing root or tuberous crops because of their similarity to the trenches around potato and beet mounds which one finds nowadays (Beex & Hulst 1968:125). The structures from Nijnsel are smaller than the other parallels, but the suggestion that they have a storage function must be noted. The Norwegian structures are interpreted as dwellings in a specially adapted agricultural economy, differing from that which characterizes larger sites with three-aisled longhouses (Løken 1989:144ff.).

Any suggestions as to the function of the turf buildings must be based on various factors, such as location, interior arrangements, size and the special interior climate which exists due to the turf walls. It is not at all certain, that all buildings are to be interpreted similarly. The parallels at Røjle Mose and Skjoldhøj demonstrate that the houses at Vadgård are not to be regarded as a

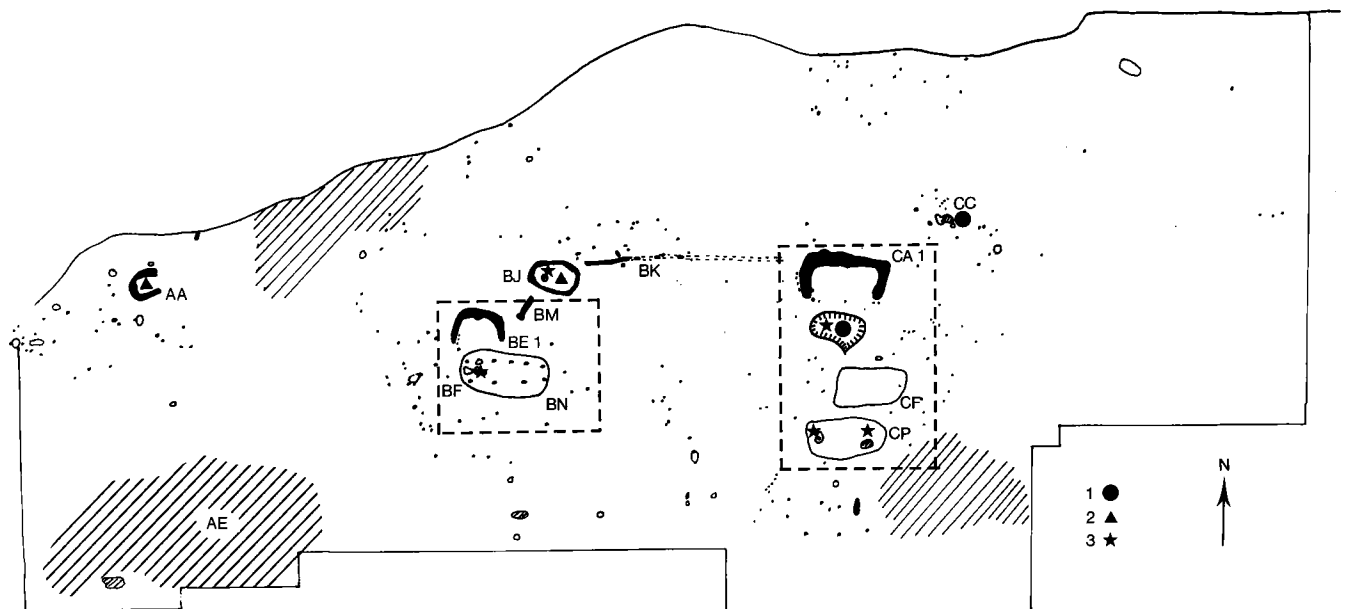


Fig. 13a. The building groups at Vadgård Nord, early phase. AE is the mentioned waste area. Legend: 1) structures older than the main phases; 2) single turf building with a special function; 3) hearth.

