The archaeology of the Bronze Age cultural landscape - research goals, methods, and results

Olausson, Deborah

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5. The archaeology of the Bronze Age cultural landscape – research goals, methods, and results

By DEBORAH OLAUSSON
Institute of Archaeology, University of Lund,
Krafts torg 1, S-223 50 LUND

1. Major trends in Scandinavian Bronze Age research up to the beginning of the project (1982)

Until the 1970s, Scandinavian Bronze Age research could be said to have concentrated to a large extent on artifact studies. The emphasis was upon placing artifacts in their spatial and temporal contexts, and questions of chronology and cultural contact constituted the primary focus. However with the rapid increase of discoveries of Bronze Age settlement sites which resulted from rescue archaeological efforts during the 1970s, a change in direction became evident. Perhaps partly also due to the influence of British and American archaeological thought, the emphasis shifted towards examining Bronze Age settlements and their effect upon the surrounding landscape, and to studies of the organization of Bronze Age society (Jensen 1988, p. 155).

In a paper which can be said to be the harbinger of this new research direction, Kristiansen correlated Danish Bronze Age subsistence and settlement patterns, showing that settlements in Denmark showed a preference for light soils (Kristiansen 1978a). Further, he noted that during the Bronze Age, agricultural intensification resulted in a transformation of the landscape in the settled areas, from that of open woodland interspersed with swathes of pasture, to an open grazed landscape with scattered forest growth. Subsequent pollen analyses in Denmark during the 1980s have confirmed this hypothesis. They demonstrate how, in the second half of the early Bronze Age, a gradual change in the landscape took place. During the late Bronze Age the landscape became much more open than before and was marked by open pasture and other unwooded agricultural areas interspersed with minor forests (Jensen 1988, pp. 162 f.).

Danish archaeologists have also been pioneers in settlement archaeological studies similar to the Ystad Project. Thrane's investigation of a 500 sq km area of south-western Funen (Thrane 1980) is the best example of such a study. In Scania, Strömberg's Hagestad Project has the aim of studying cultural development through time in a particular geographical area (e.g. Strömberg 1980b).

Most of the knowledge about Bronze Age subsistence activities we had prior to 1982 derived from analyses of settlement finds from Jutland. Finds of grain from the beginning of the Bronze Age showed that the cultivation of barley was beginning to dominate over wheat, although a greater variation in cultivated crops could be seen by the late Bronze Age. The balance between arable and pastoral farming was and is however one of the unsolved problems of Bronze Age research.

Another unsolved problem in Bronze Age research pertains to the organization of settlements, both internally and in a larger regional perspective. One area of particular interest is how early we are able to identify villages in the archaeological record. Excavation of settlements on the poor soils of Jutland yielded little evidence for any village structure, although difficulties of identifying which structures were contemporary meant that this question was difficult to address (e.g. Becker 1980). There was further no homogeneous picture of the sequence of landuse to be gained. In some cases, individual farm complexes bore traces of enlargment and repair, showing a long period of occupation. In others, plough marks showed that some of the sites were ploughed over in the Bronze Age or that they were constructed on previously ploughed land. Investigation of Bronze Age sites at Fosie (Björhem 1986), Fragtrup (Draiby 1985) and Apalle (Ullén 1988) have shed further light on this problem during the time period covered by the project (1982-1988).

2. Archaeological work in the western area of the Ystad Project

At the commencement of the project in 1982, much was known about the sandy coastal zone and its extension as the so-called "Plain of Ystad" to the east of Ystad. This situation was due primarily to the efforts by the Excavation Unit of the Southern Branch of the Bureau of National Antiquities (CBNA), who in the face of modern development had conducted rescue operations there since the 1970s. However in the rest of the project area, made up mainly of what we have termed the outer and inner hummocky landscape zones (Fig. 1), modern landuse follows the agricultural traditions of previous centuries. Although increasingly deeper ploughing and erosion are demonstrably destroying subsurface archeological evidence even in such areas (e.g. Strömberg 1987; Tesch 1985; Widholm 1980), in practice at least this has not been a sufficient basis for advocating rescue excavations. The evidence upon which to base an interpretation of landuse during the Bronze and Iron Ages was therefore much more fragmentary for these zones than it was for the coastal zone and the Plain of Ystad. The author's mandate in the project, then, was to determine the nature and extent of Bronze Age use of the landscape in the western part of the project area. In line with the overall aims of the project, the

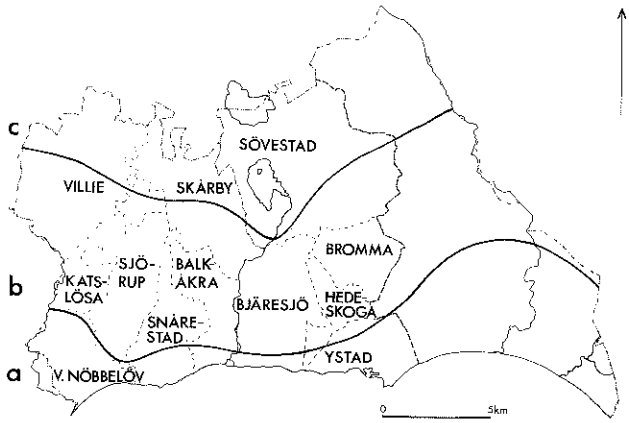


Fig. 1. Map showing the parishes studied and geographical zones.
a=sandy coastal zone, b=outer hummocky zone, c= inner hummocky zone.

primary questions were: Is there evidence for expansion or regression during the Bronze Age? Can we see a difference in landuse or settlement patterns between the sandy and the clay till zones? Are there indications of a center/periphery dichotomy vis-à-vis Stora Köpinge? The archaeological evidence needed to shed light on these questions will in the following be weighed against evidence for subsistence patterns and results from the palaeoecological analyses gained during the course of the project. Demographic and subsistence evidence will also be weighed in the analysis.

The western part of the project area cannot be seen as an isolated island, of course, but rather it is both desirable and necessary that the results gained here be considered in a wider context. Where the concrete evidence from the area is too fragmentary, examples from other similar regions will be included to help complete the picture.

The area studied encompasses the following parishes (Fig. 1):

Balkåkra	Skårby
Bjäresjö	Sövestad
Bromma	Villie
Hedeskoga	Västra Nöbbelöv
Katslösa	Ystad
Sjörup	

The sandy coastal zone is quite narrow in most of this area: at its narrowest point it is no more than 400 m wide. Nearer the present town of Ystad this zone is 600 m and to the west, at the outlet of the Skivarpsån Stream, it is 800 m. Further inland, soils consist of heavy clay till (the "outer hummocky landscape") and sandy clayey till (the "inner hummocky landscape"). Most of the area is presently under the plough, although there are patches of forest west of the lake Krageholmssjön and in the northern parts of the inner hummocky landscape zone. The Svartån Stream runs southwards from the Lake Krageholmssjön in the middle of the western area, while the stream Skivarpsån forms the western boundary of the research area. The highest part is to the northwest, where some hills rise to 145 m.a.s.l. The highest postglacial sea level was 5-6 m above the present level (Holst 1902, p. 20; Regnéll 1984, p. 3).

2.1. Models to be tested

In considering how to describe landuse in the western area during the Bronze Age, we can set up four simplified models for testing (Fig. 2):

I. The entire area was continuously occupied from the Late Neolithic through the Early Iron Age.

If this model is correct, we should expect evidence for permanent settlement and graves datable to the Bronze Age to be located throughout the area. Hoards and stray finds similarly distributed would strengthen the argument, but by themselves are not considered sufficient for proving settlement. Evidence for more temporary settlements may or may not be present in the area.

II. The coastal zone was continuously occupied, with occasional (or periodic) expeditions inland for special resources.

For this model we would expect graves and permanent settlements to be present at the coast but absent further inland. Away from the coast we could expect evidence for temporary camps, plus dispersed hoards and stray finds.

III. All or part of the area was colonized during periods of expansion, and settlement was abandoned during periods of regression.

Model 3 requires stringent chronological control enabling us to correlate the archaeological evidence with pollen analytical results. According to this model, evidence for settlements and graves should be sparse or limited during the early Bronze Age. During the late Bronze Age, when the pollen diagrams from the lakes Krageholmssjön (Regnéll 1991) and Bjäresjö and Bjärsjöholmssjön (Gaillard & Göransson 1991) indicate an increase in cultivation and grazing intensity, there should be archaeological evidence for permanent settlement and graves at least in the areas represented in the pollen diagrams. As in model I, temporary settlements, hoards and stray finds are not sufficient for proving settlement but can be used to indicate the intensity with which an area is used.

IV. The area was never colonized during the Bronze Age. Human activity occurred here only in the form of temporary expeditions from the permanently settled areas at Stora Köpinge and Skivarp.

This model represents the other extreme. We would expect no evidence for settlements or graves in the area. Only camps, sparse stray finds and perhaps an occasional hoard would be expected. There should further be a marked contrast with the areas seen as central areas (i.e., Stora Köpinge and Skivarp).

2.2. Methods of investigation

The author joined the project in September 1984, approximately two years after its start. By this time, Mats Larsson had developed a method of field survey combined with interviews and an inventory of private collections which proved to be quite successful for locating Mesolithic and Neolithic sites (Larsson & Larsson 1984, pp. 20 f.; 1986, p. 11). An approach combining the study of maps, museum

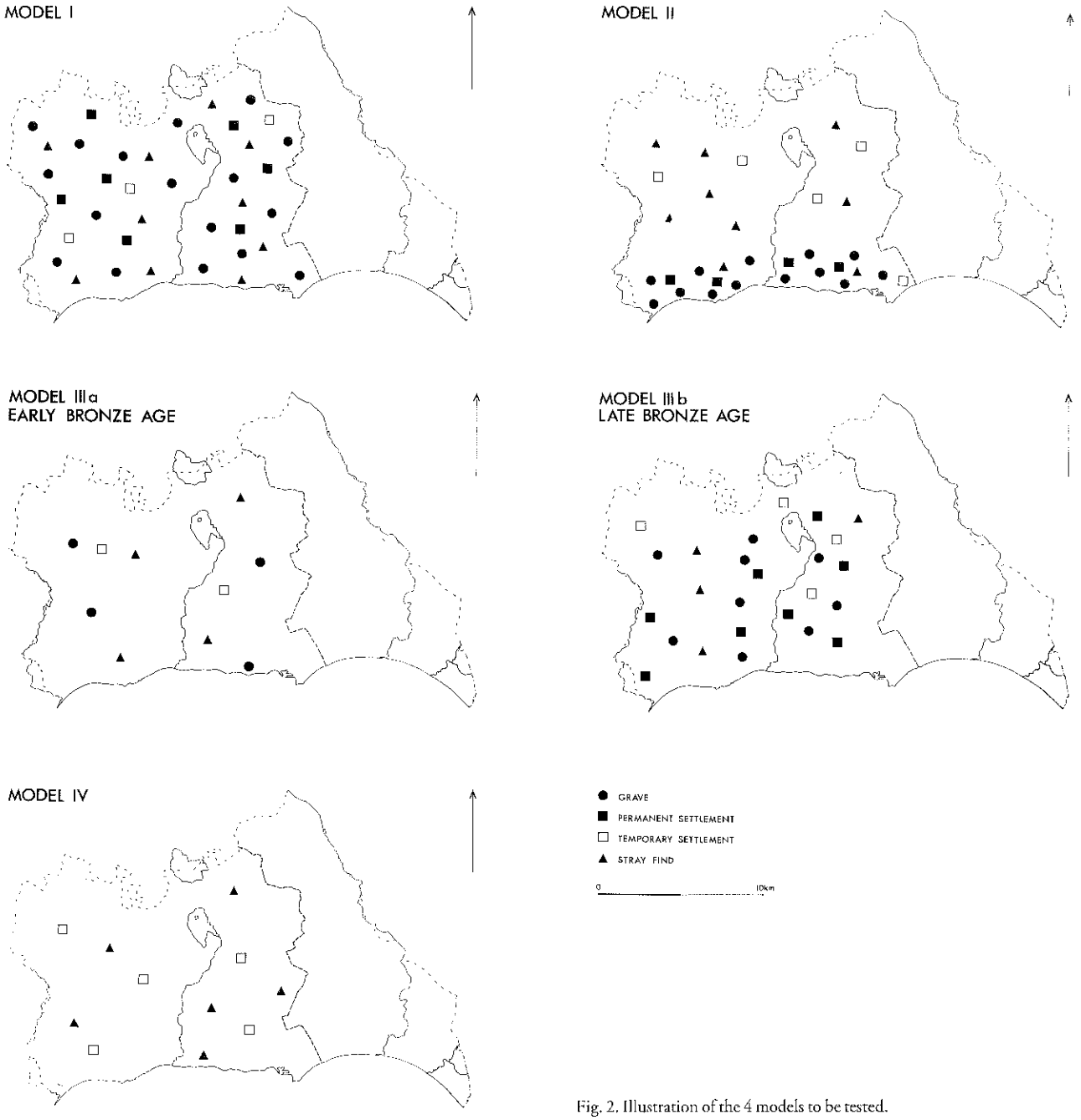


Fig. 2. Illustration of the 4 models to be tested.

and private collections, the Swedish Register of Ancient Monuments, and surface survey was considered to be the most economical means of combing the large areas involved for evidence of Bronze Age landuse (Chap. 12.2). Small-scale archaeological investigation of promising indications would, it was hoped, provide information about dating and the nature of the sites (i.e. permanent settlement or temporary camp) discovered.

2.2.1. Map studies

The geological map. The most recent soils map available for the areas was published in 1919. Luckily, however, the map was being revised concurrent with our research, and we were given access to field maps showing the latest data (I would like to thank Esko Danielsson of the Swedish Geological Survey for making this information available). While these maps were useful for showing soil composition and boggy areas, we often found them to be too generalized for our purposes. More local patches of sandy soils, which might have been attractive for Bronze Age settlement location, would for instance often be too small to appear on the map.

The Ordnance Survey Map from c. 1810 (Emanuelsson & Bergendorff 1983) provided a great deal of information on areas of former wetland and forest, and showed in general what the Scanian landscape of 180 years ago looked like before recent efforts drained wetlands and regulated water flow.

Table 1. Bronze Age barrows.

Parish	Certain	Uncertain
Balkåkra	9	10
Bjäresjö	28	10
Bromma	4	5
Hedeskoga	4	6
Katslösa	6	5
Sjörup	16	6
Skårby	4	2
Snårestad	16	11
Sövestad	4	1
Villie	1	3
V. Nöbbelöv	12	7
Ystad	1	2
Σ	105	68

The Topographical Map (scale 1:25 000) and the Economic Map (scale 1:10 000) provided information about the present-day topography, as well as the location of forested areas, open water, and drainage. In most cases the Economic Map was used as a field map during survey and for plotting data from the Register of Ancient Monuments.

Arrhenius' map of soil phosphate values (Arrhenius 1934) was also examined, although in most cases higher phosphate values cannot be linked to Bronze Age remains.

Cadastral maps from the 18th and 19th centuries were studied (cf. Riddersporre 1987). Information about possible barrows, former village sites, and former landuse was extrapolated from these maps. In most cases the author's lack of training in reading these maps meant that the concrete information gained was minimal; nevertheless the time spent was not wasted as at least an impressionistic picture of past landuse was gained. The maps from certain of the villages were subsequently studied in detail in preparation for December survey (Chap. 12:2). Here, former areas of wetlands, meadows, and pastures were traced and transferred onto the Economic Map as an aid in surface survey (Olausson 1988). In connection with the revision of the Swedish Register of Ancient Monuments undertaken in parts of the project area (Tronde 1987), these maps were again scrutinised with the aim of identifying possible barrows and other monuments of interest to the survey. Possible barrows and indications for barrows in the form of place-names are included in table 1 as "uncertain".

2.2.2. Museum collections and private collections

In an effort to locate all the finds datable to the period which have been recovered from the area, an inventory was taken from the following museums: Historical Museum, Lund; Ystads Museum, Ystad; and the Swedish National Museum, Stockholm. Private collections from farms in the area were also checked, primarily during the survey campaign conducted by M. Larsson. The survey of private collections yielded few finds datable to the Bronze Age. Metal objects are rarely discovered in private collections. Whether this should be ascribed to an actual paucity of bronze in the fields around Ystad or to local farmers' belief that metal finds will be confiscated by the "authorities" (represented by the visiting archaeologist), is difficult to say. Given this, it is unfortunate that Bronze Age flint typology is quite *ad hoc*, and type fossils of stone for the Bronze Age are few (Thrane 1985, p. 146). Bronze Age tools of stone other than flint are for some reason poorly represented in stray finds collections.

Fig. 3. Gustav Jacobæus, amateur archaeologist and owner of the Ruuthsbo estate in the early 20th century. Photo LUHM.

The disproportionate number of finds from the parishes of Balkåkra and Bjäresjö is due primarily to the efforts of Gustav Jacobæus, who was the owner of the Ruuthsbo Estate early in the century and an avid amateur archaeologist (Fig. 3). Jacobæus was careful to collect and record the position of stray finds, hearths and pottery brought up by the plough at Ruuthsbo. According to the catalogue of the Historical Museum University of Lund, the map made by Jacobæus was included when his extensive archaeological collection (more than 2000 catalogue entries) was donated to the museum in 1924. Unfortunately, it has not been possible to locate this map in the museum.

2.2.3. Surface survey (Fig. 4; cf. Chap. 12: 2 this vol.)

Our present-day cultural landscape is a palimpsest of all that has previously occurred there. We are here faced with the task of uncovering the Bronze Age cultural landscape, which is today hidden and distorted by subsequent uses. As we cannot peel off the ploughzone and the modern disturbances resting on and in it, we must find other means of reaching back to landuse patterns from former times. Locating and mapping barrows and graves, stray finds and hoards, and evidence which has turned up by excavation, aid us in this task. There are as well other prospecting methods in use to-

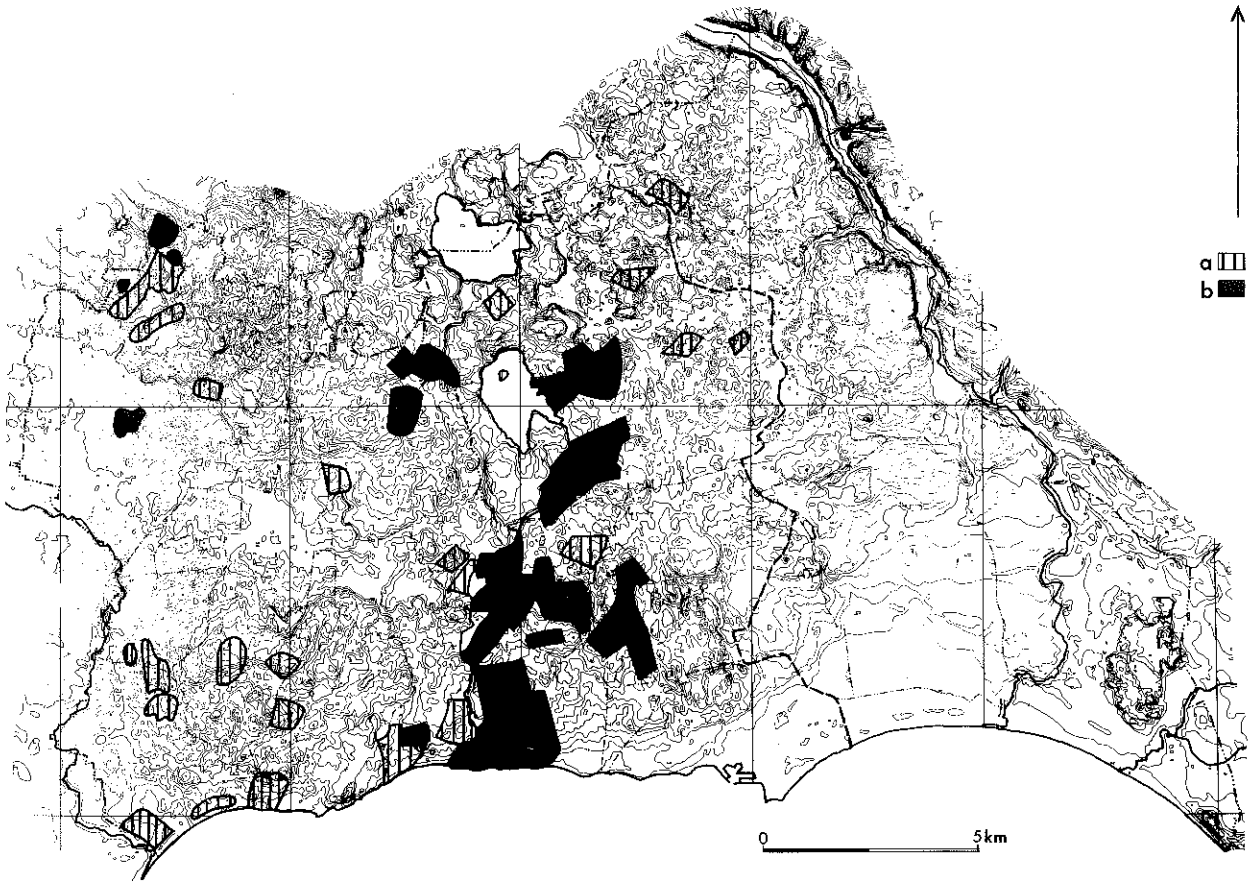


Fig. 4. Map showing areas surveyed by the author. a= spring survey, b=December survey

day: aerial photography, phosphate mapping, and georadar are those which are most often used in Sweden. Another method which has been used in Denmark since the 1940s (Mathiassen 1948) is that of surface survey. Using this technique, Mats Larsson was able to discover Stone Age settlement sites by intensive survey (*sensu* Vorting 1984) in the parishes of Stora Köpinge and Stora Herrestad (Larsson & Larsson 1984, pp. 20 f.). Experiences gained in this area were applied in the extensive survey of the western parts. The author joined Larsson's team for spring survey in 1985, during which time an area of approximately four square kilometers of open fields was surveyed. During spring survey in 1986, the author carried out independent survey at several spots around the village of Bjäresjö and at the coast. An area of 1.9 sq km was surveyed. Besides 3.3 kg of worked flint, this survey turned up one hearth containing one sherd of late Bronze Age ware, located inland near Bjäresjö. This was however the only concrete evidence for Bronze Age activity gained during two seasons of spring survey. Nor had the excavations at Mossby or Krågarp yielded evidence of Bronze Age settlement (see below).

In view of the poor results from spring survey, the author decided to adopt a methodology used with success by Erland Porsmose on Funen (Olausson 1988). In preparation for this survey, 18th and 19th century cadastral maps for 10 villages or manors were again consulted. In Porsmose's experience from Funen, Iron Age sites were often found at the boundaries of wetlands/pasturelands but seldom in the wetlands themselves. Accordingly, areas shown as wetland/pasture and open water on the maps were transferred onto the modern Economic Map, which was used as a field map. Porsmose recommended survey in late autumn, after the fields had been ploughed and washed by the autumn rains, but prior to the onset of winter. The author and one experienced surveyor covered an area of 10 square km in 15 days in December 1986. Remains of at least 70 ploughed-up hearths/earth ovens and a large number of concentrations of fire-cracked rocks were recorded, as well as 418 g of pottery (Olausson 1988, Table 1). As much charcoal as possible was collected for radiocarbon dating. Five of the hearths could be dated to the Bronze Age and seven to the late Iron Age. An additional five hearths contained late Bronze Age pottery.