local phenomenon. The Norwegian houses, the houses at Skjoldhøj and Røjle Mose all contain hearths, while this only applies to a few of the houses at Vadgård. Buildings with hearths and the larger huts with internal roof-bearing posts may have functioned as dwellings, while the huts at Vadgård lacking hearths may primarily have been used for other purposes. The theory about storage buildings is tempting but seems difficult to combine with the interior climate of turf buildings. The interior has almost certainly been frost-free and warm; on the other hand the room must have been very humid, which makes it difficult to see the advantage of storing, for instance, foods like cereals, dried fish etc. However, there is no doubt that the huts provided shelter with their solid eastern, western and northern walls. An alternative to the theory that they were used for storage space may be a function as housing for cold-sensitive animals. However, also the accessible resources may have been a determining factor. Large grazing areas indicate that it was possible to obtain plenty of turf, while it is not at all certain that wood was easy to obtain. A reflection of which may be the small light post-built buildings. While the available resources may have determined the building material, the size and interior arrangement of these huts must be related to their function.

However, not only the turf buildings at Vadgård are small and short, when compared to other contemporaneous house types. The same also applies to the post-built houses, which measure ca. 12 m by 5-6 m (Fig. 12). The existence of these particular house types and the fact that so many different types are present at the same site, gives rise to further speculation as to the character and structure of the settlement.

A contemporaneous existence of all the houses is physically impossible. The results of radiocarbon datings and especially the observations of distinct phases in the turf buildings (i.a. fire layers and repairs) indicate that the site was inhabited over a longer period. When combining the different chronological information, such as absolute datings, the phases of the constructions, the stratigraphical relations and the mutual location, two main phases and a few older events can be separated at the northern site at Vadgård (M. Rasmussen 1993a:68ff.). In each main phase the buildings are divided into two separate groups in the eastern and the western sections of the site, respectively (Fig. 13). Neither the contemporaneous ones, nor the chronologically differentiated groups are completely similar, but each is made up of at least two different house types. It is characteristic that each group in both phases contains at least one turf building lacking a hearth as well as a