Field survey in the late autumn proved to be a good means of finding Bronze and late Iron Age sites in the clay till soils of southern Sweden. Early Iron Age sites, however, remain elusive. This is in direct contrast to results from the Danish natural gas survey projects (Näsman 1987, pp. 69 ff.;Vorting 1984, p. 24). Bronze Age sites can best be recognized by ploughed-up hearths and by sherd concentrations. While such phenomena can also survive the winter to be found during spring survey, the chances of finding them, at least in clayey soil, are probably better before winter has set in. The expansion and contraction of water--soaked clay soils during

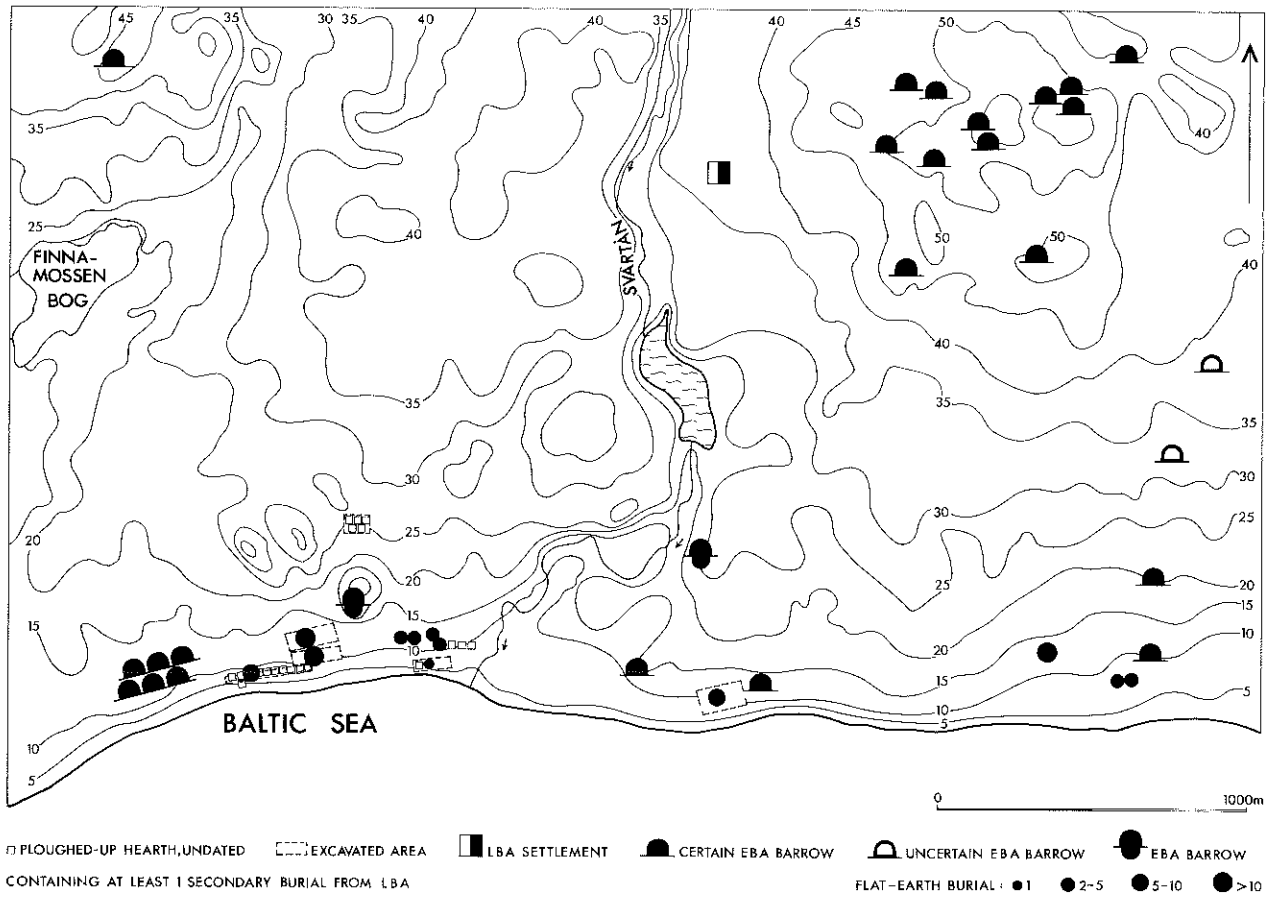


Fig. 5. Early and late Bronze Age graves and hearths in the area around the present village of Svarte. The information has been compiled from the Swedish Register of Ancient Monuments, rescue excavations, museum archives, Jacobæus' information, and project survey.

the winter causes the rapid deterioration of fragile prehistoric pottery occurring in such a matrix. Pottery in well drained soils is not as affected by freeze/thaw cycles and is more likely to survive the winter and be visible in the spring (Olausson 1988, p. 109).

2.2.4. Excavation

Archaeological excavation in the area began in 1911 with investigations of three barrows on the Ruuthsbo Estate. Excavation around the village of Svarte continued at intervals until 1924 and resumed with salvage excavations by the CBNA in the 1980s (Olausson 1987, pp. 130 ff.). Thanks to these efforts, much is known about Bronze Age burial here. However, the spatial distribution of the flat-earth burials as seen in fig. 5 cannot be assumed to represent any real pattern but may rather be a function of the patchy nature of investigation there.

A report by Jacobæus in 1922 of ploughed-up sooty patches on the Ruuthsbo property, 1.5 km from the coast (Fig. 7 "h"), led to an excavation by Torsten Mårtensson and Olof Sundin from the Historical Museum in Lund. Mårtensson describes the area as a settlement, from which the occupation layer had successively been ploughed away. Fifteen refuse pits, most of them quite shallow, were excavated; 9 of them contained finds. The largest pit was 3 x 1 m, while the others were smaller. The pits were spread out over an area 30 x 50 m. A total of 13 kg of late Bronze Age pottery was recovered from the pits. This pottery is typical period V-VI pottery, and is similar in appearance to the collection from Bjäresjö 19:17 (below). Flint objects consisted for the most part of poor quality flakes, although there was also one pruning knife in pit I (Fig. 6) One horse tooth and one pig tooth were also found (Lindahl & Olausson 1991).

Within the project, excavation in search of Bronze Age settlement was undertaken at five locations, all of which were found during surface survey (Fig. 7).

a. Mossby 12:11, 12:12. Poor quality worked flint was found in a sandy field betwen a Bronze Age barrow and the sea. Auger samples turned up evidence for occupation soils. Removal of the topsoil over an area of 600 sq m revealed 54 features and an occupation layer. No Bronze Age remains were found, however. Prehistoric activity included a hearth from the Mesolithic, an occupation layer from the Neolithic period, cremation burials from the early Iron Age and hearths from the Vendel Period.

b. Krågarp 4:30. Indications for possible settlement here were slight and consisted of poor quality worked flint found during survey. However, in view of the proximity to an inland concentration of barrows we decided to undertake a brief test excavation here. Eleven scattered features, most of

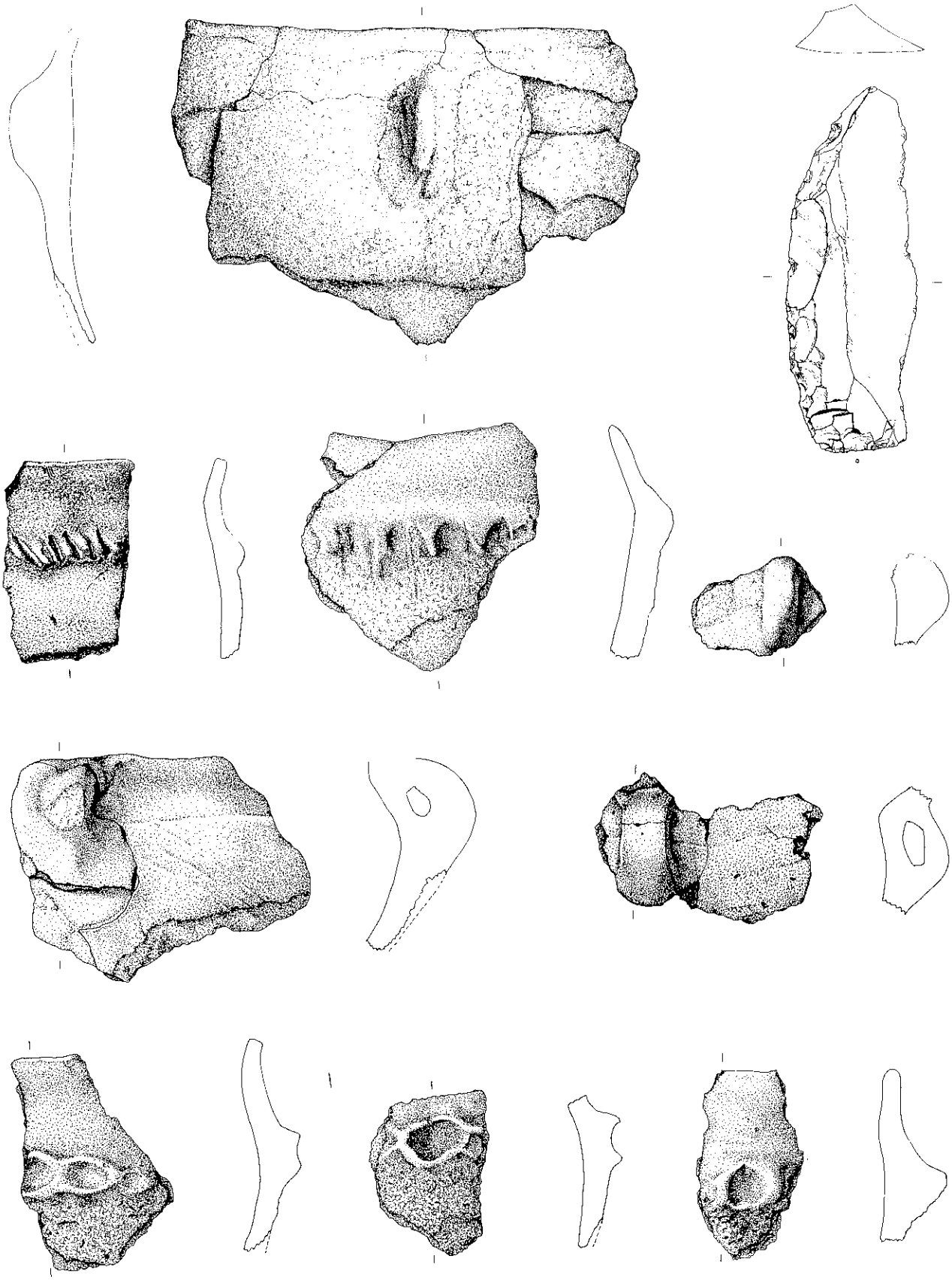


Fig. 6. A sample of the pottery and a pruning knife from the excavation of refuse pits at Ruuthsbo by Mårtensson and Sundin in 1922. Scale 60%. Drawn by Elisabeth Rudebeck.

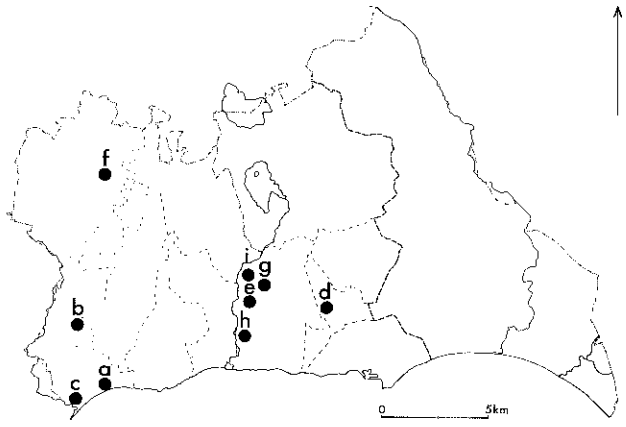


Fig. 7. Location of excavations mentioned in the text. a=Mossby 12:11, 12:12, b=Krågarp 4:30, c=Mossby 10:4A, d=Hedeskoga 5:1, 8:1, e=Bjäresjö 19:17, f=Trunnerup 4:2, g=Bjäresjö 2:1, h=Ruuthsbo site, i=Sulebjär.

Fig. 8. Pot from Bjäresjö 19:17. Scale 43%. Photo LUHM.

them undatable, were encountered, but little was found to indicate Bronze Age activity. An offering from the late Neolithic/early Bronze Age and a large part of a pot from the Roman Iron Age were found.

c. Mossby 10:4A. An area of ploughed-up hearths, with scattered flints and potsherds, was found in a field near the mouth of the Skivarpsån Stream during surface survey. Excavation revealed a hearth and pit-house from the late Iron Age (Larsson & Olausson 1986).

d. Hedeskoga 5:1, 8:1. December survey had revealed several concentrations of hearths in the fields directly east of the lake Bjärsjöholmssjön (Olausson 1988, Fig. 5). One hearth was radiocarbon dated to the early Bronze Age, while three others were dated through pottery or C-14 to the late Bronze Age. Although the soils here consisted of heavy clays, the location within the band of Bronze Age barrows and proximity to the coast meant that we were optimistic as we commenced bulldozing. However it soon became apparent that our optimism was not well-founded, as only three features were uncovered in 700 m of trenches. Radiocarbon dates show that two hearths were from the Bronze Age (3430 ± 150 BP, ß-24420; 2720± 70 BP, ß-24421). But unfortunately these were the only remains of relevance to the project which we found here.

e. Bjäresjö 19:17. Surface indications here consisted of a large number of sooty patches, one of which looked large enough to be a pit-house, in the ploughzone. A C-14 date from one of the sooty patches gave a dating of 1545 ± 95 BP (Ua-496). Removal of the ploughzone revealed 14 features. Excavation showed that seven of these were earth ovens, containing up to 250 l of fire-cracked rocks and charcoal. The larger feature which had been visible on the surface during survey turned out to be a pit with an area of c. 9 sq m and a depth of 70 cm. The refuse pit contained 8020 g potsherds, as well as charcoal, fire-cracked rocks and 23 g burnt bone. Several of the potsherds could be fitted together (Fig. 8) and the configuration and number of rimsherds indicated at least 40 pots are represented in the material. There are also fragments of 3 perforated vessels (Lindahl & Olausson 1991). The pottery is typical of period V-VI Bronze Age in forms and surface treatment (Baudou 1960; Draiby 1985; Jensen 1967; Stjernquist 1961). Eighty-two per cent of the sherds have a rusticated surface, while 18 % are smoothed.

Soil samples from the refuse pit and several of the cooking pits were submitted for flotation. Of these only the samples from the refuse pit yielded seed remains (Engelmark 1988). The material was heavily charred and probably represents household refuse (Table 2). Barley dominates, with the hulled variety as the most common. Wheat is the next most frequent grain, while the presence of 2 oat grains shows that this cereal had also been introduced. One millet grain and 2 rye-brome grains were present in the sample. Gold of pleasure (*Camelina sativa*) made up fully 53% of the identifiable remains from cultivated plants.

The number of weed seeds in the sample was low. *Polygonum lapathifolium* and *Fallopia convolvulus* were two of the most common. *Chenopodium spp.* made up 33 % of the weed seeds. Engelmark notes that its presence indicates some form of manuring, although the low number of weed species indicates that each field was cultivated for only a few years (Engelmark 1988).

Table 2. Plant materials from Bjäresjö 19:17 (taken from Engelmark 1988).

Plant	Number	%
Barley *(Hordeum vulgare)*	9	15
Emmer *(Triticum dicoccon/spelta)*	4	7
Oats *(Avena cf sativa)*	2	3
Cerealia fragment	10	17
Rye brome *(Bromus secalinus)*	2	3
Millet *(Panicum miliaceum)*	1	2
Gold of pleasure *(Camelina sativa)*	32	53
Σ	60	100 %
Fat hen *(Chenopodium spp.)*	10	33
Pale persicaria *(Polygonum lapathifolium)*	7	23
Black bindweed *(Fallopia convolvulus)*	1	3
Hemp nettle *(cf Galeopsis)*	1	3
Grass *(Poaceæ)*	11	37
Σ	30	99 %

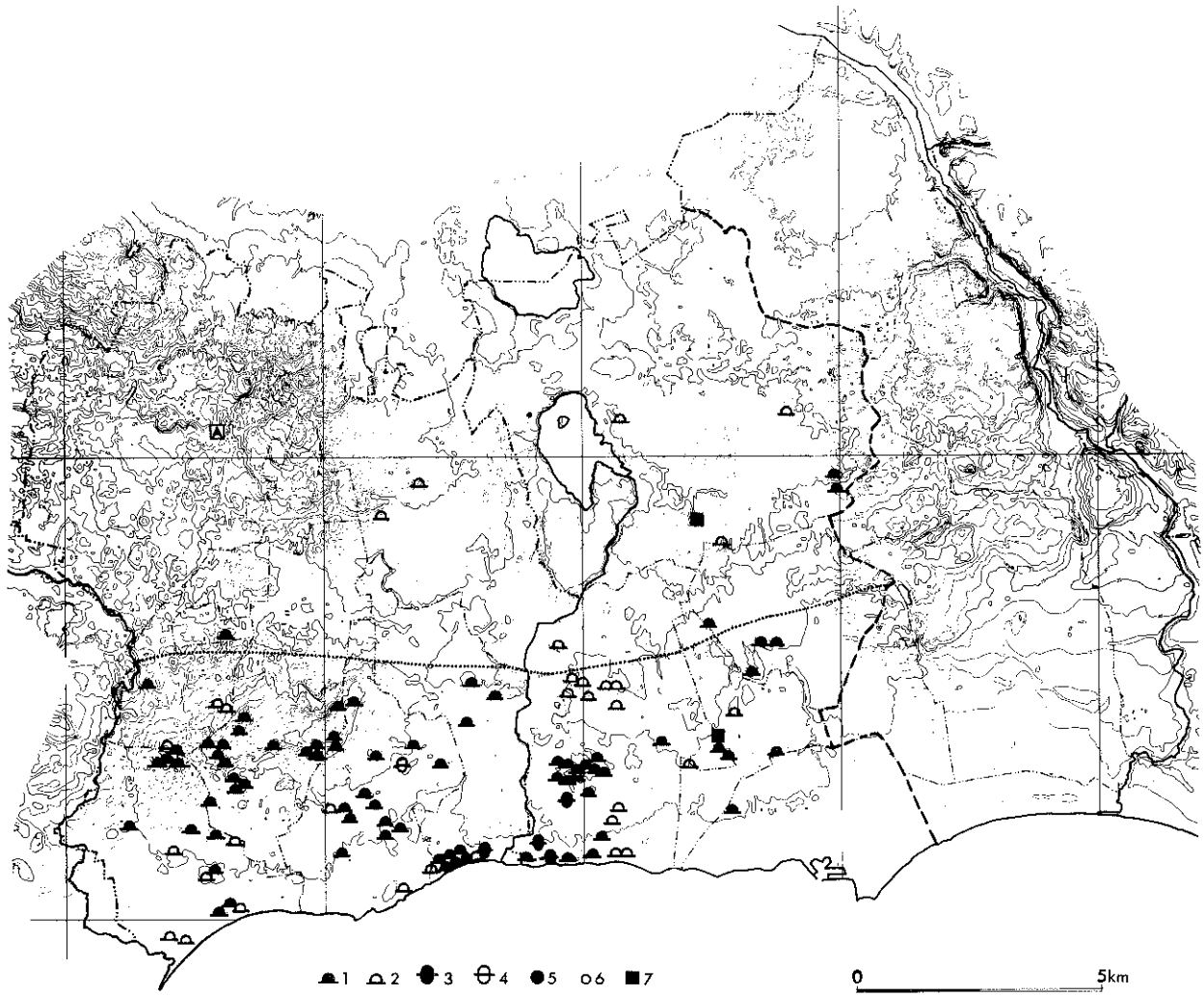


Fig. 9. Map showing distribution of early Bronze Age barrows and settlement for the western area. The dotted line indicates the boundary zone for the hypothesized primary settlement zone. A=the site of Trunnerup, where early Bronze Age remains were found. Legend: 1= early Bronze Age barrow, 2=early Bronze Age barrow, uncertain, 3= early Bronze Age barrow containing at least one secondary burial, 4=indication of early Bronze Age settlement.

A further two sites with remains from the Bronze Age were uncovered during project excavations searching for remains from other periods.

f. Trunnerup 4:2. An excavation aimed at investigating Neolithic settlement also turned up early Bronze Age remains in the inner hummocky landscape. A limited occupation layer and a pit containing c. 1100 g of early Bronze Age pottery were found here. Although topsoil was removed from a large area, no remains of structures were found (M. Larsson, pers. comm.).

g. Bjäresjö 2:1. At least five pits containing late Bronze Age potsherds were uncovered during excavations investigating Iron Age and later occupation near the Bjäresjö church. More than 3 kg of Bronze Age pottery was recovered, but no evidence for structures could be seen in the area from which the topsoil was removed (Callmer, pers. comm.). Samples from one of the pits were submitted for flotation analysis, but the results from this indicated a flora which was more Iron Age than Bronze Age in its makeup (Engelmark, pers. comm.).

3. The early Bronze Age cultural landscape in the western zone

3.1. Burial (Fig. 9)

By the beginning of the Bronze Age, southern Sweden had adopted the northwestern European tradition of single burial in monumental grave mounds (Kristiansen 1987a, p. 43). Without excavation, we cannot state with certainty that a given mound dates to the early Bronze Age. Nevertheless, experience has shown that the large mounds from periods other than the Bronze Age are few compared to those known to be from the Bronze Age (Baudou 1983, p. 4; 1985, p. 70). Here we adopt current convention and consider a mound 10-25 m in diameter and 1.5-3 m high as a Bronze Age burial (Hansen 1923-24, p. 46; Hårdh 1984, p. 90; Mathiassen 1948, p. 87; Thrane 1984, p. 119).

In the western zone, there are 105 known barrows, plus 68 place-names or physical remains which may be barrows (Table 1). As is evident from fig. 9, the barrows are to a large

extent to be found within a zone following the coast and approximately 4-4.5 km wide. Only 10 % of the barrows lie outside this band of primary settlement (i.e., in the parishes of Skårby, Sövestad and Villie).

3.1.1. Population estimates

The barrow data can be used for estimating minimum contemporary population density for the region during the early Bronze Age. Before we do this, however, it is necessary to examine each link in the chain of reasoning to assess its strength. Given the extent to which the area has been farmed (most areas continuously since the barrows were erected), we must assume that the number of barrows remaining today does not correspond to the number in fact erected. But how many have we lost? Estimates of this figure vary considerably. An extreme value is given by Eriksen (1987, p. 19), who suggests that in many parts of Denmark only 10-20 % of once existing ancient monuments have survived. Baudou notes that monuments in brown earth soils are especially prone to "disappear", thanks to prolonged and widespread cultivation in such areas (Baudou 1985, p. 78). For the Swedish county of Halland, Lundborg notes that 50 % of the barrows plotted on a map from 1890 had disappeared by 1967 (Lundborg 1972, p. 98). Tesch estimates that only 1/3 of the barrows which once existed are still visible (Tesch 1983, p. 23). For Zealand, Kristiansen calculates with a loss of 1/3 to 1/2 of the original number of barrows (Kristiansen 1985, p. 126). Based on his study of cadastral maps for the Ystad area, Riddersporre has found that the pattern of distribution of the barrows is not radically altered when the barrows which have disappeared since the maps were made are added (Riddersporre 1987, p. 23).