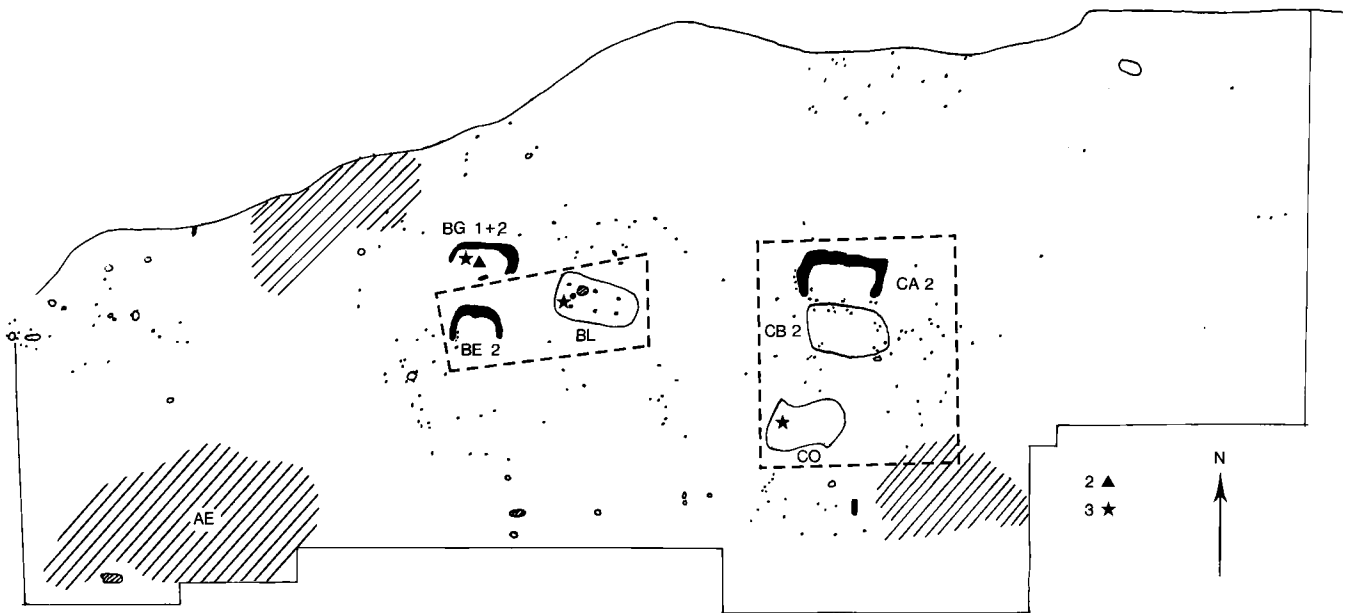


Fig. 13b. The building groups at Vadgård Nord, late phase. AE is the mentioned waste area. Legend: 1) structures older than the main phases; 2) single turf building with a special function; 3) hearth.

post-built house with a hearth. The division into two groups of contemporaneous buildings, the closeness of the buildings inside the single groups as well as the above-mentioned composition of house types, collectively suggests that the groups represent units that belong together. Each unit consists of at least one post-built dwelling-house and one so-called economy building made of turf. Apart from these central buildings, the western group in each main phase contains a single turf building with a hearth, which may represent quite another function, or which might have been used for housing a certain group of people.

The structure of Vadgård Nord during the two phases testifies to a settlement structure of a quite strong organisational character. Not only the buildings, but also the distribution of the finds, can shed light on the organisation of the settlement. It is well-known that bronze artifacts only rarely are found at these sites, but also the more common find categories – flint and pottery – usually occur only in very small quantities. The scarcity of finds, i.e. waste, is so striking for this period that rather than being merely accidental, the causes must have been culturally determined.

The majority of the pottery found at Vadgård comes from a huge concentration of waste in a single natural depression on the periphery of the site (Fig. 13), and from the wall ditches of the turf buildings. The latter group consists of large, well-preserved sherd collections deriving from whole vessels which have been deposited in connection with the foundation of the wall before the turf-building began. They probably represent deliberate depositions of a ritual nature (Lomborg 1976:418f). Only a very small amount of the pottery-waste comes from a few of the several pits in the area. Apparently this reflects a somewhat unusual deposition pattern, according to which the waste has been moved to the aforementioned depression outside the central settlement area. The specially selected character of the waste area is emphasized by the fact that six similar depressions did not contain finds but only material deposited by the wind.

The site at Torslev in itself is an example of this situation, where waste is deposited in a specific area selected for the purpose. As already mentioned, no structures were found in connection with the culture layer, which therefore does not belong to that part of the settlement, where buildings were erected. All the pottery from this site consists of waste from worn-out and bro-

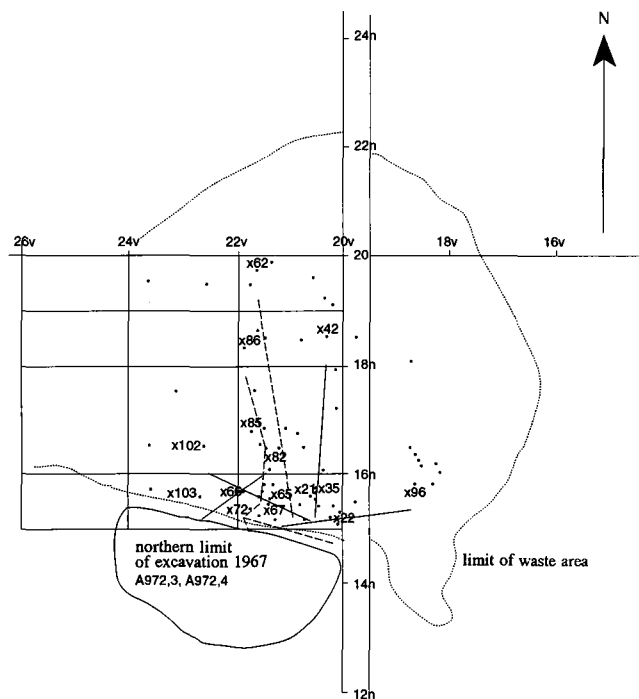


Fig. 14a. The horizontal distribution of pottery-sherds at Torslev. Lines indicate examples of different situated sherds from the same vessel.