Although there are a great many unknowns to be reckoned with, we should nevertheless be able to use the barrow data as a basis for discussing early Bronze Age population density in the 4 km wide primary settlement zone at the coast.

Barrows in the coastal parishes (including uncertain barrows):

96 + 62 = 158

Existing today	*This figure is x no. of once existing barrows*		
	2/3	1/2	1/3
158	237	316	474

For calculating population from these data, we assume each barrow contained three early Bronze Age adult burials (revised figures, based on Osbro-Abbekås:Hansen 1938, p. 56; Kristiansen 1985, p. 125; Lundborg 1972). This yields:

Existing today	2/3	1/2	1/3
474	711	948	1422 adults

To calculate the size of the contemporary population we can use Kristiansen's formula (1985, p. 125):

22.3	33.5	44.7	67

Adding women (39%):

31	47	62	93

Adding children (x 2):

62	94	124	186

Assuming 40 % of the male population was buried:

155	235	310	465

Our calculations have thus established that between 155 and 465 contemporary individuals lived in the western primary settlement zone at any one time during the early Bronze Age. Based on an area of ca. 60 sq km, this makes a density of 2.6 to 7.8 persons per sq km. These figures compare well with data arrived at by other researchers for similar regions (Table 3). They represent a minimum value, since we do not know to what extent individuals were buried outside barrows.

The figures are however only applicable to the coastal band; outside of this zone density (as seen in barrow distribution) drops sharply.

3.1.2. Barrow distribution and settlement

Some idea of the impact which the building of these barrows had on the landscape can be gained by considering the extent of the grass turves needed for each barrow. Estimates here vary also. Estimates of 1 to 1.6 ha per barrow are given (Fenton 1981, p. 212; Glob 1971, p. 107). Based on careful measurements, Thrane has calculated that a barrow of Lusehøj's size (6 m high, 36 m in diameter) would have required 7.3 ha of turf (Thrane 1984, pp. 151 f.). If we assume that each barrow required 1.6 ha of grass sward, then 253 to 758 ha (4-12 %) of the area, all of it necessarily well established grassland, in the barrow zone would have been stripped of at least part of its topsoil during the course of the early Bronze Age. Opinions differ as to how destructive this activity would have been for continued economic activity. If stripping was confined to limited "islands" in a landscape otherwise covered with vegetation, then recolonization could have occurred fairly quickly and the area would again have been usable for grazing within a short time. Recolonization of larger bare areas would however have taken much longer as successive waves of advance needed to encroach from the edges of the bare patch (G. Olsson, pers. comm.). While the area *under* the mound was forever re-

Table 3. Estimates of Bronze Age population density.

Location	Time	Comment	Pop./km2	Source
Poland	MN	general	14.5	Kristiansen 1988
Jutland	e BA	clay soil	2.5	Mathiassen 1948
		sand	8.1	
		sandy heath	3.3	
Zealand	e BA	general	4.5 – 6.0	Kristiansen 1985b
Blekinge	1500 BC	general	0.28– 0.84	Nilsson 1986
Bjäresjö	e BA	barrows	1.6 – 2.2	Olausson 1991b
Krageholm	e BA	barrows	0.14	Olausson 1991c
St. Köpinge	e BA	barrows	1.8 – 4.1	Olausson 1991a
Jutland	BA	general	2.3 – 7.6	Poulsen 1983
		poor soils	0.7 – 1.9	
		good soils	2.1 – 6.4	

moved from subsistence activity, grass growing on the mound itself could be grazed - indeed this might have been a preferred means of keeping vegetation in trim so the barrow was visible. In an area of fertile soils such as our western zone, we should perhaps be cautious about overemphasizing the extent of economic destruction the barrows represent. Recovery here should have been more rapid than on sandier soils such as those in the Stora Köpinge area or on Jutland. In the latter areas, grazing and barrow construction could have irreparably damaged the more fragile ecosystem (Bergström 1980, p. 110; Kristiansen 1978a).

Even though there are many barrows missing from fig. 9, we should be able to use the distribution of the existing barrows as the basis for a discussion of early Bronze Age settlement patterns. Kristiansen (1988, p. 101) notes that barrows can occur in three patterns in Denmark: a. linear (northwest Jutland), where they mark the boundary between cultivated land and pasture, b. oval or circular, where barrows encircle a higher area, which perhaps served as common grazing, or c. central - here groups of family barrows lie close together, often on a hill with a view in all directions - this cluster constitutes the center of a territory. An interpretation of barrows as boundary markers separating cultivated land from pasture has been evoked in other geographical areas as well, e.g. Kävlinge in northeastern Scania (Thurborg 1985, p. 16), northwest Jutland (Kristiansen 1978a, p. 331), Gotland (Carlsson 1983, p. 35), or to the east at Valleberga (Strömberg 1975b, p. 78; cf. Hansen 1938, p. 14). In most of these examples, however, placement of the barrows corresponds with a difference in terrain and/or type of soil - sand and moraine, for example. In the western area, barrow placement does not seem to be dictated by such constraints: the band of Bronze Age activity ends in the middle of the outer hummocky landscape (Fig. 9) and follows no discernable constraints of soil type or topography. Rather the impression here is that the primary deciding factor for barrow placement is distance from the sea.

Whether barrows mark the center of a territory (pattern c) or its boundaries (pattern b), it seems likely that one of their functions was to lay claim upon an area of land. Their positioning on high points in the cleared landscape (noted and poetically described by e.g. Bruzelius 1854, p. 346) indicates they were meant to be seen (Petré 1981, pp. 11 ff.). For the barrows situated inland in the hummocky zone, barrows could mark a group's rights to exploit a given territory - and the area where they controlled rights to grazing, rotating fields, the products of coppice woods, etc. (Carlsson 1983, p. 35; Chapman 1981, p. 80; Jarman et al. 1982, pp. 251 ff.).

The barrows located at the coast are perhaps a special case. Should these monuments be regarded from the land, in which case they were seen as marking the outer boundary for a settlement located inland, or were they meant to be seen from the sea, as a statement that grazing "behind" them was spoken for? Yet another possibility is that they represent certain groups' control over the sea, with its marine resources and access to trade routes (see below). With so little evidence for early Bronze Age settlement in the area, it is not possible to choose between these alternatives.

3.2. Settlement

The meager evidence for settlement is in poor agreement with the picture of activity evidenced by the barrows. There is however ample evidence from other areas in support of the idea that one of the factors influencing an early Bronze Age group's choice of settlement was proximity to barrows. There is a strong tradition in Swedish and Danish archaeology which considers burial to be indicative of settlement. This tradition is exemplified by such scholars as Ambrosiani (1964, p. 88), Bergström (1980, p. 85), Furingsten (1985, p. 22), Hyenstrand (1979, p. 28), Kristiansen (1978a, p. 322) and Randsborg (1975, p. 199). Where distances between settlement and burial are known, they can vary from 100 m (Ingelstorp: Strömberg 1982, p. 158), to "a few hundred meters to 1 km" (Denmark: Kristiansen 1978a, p. 331), to 700 m (Great Britain: Bradley 1981, p. 100), to 1 km (Malmö: Säfvestad & Björhem 1989, P. 60; Røgle Mose, Denmark: Jæger & Laursen 1983; Ven: Welinder 1977, pp. 115 f.), to 2-4 km (Östergötland; T. Larsson 1984, p. 24). Barrows must have represented a group's ties with the ancestors and a physical manifestation of their sense of place. In addition, there are practical considerations to be taken into account for the transport of the corpse to its final resting place. For these reasons, I maintain that the entire 4 km wide band in which the barrows are located was the primary settled area during the early Bronze Age. This was the area within which Bronze Age groups settled, lived, and died. The gradual opening of the landscape to be seen in pollen diagrams from Bjärsjöholmssjön (Gaillard & Göransson 1991) and Bussjö (Regnéll 1991), which occurs in an accelerating tempo towards the late Bronze Age, is due to mobile settlements of family groups dispersed throughout this zone. Assuming an average family group of 10 people (Table 4), we find that 16 to 47 such groups could have existed in this 60 sq km area at one time during the early Bronze Age. The sites located far inland and isolated from barrows would then be explained as more special purpose sites for the exploitation of a particular resource. Such a model was suggested by Mathiassen, based on the Danish evidence (Bergström 1980, p. 85).

Thanks to investigations carried out over the past decade in Denmark and Scania, we now have some knowledge of the appearance of early Bronze Age settlement, even though we do not have direct evidence for settlement from the area west of Ystad. (The information is compiled from the following sources: Becker 1980; Boas 1980, 1983; Boysen & Andersen 1983; Callmer 1973; Ellison 1981; Ethelberg 1986; Fagerlund 1985; Jensen 1981, 1987; Jæger & Laursen 1983; Kjellmark 1925; Lomborg 1973, 1980; Nielsen et al. 1985; Thurborg 1985). The characteristic lo-

Table 4. Estimates of size of primary economic unit (household).

Date	Number	Source
early BA	20 inds	Callmer 1973
early BA	7–15 adults + children	Strömberg 1982, p. 111
middle BA	10–20 inds	Ellison 1981, p. 432
late BA	5–6 inds	Strömberg 1981b, p. 464
BA	10 inds	Welinder 1977, p. 169

cation for early Bronze Age sites is on the southern slope of a low hill which is often surrounded on several sides by wetlands or open water. Sandy soil is preferred, although settlements on clay soil are not unknown. Sources of clay and fresh water should be available nearby, and a location not too far from a forested area was usually sought. Arable fields would be nearest the settlement, while grazing could be located further away. A striking feature of the placement of Bronze Age settlements is that they are often located at a juncture between two soil types, allowing for maximum output from agriculture and grazing with a minimum expenditure of effort (Furingsten 1985, p. 25; Malmer 1984, p. 57; SARG 1974, p. 111). Another factor influencing settlement placement was proximity to graves - as we noted above there is usually at least 1 barrow within 1 km of the early Bronze Age settlements of which we have knowledge.

By now it is clear that early Bronze Age houses were substantial timber built structures up to 30 m long. All or part of the floor can be lower than the land surface (Boas 1980, 1983; Boysen & Andersen 1983; Callmer 1973; Ethelberg 1986; Jeppesen 1984; Jæger & Laursen 1983; Lomborg 1973). A change from a 2-aisled to a 3-aisled construction occurs during the early Bronze Age (Jensen 1987).

3.3. Early Bronze Age subsistence

Unfortunately, we have no direct evidence for early Bronze Age subsistence activities from the western area, but rather we must again rely on more indirect evidence and on parallels from other areas.

The early Bronze Age economy is generally assumed to have been based on mixed farming. The discovery of a burnt down house and several refuse pits at Lindebjerg on Funen has afforded us valuable knowledge about what crops were grown (Jæger & Laursen 1983; Rowley-Conwy 1979). Analysis reveals the use of systematic agricultural practices, with naked 6-row barley and emmer wheat as the dominant crops. The trend in which the former gained in importance over the latter began in the middle Neolithic (Barker 1985; Jensen 1982, p. 225). At Egehøj, a burnt down house dating to Montelius period I on east Jutland, the composition of the carbonised grain was as follows : barley (25%), bread wheat (23%), emmer type wheat (11%), unidentified wheat (6%), unidentified cereals (34%; Rowley-Conwy 1984b, p. 106). The increasingly common discoveries of ard traces under barrows (e.g. Glob 1951, p. 80; Jacobsson 1986, p. 108; Lundborg 1972, pp. 108 ff.; Thrane 1984, p. 20) lead to the conclusion that the ard was a common aid in cultivation during the early Bronze Age or even earlier.

Turning now to the faunal component of the subsistence base, we can note two early Bronze Age sites from western Scania which contained identifiable faunal material: Sohög and Holländaren. At Sohög, bones from cattle predominated. Horse, sheep/goat, red deer and seal were also identified (Strömberg 1954, p. 322). Remains from cattle also predominated at the Holländaren site in Landskrona. Pig, dog, red deer and bear were also present (Berlin 1954, pp. 378 ff.). The use of cowhides as shrouds in many of the early Bronze Age oak coffin burials further indicates the importance of cattle in early Bronze Age society and may illustrate a symbolic value above and beyond subsistence needs (Kristiansen 1987b, p. 85).

Still more indirect evidence for animal husbandry can be gleaned from analyses of the soils beneath barrows and of the grass turves of which they are built. Study of the soil beneath the barrow at Rollright, Oxfordshire, for instance, showed a noncalcareous, shallow, stone-free well developed sol lessive. This led Robinson and Wilson (1987, p. 38) to conclude that grassland must have been present for many years prior to the barrow's construction, because ploughing would have caused soil mixing, introducing fragments of limestone. Similarly, Thrane notes that the appearance of the turves of which the late Bronze Age barrow at Lusehøj was built indicates long-term grassland, since the turves would otherwise not have held together well enough for transport (Thrane 1984, p. 116).

The pollen evidence from the Ystad area (Gaillard & Göransson 1991; Regnéll 1991), and from various other localities in Sweden (e.g. Digerfeldt & Welinder 1985, p. 113; Welinder 1977, p. 45), Denmark (Kristiansen 1988, pp. 80 f.), and England (Scaife 1987, p. 142) shows an increase in grazing lands and in the proportion of open landscape during the early Bronze Age. Together with the above evidence, this points to increased grazing, which we attribute to domestic stock held by the Bronze Age farmers. No doubt grazing on more open grasslands was supplemented by products from coppiced woods and deciduous forests which surrounded the open patches of grassland and arable (cf. Göransson 1988, p. 82).

Based on evidence from other excavated sites, we can suggest that early Bronze Age domestic sites were relocated at regular intervals. We have no concrete evidence that manuring was practiced during the early Bronze Age, in which case a system of long-term fallow was the only means of renewing soil fertility. We can further assume that for reasons of economy of effort, arable fields were placed as near to the settlement as possible (Chisholm 1962). Each field was farmed for a few years before being left to regenerate, whereupon a new field was taken into use from the area around the settlement (Chisholm 1962, p. 71; Jensen 1981, p. 52, 1987; Näsman 1987, p. 83; Müller-Wille 1977, pp. 215 ff.; Olsson 1991a, p. 297). This extensive use of the landscape requires large areas of land, and is the process by which an open landscape came to dominate over forest during the course of the Bronze Age (Kristiansen 1988, pp. 60 ff.).

3.3.1. Ecomonic and social factors affecting settlement location

Without more concrete evidence for settlement, it is difficult to describe the settlement pattern in any detail. We are assuming that settlement consisted of dispersed farmsteads in the western zone. The arguments for this assumption are as follows: First, the pattern of barrows, which, in contrast to what we see in the Stora Köpinge area to the east, are fairly evenly spread throughout the primary settlement zone (Fig. 9). Second, the evidence we do have indicates small-scale, dispersed settlement, rather than the clusters of re-

mains to be seen in Stora Köpinge. In the Fosie IV investigations, Säfvestad and Björhem found that late Neolithic settlement consisted of single farmsteads or several contemporary units (Säfvestad & Björhem 1989, p. 51)

As we have remarked earlier, the zone of primary early Bronze Age settlement in the western area is clearly tied to the coast (Fig. 9). Indeed a large number of the barrows is located at the coast, in the sandy zone itself. It is impossible to discuss the early Bronze Age subsistence pattern without taking this fact into account. The potential contributions of a seaside coastal location are many: transportation and access to trade routes, protein in the form of marine resources, seaweed for manure or for barrow construction, and grazing on natural coastal meadows. We have no definite evidence in support of any of these alternatives, and indeed it is possible that each of them, together or separately, played a part in decisions for settlement location in the primary zone.

The Balkåkra "sun drum" (Fig. 10) and the ceremonial bronze carriage from Hedeskoga are two concrete examples from this area which bear witness to far-reaching trade during the early Bronze Age. The sun drum (SHM 1461) is considered to have come from Hungary, where a find of a similar object was discovered in 1914 (Frej 1977; Lund 1979; Montelius 1917, no. 847; Oldeberg 1974). The bronze vessel belonging to the "Hedeskoga wagon" (SHM 2791) has disappeared since the wagon was found in 1855, but on the basis of the undercarriage it has been suggested that the object came from Czechoslovakia (L. Larsson 1984; Montelius 1874). There is of course no proof that these objects arrived here directly from the south by sea rather than having followed a more circuitous route over land. Strömberg has however suggested for the Viking Period that the outlets of the Scanian streams functioned as natural harbours. Trade goods were then transported further by land (Strömberg 1963, pp. 12 f.). If the main entry point for the prestige goods which the bronze objects represented was the sea, it is clear that control over the coast would have affirmed socio-political power. Bradley (1981, pp. 98 f.) has suggested this as a mechanism manipulated by members of the Wessex Culture to maintain control in southern England at this time. T. Larsson has made a similar suggestion for Scania, although his model is on a larger scale than what we are discussing here (T. Larsson 1986, p. 128). Aside from the question of trade routes, the sea and waterways were important for transportation as well (Kristainsen 1978a, p. 331). Broadbent suggests barrows on the shore could have been used for sighting in fishing waters from the sea (Broadbent 1983, p. 17).

The sea's resources could have played a supplementary role in a land-based economy. Direct evidence for the use of such resources in the early Bronze Age economy has been found at several south Scandinavian early Bronze Age sites. A rock carving showing a fish impaled on a hook at Vadgård, Jutland, is accepted as evidence that fishing played a part in the subsistence economy here (Lomborg 1973). The presence of seal bones at Sohög, on the southern coast of Scania, also provides more direct evidence for the use of marine resources (Strömberg 1954, p. 322). There is however evidence, in the form of domestic animal bones, grinding stones, etc., that these sites were not solely special purpose seasonal settlements for exploiting marine resources, but rather year-round habitations in which marine resources supplemented the usual Bronze Age mixed farming economy. As Osborn (1977) has pointed out, marine resources are variably accessible during the year, and are inferior to terrestrial resources in terms of human labor investment and in terms of protein yield. Therefore, total reliance on marine resources is a risky strategy which would have been resorted to only if other possible strategies were impossible. However, using such resources to supplement the diet, perhaps during certain times in the yearly cycle, was a wise use of resources. The wide occurrence of shells at early Bronze Age sites, even in contexts several kilometers from the coast, may show that sea resources were more widely used than supposed (Nyegaard n.d.). This type of mixed strategy has been suggested for Iron Age coastal settlements from the Hagestad region (Strömberg 1980a).

Fig. 10. The "sun drum" from Balkåkra. Early Bronze Age. Scale 20%. Photo ATA.

During the summer months, the southern coast of Scania is heavy with the smell of rotting seaweed which has washed ashore. Seaweed contains more nitrogen and potassium than animal manure, but much less phosphorus. It is therefore especially helpful as fertilizer on sandy soils, which tend to be deficient in potassium. For instance, because of the value of seaweed for the land, rights over the beaches on which it was cast ashore were well organized on the Shetland and Orkney islands up to recent times (Fenton 1978, pp. 274 f.). This is an interesting thought when coupled with the discussion of the meaning of the coastal barrows (above): perhaps these mark rights over a particular stretch of beach, where seaweed was one of the resources to be guarded. Brøndsted (1958, p. 33) notes that seaweed was used in barrow construction.

Another potential resource was coastal meadows for grazing. Jarman et al. (1982, p. 254) note that coastal seasonal grazing resources, rather than marine fauna, were what attracted many prehistoric populations to the coast. In an account of early animal husbandry in Sweden, Frödin de-

scribes how horses and cattle were brought to the coast to graze on the salt meadows each year (Frödin 1957, p. 220). Kristiansen notes that the landscape type which was especially suitable for open grazing was lighter, hilly soils (Kristiansen 1988, p. 75) such as we have here in the outer hummocky landscape.

In summary, the evidence at hand for the early Bronze Age indicates that settlement in the western area was fairly evenly distributed along the whole coast, and stretched inland to 4-4.5 km. Within this zone, the large number of barrows and bronze finds, and the Balkåkra drum and Hedeskoga carriage in particular, suggest a generous subsistence base which was capable of supporting between 16 and 47 families, as well as providing a surplus which enabled them to acquire exotic trade goods. A mixed economy, combining traditional elements of Bronze Age subsistence with supplementary sources such as those offered by the proximity to the sea, provided the economic basis for prosperity. Settlement would have been dispersed in this primary zone, and mobile. Livestock could have grazed freely all year round in the open fields and grasslands growing on the clay till of this zone, or on natural meadows at the coast. The area inland from the primary settlement zone could also provide leaf-fodder and grazing, as well as resources obtainable through hunting and gathering. In addition the sea, with its marine resources and possibilities for trade and transportation, must have been an important element. Such a pattern is, we might add, comparable to that suggested for Kristiansen for early Bronze Age Zealand (Kristiansen 1978a p. 334).

4. The late Bronze Age cultural landscape in the western zone

4.1. Burial

During the course of the Scandinavian Bronze Age, burial customs underwent remarkable, though gradual, change. The development in southern Scandinavia was from inhumation burial under an imposing barrow of grass turves and soil in the early Bronze Age, to cremation burial sunk into the ground or into an already existing barrow in the late. Along with the tendency towards more modest burial, aboveground monuments also shrink in size. The gravegoods buried with the deceased shrank in size as well. After the dispersed pattern of early Bronze Age barrow placement (see Fig. 9), burial tends now to be agglomerated in cemeteries.

Except for three burials, all the late Bronze Age burials known for the western area are located at the coast (Fig. 11). However, due to the less monumental nature of the later graves, we must ask ourselves whether this pattern reflects the actual distribution of late Bronze Age burial, or whether it is the result of source-critical biases.

Secondary burials from periods later than the central grave are a common occurrence in Bronze Age barrows. Through excavation or chance finds, we know of 4 barrows containing 11 late Bronze Age secondary burials from this area. A compilation of the data from the barrows for the whole area covered by the project shows that we have knowledge of the contents of only 13 of them. These contain a total of 46 graves, or 3.5 graves per barrow. Of the 38 graves which could be dated, 17 were from the early Bronze Age and 21 from the late Bronze Age. Not all of these barrows have been professionally excavated, and not all the graves which were recovered could be dated, however. These figures can be compared with a compilation by Lundborg for Halland, Sweden. There, 76 excavated barrows contained 20 inhumation burials dated to the early Bronze Age and 215 late Bronze Age cremation burials: 3.1 graves/barrow (Lundborg 1972, p. 121).

The modest so-called flat-earth burials are of course much more prone to destruction than the prominent barrows are. With little or no standing monument to mark them, such graves can easily have been obliterated by ploughing by subsequent generations. Late Bronze Age cremation burials would not be easily recognized during surface survey, although they should be as amenable to detection as ploughed-up hearths and cooking pits are.

When examining the map in fig. 11, we should again bear in mind that the large number of graves registered in the parish of Bjäresjö is in part due to the efforts of Gustav Jacobæus. While his efforts mean a much higher find density on the Ruuthsbo grounds than in the rest of the area, the spatial pattern of finds *within* the boundaries of this estate can be considered to reflect a real situation, since the chances for observation during ploughing can be assumed to have been equal on all the Ruuthsbo fields (i.e., both at the coast and inland). We also note that late Bronze Age burial in the Stora Köpinge region shows a preference for sandy soils as well (Olausson 1991a).