ken vessels. Based on criteria of ware as well as shape, a series of experiments were undertaken involving refitting of sherds from the culture layer. These experiments showed that fragments from different levels and different surface-squares belonged to the same vessel (Fig. 14), and in a few instances they could be refitted to larger vessel fragments or almost whole vessels (M. Rasmussen 1993a:61f.). The pottery reflects a complete dispersal caused by the accumulation of completely accidental dumpings of waste. The totally homogenous character of the whole culture layer as well as the obvious affinity of the finds, physically as well as chronologically, demonstrates that the layer is one unit, accumulated over a short time-span. The large amount of waste, collected during a short time, demonstrates further that the area had been deliberately chosen for the deposition of waste. The site must be regarded as a midden or rubbish dump belonging to a no longer preserved settlement, the exact position of which cannot be determined. As the culture layer contains all sherd sizes, from large vessel fragments to very tiny pieces, it seems reasonable to assume that almost all the waste was

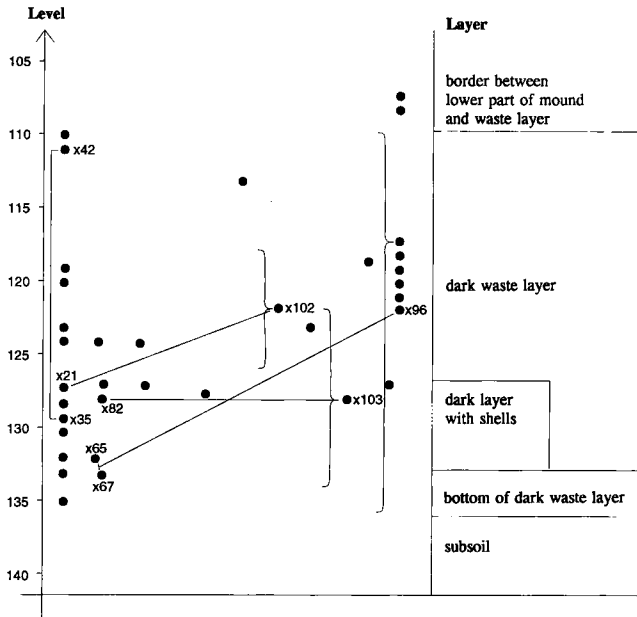


Fig. 14b. The vertical distribution of pottery-sherds at Torslev. Lines indicate examples of different situated sherds from the same vessel.

deposited here. The original extent of the dump cannot be determined. The reason for its preservation just under the primary barrow phase may be due to it never having been larger, or that what was outside was destroyed by ploughing already in prehistory before the construction of the secondary barrow phase (M. Rasmussen 1993b:182).

The Torslev midden is not an outstanding phenomenon, as more examples of such relatively rapidly accumulated culture layers with large amounts of waste are known. Dalsgård from Vester Hanherred is a very similar site where a pile of waste was preserved due to an overlying barrow (5).

The deliberate removal of waste to areas on the periphery of the settlement, where it either accumulates directly on the topsoil, in a natural depression or in an old pit, is an expression of settlement organisation and the general behaviour of the people. The pattern of deposition may be part of the explanation for the scarcity of finds from the majority of the known settlements from the Early Bronze Age.

SUMMING UP

Torslev presumably only represents part of an originally much larger settlement area. The actual settlement with buildings was not preserved. The huge amount of waste accumulated through a short time span as well as other sites in the neighbourhood indicate relatively extensive settlement activities in the area (6). The rather rapid succession of the events on the site makes probable the suggestion that this represents a settlement unit which had been in existence during at least the first half of the Early Bronze Age. The location reflects what seems an ideal choice for a prehistoric agricultural society, but at the same time the finds emphasize that a very broad economic potential had been exploited, including the resources of the fjord.

Vadgård, on the other hand, presumably represents a complete settlement area with a succession of phases. The location was coastal, while giving access to grazing areas. The diversity of the surrounding landscape stands almost in contrast to the clear agricultural evidence of the finds. In addition to the location, the presence of particular house types also indicates a more complex production strategy.

Generally it is a problem that, due to their comprehensiveness and the conditions of preservation, finds indicating agriculture are often much more visible in the record than indications of other economic activities. The importance of cultivation is often overestimated unless several other factors are taken into consideration (Thrane 1984a:7f).

A certain behavioural pattern undoubtedly lies behind the organisation of the settlement area. Three aspects point in that direction: The distribution of the different house types at Vadgård reflects a well-organized settlement with two contemporaneous social and economic units. The deposition of waste also indicates an organised structure, and it is obvious to regard the purpose of the special midden areas as related to the economic strategy and the movements inside the resource area as a whole. The final aspect, the exploitation of the resource area, presumably rests on a complex principle of rotation which includes the integration of both arable fields, grazing areas, settlement areas and barrows (Thrane 1984b:116ff; Rasmussen 1993b, Fig. 9). Torslev and Vadgård are both examples of parts of this pattern. The stratigraphy at Torslev may thus reflect a whole settlement unit through, firstly, its

dumping area, secondly sections of its field areas (the ardmarks in the culture layer) and finally part of the burial area (Fig. 3). Altogether it probably is the result of frequent movements inside a certain defined settlement and resource area. At the site of Vadgård, it is especially the relations between the two settlement areas that shed light upon this problem. The character of the pottery, its contextual aspects, and the particular house types, all point to a close connection between the two settlements (M. Rasmussen 1993a:70). It seems reasonable to interpret the southern site as the predecessor to the northern site. The fact that part of the southern site has been ploughed after abandonment (Fig. 4) perhaps indicates that the area later formed a part of the arable field area for the northern site (Lomborg 1980:122).

Vadgård and Torslev display identical as well as different traits. The characteristics in terms of topography and economy are different and indicate that the specific composition and priority of economic activities may differ between the settlements even though the various forms of economic activities are basically the same. A broad, compounded and varied economic strategy is, however, a shared trait.

ECONOMIC VARIATION

There remains the question, whether this varied and complex economic structure is a regional characteristic. Until now, the Limfjord area in particular, has been known for a specific economic tradition which combines fishing in the fjord and small-scale farming.

As mentioned at the beginning, the known settlement sites are characterized by great variation. This may be due to several factors, but the differences between the settlements should be seen in relation to the exploitation of resources and economic strategy.

The character of the environment points to other examples: Røjle Mose in the northwestern part of Funen has a typical coastal location (Jæger & Laursen 1983, Fig. 5). As to the constructions, a direct comparison with Vadgård can be drawn, but the finds show greater variety. In addition to a small sample of carbonised cereal grains and some pressure-flaked sickles, a couple of oval stones with grooves were found, which, according to the excavator, were used as weights in lon-

gline fishing (Jæger & Laursen 1983:111f.). Røjle Mose belongs to the same chronological ceramic group as Torslev (M. Rasmussen 1993a:137f.).

Bjerre in the northern part of Thy is situated very low on an area of raised sea floor, which usually is not regarded as an ideal environment for an agricultural society (Bech 1991:41). However, the connection to the open coast line is delimited by the Hanstholm ridge (Bech 1991, Fig. 1A). The many settlements from the Bjerre area probably span most of the Bronze Age with the emphasis on the later parts (Bech 1991:43).