Apparently, then, the late Bronze Age flat-earth graves are limited to the sandy coastal zone. The situation for secondary burial in barrows is less well known, but based on excavated early Bronze Age barrows from other areas, we assume that most or all of the barrows continued to be regarded as places for burial during the late Bronze Age. If this is so, we find two complementary patterns of burial emerging during the late Bronze Age: one which continues the earlier more dispersed pattern (i.e. in barrows), and one in which burial was in cemeteries in the sandy coastal zone. We should perhaps not place too much emphasis on apparent differences here. It is entirely possible that the dispersed pattern of barrow placement was a function of the building and exposure of the barrows, which do not lend themselves to agglomeration. The clusters of barrows which do exist may have served the same function as cemeteries came to serve (cf. Balkwill 1976, p. 192; Hansen 1923-24, p. 47). It is nevertheless interesting to note the rise of cemeteries in the Scanian late Bronze Age and to speculate on what they represented in socio-political terms. On the one hand we have a dispersed pattern in which burial occurred in barrows where ties to the ancestors are maintained. Such burial affirms spatial proximity to settlement, just as it had during the early Bronze Age. New to the late Bronze Age is the occurrence of cemeteries at the coast (Olausson 1987). Stjernquist (1961, p. 127) notes that the cemetery at Simiris was first used during Montelius period IV. She points out however that this

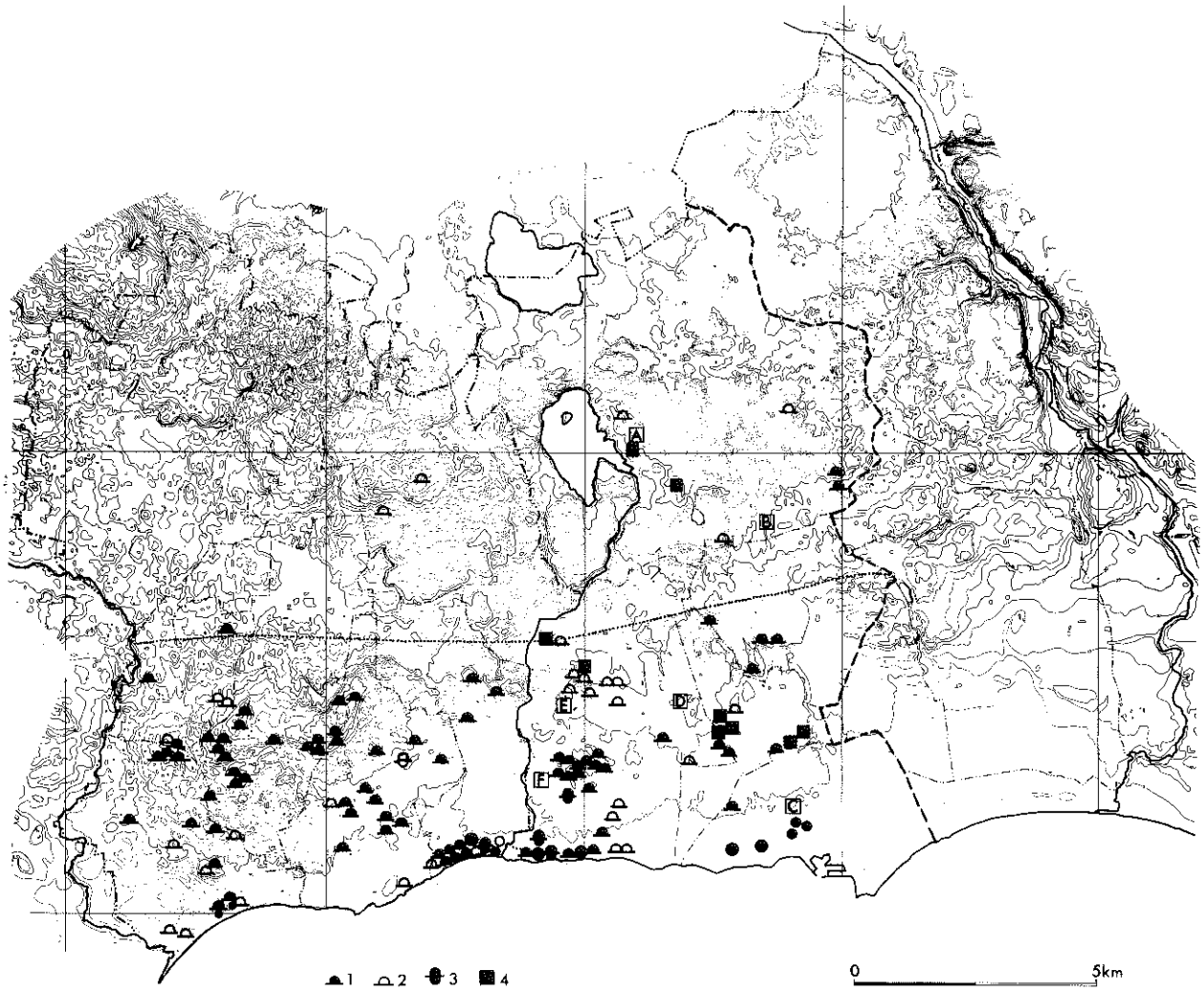


Fig. 11. Map showing the distribution of late Bronze Age settlement and burial in the western area. The primary settlement zone has expanded inland only slightly. However there is more evidence for settlement activity in this zone, as well as in the inner hummocky zone, as compared with the situation during the early Bronze Age. A=location of late Bronze Age ploughed-up hearths found during December survey, B=location of the hoard at "Hästhögsbacken", C=location of bronzesmith's hoard, D=location of the late Bronze Age vessel from Bjärsjöholmssjön (SHM 7993), E=settlement remains at Bjäresjö 19:17, F=settlement remains at Ruuthsbo 2:1. Legend: 1=early Bronze Age barrow, 2=early Bronze Age barrow, uncertain, 3=early Bronze Age barrow containing at least one secondary burial, 4=early Bronze Age barrow containing at least one secondary burial, uncertain, 5=flat-earth burial from the late Bronze Age, 6=flat-earth burial from the late Bronze Age, uncertain, 7=indication of late Bronze Age settlement.

need not imply a shift in settlement - rather changes in the burial rite may have been the reason for opening a new grave-field.

As was true for the early Bronze Age, we have little direct evidence for late Bronze Age settlement in the western area and must instead rely heavily on the pattern of disposal of the dead in our discussions of the living. Here the question of the meaning of the coastal flat-earth cemeteries vis-à-vis settlements becomes highly important. Review of the archaeological and social anthropological literature shows however that there is no homogeneous pattern to be found. Ambrosiani (1964, p. 88) and Petré (1984, p. 57) maintain that cemeteries are directly tied to settlement, while Hodder notes that there need not be direct connections between settlement and cemetery. Both Säfvestad and Björhem (1989, p. 55) and Jensen (1987b, p. 46) note a close spatial association between settlement, barrows and urnfield cemeteries. Cemeteries occur adjacent to settlements when the dead and the ancestors are seen as being directly connected to the contemporary community. In such cases, communities may wish to stress their ties and rights to land through their links with the past. Where society and land rights are not closely linked, it may be easier for cemeteries to be placed well away from settlements on peripheral or unused land (Hodder 1982, p. 196). Petré notes for Lovö that monumental Bronze Age graves usually lie on high spots and mark territorial boundaries (Petré 1984, p. 57). Fernholm suggests that even late Bronze Age flat-earth cemeteries served as territorial markers (Fernholm 1982, p. 53). While these graves were not as monumental as their predecessors, there is evidence that many of them bore monuments in the form of smaller mounds, stone-settings, etc. (Tesch 1983, fig. 26;

Thrane 1984, pp. 209 ff.) which marked their position above ground.

Several other authors have also emphasized the cemetery as a group's means of claiming control over an area. Bradley (1981, p. 103) suggests that burial in cemeteries (instead of barrows) may be a sign of intensified subsistence. Cemeteries are most likely to be found in areas and periods where there is an imbalance between society and critical resources. In a similar vein, Goldstein suggests that the maintenance of a permament, specialised, bounded area for the exclusive disposal of the dead is a group's means of affirming descent from the dead and thus control over crucial but restricted resources (Goldstein 1981, p. 61).

The shift from highly visible burial mounds to more modest and less visible flat-earth burial in cemeteries may also relate to changes in society and settlement. In regard to social changes, T. Larsson has argued that late Bronze Age burials reflect a need to at least give an appearance of social equality. This was possible in regions in whcih rival groups had established a balance of power (T. Larsson 1986, p. 128).

Another explanation which comes to mind relates to landuse. We will argue below that settlement locations had become more or less permanent by the late Bronze Age. During the early Bronze Age, barrows could have served a function as territorial markers in a mobile settlement pattern (Säfvestad & Björhem 1989, p. 59). As settlement patterns coalesced, territorial statements were made in other ways (e.g., fences, tracks, houses etc.). The function of barrows as territorial markers decreased when mobility decreased. Burial could now occur collectively in cemeteries which were in close association with the group's home area.

Whether or not the cemetery lies in the immediate vicinity of the settlement, it is clear that most authors maintain the cemetery's function in affirming control over an area and/or over certain resources. In the cemetery or cemeteries at the coast we are perhaps seeing a continuation of the need for control established by the coastal barrows (see above). We will return to speculation about what this says about the use of the western area when we discuss settlement patterns below.

4.1.1. Population estimates

In all, 219 burials datable to the late Bronze Age are known from the western area. Of these 161 (74%) come from the concentration of burials around the present-day village of Svarte (Olausson 1987) and 31 (14%) come from flat-earth cemeteries in the vicinity of the present town of Ystad (Strömberg 1978, pp. 88ff.). Because of the uneven history of excavation and land development along the coast, we unfortunately cannot claim with any certainty that the apparently empty areas on fig. 11 really were devoid of burial (Olausson 1987). Estimates of the normal size for a late Bronze Age flat-earth cemetery vary from 125 (Strömberg 1975a, p. 211) to 55 (Fernholm 1982, p. 34) to 40 (Ellison 1981, p. 422). The Piledal cemetery in Stora Köpinge parish with its 70 late Bronze Age burials would thus probably have been a single cemetery, while the 161 late Bronze Age burials around Svarte would numerically correspond to two cemeteries (Olausson 1987). Perhaps the Svartån Stream acted as a boundary in the latter case.

In order to get an idea of the population represented by the late Bronze Age flat-earth cemeteries at the coast, we will lump the known flat-earth burials together. Applying Kristiansen's formula (1985, p. 125), we arrive at 23 adult males. As we did for barrow calculations, we will add women (39%) = 32 and children (x2) = 64. Assuming 40% of the male population was buried we arrive at a contemporary population of 160 individuals for the whole area represented in the flat-earth burials alone.

Although data on finds from the barrows here are slight, there is nothing to suggest that there was any difference in function between flat-earth graves and secondary burial in barrows (cf. Broholm 1933, p. 56). In both cases the cremated remains were sunk, together with grave goods and with or without an urn, into the earth. The burials at Svarte included all ages and sexes and varying amounts of grave goods and burial treatments (Olausson 1987). Hansen notes that the fact that flat-earth graves are often placed around barrows means that there was no cultural difference between these grave types, although he claims class differences are possible (Hansen 1923-24, p. 47; cf. Chapman 1981, p. 80).

A serious difficulty connected with trying to calculate late Bronze Age population is the lack of data on the contents of the barrows. In the calculations of early Bronze Age population, based entirely on barrows, we assumed that barrows contained an average of three early Bronze Age adult burials. To try and arrive at a realistic picture of how many *late* Bronze Age secondary burials in barrows we have in the western area, we will adjust Kristiansen's formula with the number of late Bronze Age burials in excavated barrows in the project area: 1.6 per barrow (the comparable figure for barrows in Halland is 2.8, calculated from data in Lundborg 1972, p. 121).

Barrows from the western area:

certain	105
uncertain	68
total	173

Existing	*The is x no. of what once existed*		
	2/3	1/2	1/3
173	259	346	519
x 1.6 late Bronze Age burials per barrow=			
277	414	554	830
Calculating contemporary population=			
30.5	45.5	61	91
Adding women (39%)=			
42.4	63	84.8	126.5
Adding children=			
84.8	126.4	169.6	253
Assuming 40% of the males were buried:			
212	316	424	633

Estimates for the late Bronze Age contemporary population for the western area based on secondary burials in the barrows range from 212 to 633 individuals. If we add the data from the flat-earth burials (p. 16), we reach a minimum figure of 372 to 793 individuals living in the area at any one time during the late Bronze Age.