A far more ideal location in terms of agricultural activities is occupied by the settlement at Højgård (Ethelberg 1987:152). Højgård has a typical inland location on relatively high, dry and well-drained terrain surrounded by meadows and river valleys with grazing potential (Adamsen & Rasmussen 1993:140). Radiocarbon dates, stratigraphical factors and the pottery demonstrate that the site at Højgård covers several phases throughout the Early Bronze Age (Ethelberg 1987:161ff.; Ethelberg 1993, Fig. 19; M. Rasmussen 1993a:124).

The same applies to the site at Hemmed Church (Boas 1993, Fig. 23). Here, too, the location is inland on slightly sloping ground above the broad river-valley of Treå to the south (Boas 1991, Fig. 1). Even though the open coast is only 4-5 km to the north as the crow flies, the neighbouring environment mainly indicates ideal agricultural potential. The finds primarily reflect agricultural activities (ploughmarks, quern-stones, cereals, pressure-flaked sickles etc.) (Boas 1991:98 & Fig. 13), and pollen diagrams as well as the measurement of dust-deposition on the bog at Fuglsø only 11 km west-south-west of the site, both indicate an increase in open cultivated areas in the region (Aaby 1985, Fig. 5 and 6; Malmros 1991:110).

In connection with the sites at Bjerre the existence of an open landscape with sparse tree growth has been mentioned. In this region it is linked to grazing areas and live-stock, based on the evidence from pollen diagrams (Bech 1991:44ff.). Agricultural activities are, however, very visible in the archaeological record, including some of the finest examples of fields in Denmark, as well as evidence of extensive production of pressure-flaked sickles (Bech 1991:46ff.).

Various types of landscape are present, and the significance of the variation is demonstrated by the fact that it extends beyond the mere topographical location and

includes the structures of the settlements as well. As already mentioned, Røjle Mose contained three constructions very much like the turf buildings at Vadgård, but not a single longhouse. At Højgård, as well as at Bjerre and Hemmed Church, regular post-built longhouses were found, although they display differences. In addition to the longhouses, Bjerre contained some smaller, circular post-built structures (Bech 1991:43 & Fig. 3). A semicircular feature was also found at Vadgård though the interpretation of this is open to discussion (M. Rasmussen 1993a, Fig. 19). The economic units must have consisted of several buildings with different functions. In comparison, on a site like Højgård, the individual houses seem to have been autonomous units. They are very similar in terms of interior arrangements, including for instance concentrations of cooking pits in the western part, yet the contemporaneous houses at the site differ for example with regard to length (from about 30 m to 16-17 m) and the presence of partition walls (Ethelberg 1987:156f).

The Early Bronze Age is characterized by a number of different kinds of settlement in different kinds of environment. Even when the economic strategy of the various sites cannot be compared directly due to insufficient evidence with regards to the specific composition of economic activities, other aspects testify to the diversity among the sites. Detailed investigations of the finds from the sites, as for instance the aforementioned comparison of flint tools, reflect marked and significant differences in the assemblages. There seems to be no simple connection between the preferred location and the economic activities indicated by the finds. Features such as the exploitation of the coastal environment, a characteristic of the sites at the Limfjord, can also be found elsewhere.

The topographical location, the relationship between exploited resources, circumstances of continuity and systems of rotation are all very important aspects of the organisation. The relationship between buildings and other structures with different functions as well as the pattern of deposition reflects an organized settlement area. A settlement like Vadgård cannot be characterized as a village with a clear division between several contemporaneous economic units (cf. Lomborg 1973; 1976). Vadgård should rather be seen as series of successive occupations by a few (but not single) social and economic units consisting of a complex of buildings and structures. It is tempting to regard the removal and

concentrations of waste as an expression of more permanently used settlements. The exploitation of the manuring potential of former settlement areas for later arable areas should be considered a possibility (Thrane 1984b:117f.).

Varied exploitation of several different resources must have been practised. The composition and relationship between these have differed from place to place in connection with the location of the site and other aspects. However, the individual settlements have not been isolated from each other which the mere fact of the wide distribution of the bronzes demonstrates. The presence of various types of houses and structures in the Early Bronze Age are not only due to chronological, but also to functional and socio-economic factors (M. Rasmussen 1993a:142f.).

According to Harding, it is not realistic to assume an agricultural surplus as a basis for participation in the exchange of bronzes. The settlements have only been capable of producing food and, for instance, providing storage space for local consumption and eventually for small-scale exchange with the nearest neighbours (Harding 1984:143). It is not a question of a measurable surplus of production based on, for instance, large-scale production of cereal or cattle. Perhaps the variation itself regarding economy and production can be the key to the problem. With the exploitation of a broad spectrum of economic resources, the individual settlement would be able to contribute to and participate in the superior societal interaction. Not a large-scale production, but rather a differentiated production, may have determined the economic dynamics in this society. This applies both to the individual settlement and to the relationship between the communities. The participation in the bronze exchange systems was not based on surplus in the traditional sense of the word, but rather on the diversity of the subsistence-economy and on extensive circulation and communication.

There was a change affecting a number of factors important for the economy towards the end of the Early Bronze Age, which indicates a limited duration of the outlined characteristics. It is claimed, that an open landscape was created in the middle of the Bronze Age, when a cultural landscape really came into being (Jensen 1988:162f.). This assumption is based on several scientific analyses carried out during recent years (Andersen, Aaby & Odgård 1983; Aaby 1985 and 1986; Malmros 1991). However, only the landscape and vege-

tational history of single regions have been mapped. To what degree the landscapes and their development were similar or different, and when and how fast the regional changes took place is not yet clear. Some variations of this picture should be expected. For instance, it is not at all certain that the scarcity of wood in Thy also applies to other areas. The changes in the economy and exploitation of resources may not have taken place simultaneously everywhere and may not have been of the same extent. For that reason it is not possible to determine the general significance of the creation of the open cultural landscape. However, it is not unreasonable to assume a somewhat different economic structure after the years around 1000 BC.

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NOTES

- 1 Radiocarbon dates from Torslev (calibrations according to Pearson and Stuiver, 1993, calibrated ± 1 standard deviation), published in agreement with Erik Johansen:
K-5754 charcoal: 1470 \pm 70 bc (1740 BC cal.). Central part of the culture layer.
K-5755 charcoal: 1440 \pm 80 bc (1730-1690 BC cal.). Central part of the culture layer.
K-5756 shells: 1410 \pm 80 bc (1680 BC cal.). Central part of the culture layer.
- 2 I am not aware of the existence of any comprehensive scientific study which has determined exactly the age of these "rimme". They are a well-known phenomenon in the Limfjord area, though, and on one situated on the western coast of Himmerland settlement remains were found dating to the Atlantic period. Søren H. Andersen, Moesgård is thanked for kindly providing this information.
- 3 Højrimmen. Næsborg parish, sb.36, Ålborg county, NM 1976/1806. Bent Jensen, Løgstør, is thanked for further information about this find, circumstances of discovery, etc.
- 4 Skjoldhøj. Brabrand parish, sb.45, Århus county, FHM 1812. Excavated in 1974 by Torsten Madsen, Moesgård, who is thanked for drawing my attention to the site and for permission to mention it.
- 5 Dalsgård. Tømmerby parish, sb.138, Thisted county, THY 2150. Excavated in 1985 by Jørgen Seit Jespersen, Værløse. Description in "Archaeological Excavations in Denmark", 1985 p.93. The site consisted of a compact and homogeneous culture layer sealed by a barrow with a primary burial from Per. II. The layer was separated from the mound-fill by a thin vegetation layer, but neither other layers nor structures were found. The site contained pottery, charcoal and flint. Among the tools must be mentioned pressure-flaked flint sickles of the "Jutish type".
- 6 An example is a ploughed-over settlement site, positioned just 250 m northwest of Torslev, where pressure-flaked flint was found during surveying. Torslev parish, sb.88, Hjørring county, ÅHM 945.

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