4.2. Settlement

Although meager when compared with the Stora Köpinge region (Tesch 1983, pp. 41 ff.), direct evidence for late Bronze Age settlement activity in the western area is at least more frequent than early Bronze Age indications (Fig. 11). While most of the points are located in the primary settled zone, there are a few scattered indications inland as well. These inland points mostly consist of ploughed-up hearths found during surface survey. Since December survey in the inland areas was of limited extent (Fig. 4), we do not know whether an absence of similar points is due to this fact or to a genuine absence of late Bronze Age activity in the apparently empty areas. Just east of Lake Krageholmssjön, a clearance cairn containing late Bronze Age pottery was uncovered during excavation of an Iron Age site in the project (Callmer, pers. comm.). The other two points nearby are isolated hearths which have been radiocarbon dated to the late Bronze Age ("A", Fig. 11).

In the primary settlement zone we have a better basis for discussing settlement (Lindahl & Olausson 1991). Concentrations of up to 10 hearths/earth ovens have been found by surface survey around Bjäresjö and Hedeskoga. Attempts to locate settlement in connection with several of the points at Hedeskoga were however unsuccessful. Better results were reached at Bjäresjö 19:17, where seven earth ovens and a large refuse pit with late Bronze Age pottery and plant remains was uncovered (Fig. 7"e"). An apparently similar site is located 1.5 km south of this, on the Ruuthsbo estate (LUHM 28053; Fig. 7"h"). Here 15 pits were excavated by Mårtensson and Sundin in 1920. The pits contained 13 kg of pottery, as well as a number of flint tools (Fig. 6), bits of clay daub, one horse tooth and one pig tooth . The pottery is typical late Bronze Age ware, and there are several perforated vessels represented. As these pits were dug by hand and the ploughsoil was not removed from the area around them as is the practice today, we do not know if these pits represent a temporary special purpose site or are associated with a permanent settlement (e.g. Thrane 1974, p. 85). Subsequent surface survey and phosphate mapping by the project and by CBNA UV-South (Tesch 1981, p. 30) have failed to turn up any more indications for settlement in the vicinity of the excavated site. There is however a striking similarity in the character of this site and Bjäresjö 19:17. At Sulebjär, approximately the same distance northwest of Bjäresjö 19:17, two late Bronze Age hearths were found on two different survey occasions (Fig. 7"i"). The site bears the classic characteristics of late Bronze Age settlement location: a south-facing slope, surrounded by wetlands, on a patch of well-drained soils (Plate 5/1). It is therefore unfortunate that practical considerations prevented us from excavating here. At Bjäresjö 2.1, which lies between Sulebjär and Bjäresjö 19:17 (Fig. 7"g"), several pits containing late Bronze Age pottery were discovered during project investigations (Callmer, pers. comm.). Soil samples were taken for flotation analysis. However results revealed remains more characteristic of Iron Age than of Bronze Age agricultural practices (Engelmark, pers. comm.)

In the sandy coastal zone, there is evidence for large numbers of hearths interspersed with the flat-earth graves (Nagmér 1983; Hansen 1924). No postholes indicating structures are known, and none of the hearths has been dated.

The map showing late Bronze Age settlement (Fig. 11) in the western area represents an interpretation based on evidence from the area complemented by analogies with other areas, where appropriate. The primary settlement zone is largely the same as during the early Bronze Age, although it now extends slightly further inland. In our interpretation, we assume that the barrows still played an active part in Bronze Age society. They continued to be used for burial and thus represented ties with the ancestors and territorial statements (cf. Säfvestad & Björhem 1989, p. 60). Because of this and because of the amount of work required to build the barrows, the members of late Bronze Age society continued to expend the effort required to keep barrows visible in the landscape. Settlements were located at regular intervals throughout this primary zone. By the end of the period, however, greater settlement stability was possible due to improved farming methods and the use of manure (see below).

During the course of the early Bronze Age, barrows were erected in the primary zone. Erection of barrows meant that at least the area under the barrow was permanently removed from cultivation, and perhaps also that a certain area of land around the barrow was "spoken for". By the end of the early Bronze Age, barrow density in the primary settlement zone was quite high. Therefore, most of the land here would have been out of circulation and not available for expansion when the need arose. In the late Bronze Age, new barrows were not built but existing barrows still functioned as burial sites and territorial markers. In addition, burial was consolidated in flat-earth cemeteries at the coast. We now have slightly more evidence for activity in the inland zones than was evident during the early Bronze Age. This activity does not however bear the character of intensive and permanent farming such as we suggest for the primary zone. Rather, we propose these signs represent temporary or seasonal occupations and occasional isolated farmed enclaves. Primarily resources available for livestock, such as grassland and leaf-fodder, may have been exploited on a regular basis in a system of transhumance similar to that practiced in northern Sweden during the Middle Ages (Nyman 1963; Thyselius 1963). The pollen evidence from Lake Krageholmssjön (Regnéll 1991) indicates an open landscape in which there is evidence for cyclical regeneration of hazel and birch. Dispersed, short term use of the inland area for extensive grazing is the only way to reconcile this evidence with the sparse archaeological finds and the apparent lack of burial here. Settlement was located in the familiar territory surrounded by barrows and deeply rooted in known farming practices. Only occasionally or for special

reasons did one leave this secure area to exploit the less tamed, partly forested landscape inland (cf. Kristiansen 1988, p. 104).

As was the case for the early Bronze Age, we can rely on parallels with late Bronze Age settlement from other areas to arrive at a picture of how settlement in the western area might have looked. Our knowledge of late Bronze Age sites is greater than our knowledge of early Bronze Age sites. Prior to the 1980s, most of what we knew about late Bronze Age settlements came from sites on the sandy soils of Jutland, which meant we could not be sure that these settlements were representative of other areas as well (Adamsen 1983, p. 109; Jensen 1988; Thrane 1985, p. 147). However, subsequent work, especially the Danish and Swedish rescue operations caused by the natural gas pipeline networks (e.g. *Danmarks længste udgravning* 1987; *Arkeologi och naturgas i Skåne* 1985) and the excavations at Fosie IV (Björhem & Säfvestad 1983) have provided a great deal of information about settlement in other areas as well. From these and other sites it is evident that late Bronze Age settlements are by no means exclusively limited to areas of sandy soil (cf. Mathiassen 1959, p. 49; Thrane 1984). However even in areas of clay till, smaller sandy patches were often sought out for settlement. Heavier clay soils covered by forest growth could provide leaf-fodder, while wetlands provided pasture. As we saw for early Bronze Age sites, locations where several types of soils and hydrological conditions met were preferred (Barker 1985, p. 245; Bergström 1980, p. 24; Ellison 1981, p. 430; Jensen 1967, p. 94; Kristiansen 1978a, p. 330; T. Larsson 1986, p. 104; Nielsen 1982, p. 138; Strömberg 1982, p. 101; Thurborg 1985, p. 40). Settlements were commonly located in gently undulating terrain, and houses were usually built on the side of a south-facing slope, surrounded on several sides by water or wetlands (Draiby 1985, pp. 129 f.; Furingsten 1985, p. 48; Tesch 1983, p. 39). As we saw during the early Bronze Age, settlements are seldom located far from burial sites. Areas of glaciolacustrine sediments, such as occur at Bjäresjö or Bjärsjöholm (Regnéll 1984, p. 3) would have been useful for forest or leaf-fodder production (Christophersen 1984, p. 9), while the clay till of the primary settlement zone would have provided good conditions for agriculture, as long as the clay content was not too high (Christophersen 1984, p. 9: Ekström 1950, p. 60).

As was true for the early Bronze Age, the project investigations have not yielded any structural remains comparable to the houses known from for instance Stora Köpinge (Tesch 1991). As we noted above, it is possible that the earth ovens and refuse pits at for instance Ruuthsbo or Bjäresjö are part of a permanent settlement. The area of topsoil removal was too limited to establish whether or not this was true. Björhem (1986, p. 95) points out that for hygienic reasons such pits are usually located 10-75 m away from the houses. At Skamlebæk, cooking pits were 40 m from the houses (Lomborg 1977, p. 128). Näsman (1987, p. 75) and Nielsen (1987, p. 27) note that 17-31% of the Bronze Age settlement sites known in Denmark lack traces of postholes whatsoever. Even when large areas are uncovered, postholes can be difficult to see in clay soils.

4.3. Late Bronze Age subsistence

Thanks to settlement sites where bone and plant remains have been preserved, our knowledge of which plants and animals formed the basis of late Bronze Age subsistence is quite good. However we still cannot state the relative importance of livestock vis-à-vis arable farming in the diet. The late Bronze Age evinces in general a greater variety of plants than in preceeding periods (Rowley-Conwy 1984a, pp. 145 f.). The most important crop was barley (Hjelmquist 1979, p. 36; Jaanusson 1981, pp. 20f.; Rowley-Conwy 1984a, p. 145). Barley is a shallow rooted crop which is best suited to light loams, while heavier loams are preferred by wheat. Barley can tolerate a wider range of lighter soils and can ripen in a colder climate than wheat, but it is less tolerant of excessive moisture (Barker 1985, p. 45; Stenberger 1979, p. 304). The wetter, cooler late Bronze Age climate may thus have favored barley over wheat. Rowley-Conwy has also suggested that since barley is a fast-growing plant, Bronze Age farmers planted barley when their first crop looked like it would fail (Rowley-Conwy 1984a, pp. 145 f.). Wheat was still an important crop, even though it was declining in importance relative to barley (Bergenstråhle & Regnell 1985, pp. 65 f.; Jensen 1967, p. 142; Jaanusson 1981, pp. 20 f.). Oats makes its first appearance at this time (Bergenstråhle & Regnell 1985, p. 65; Jensen 1967, p. 142; Jaanusson 1981, pp. 20 f.; Stenberger 1979, p. 304), as does broad bean (Stenberger 1979, p. 304) and rye-brome (Bergenstråhle & Regnell 1985, p. 66). Another newcomer is millet, which prefers dry sandy soils (Barker 1985, p. 45; Jensen 1967, p. 142; Stenberger 1979, p. 304).

As table 2 shows, the results of the flotation sample from the refuse pit at Bjäresjö 19:17 fit in well with this general picture, although the occurrence of millet is perhaps surprising in this clay till area. Gold of pleasure is also known from the central Swedish site of Hallunda (Jaanusson 1981, p. 21) and Engelmark notes that this crop is cultivated throughout the Iron Age (Engelmark 1988). The plant was probably valued for its oil (Hjelmquist 1979, p. 36).

These crops could have been harvested by uprooting or with flint or bronze sickles (Harding 1976, p. 521; Hillman 1981, p. 148). A number of flint sickles and pruning knives has been found as stray finds in the western area (Fig. 12). While Harding (1976, pp. 517 ff.) has even suggested that bronze axes were used for breaking ground, the more generally accepted explanation is that an ard was the tool used. The presence of ard furrows under nearly every barrow indicates the extent of farming (Kristiansen 1988, p. 89), even though this represents a succession of plots in cultivatation. Experiments in England have shown that it is possible to plough even heavy clay soils with an ard (Reynolds 1979, p. 51), and ard furrows in heavy clay soil under barrows at Slots Bjergby and Sevel (Glob 1951, p. 80) and at Lusehøj (Poulsen 1987, p. 233) further confirm this. Criss-cross ploughing with an ard can be used to break up virgin soil prior to the more shallow cultivation ploughing (Pedersen 1986, p. 172), but experiments at Lejre have shown that the ard was not suitable for breaking up well developed grass turf (Hansen 1968, p. 79). This last lends support to the idea that

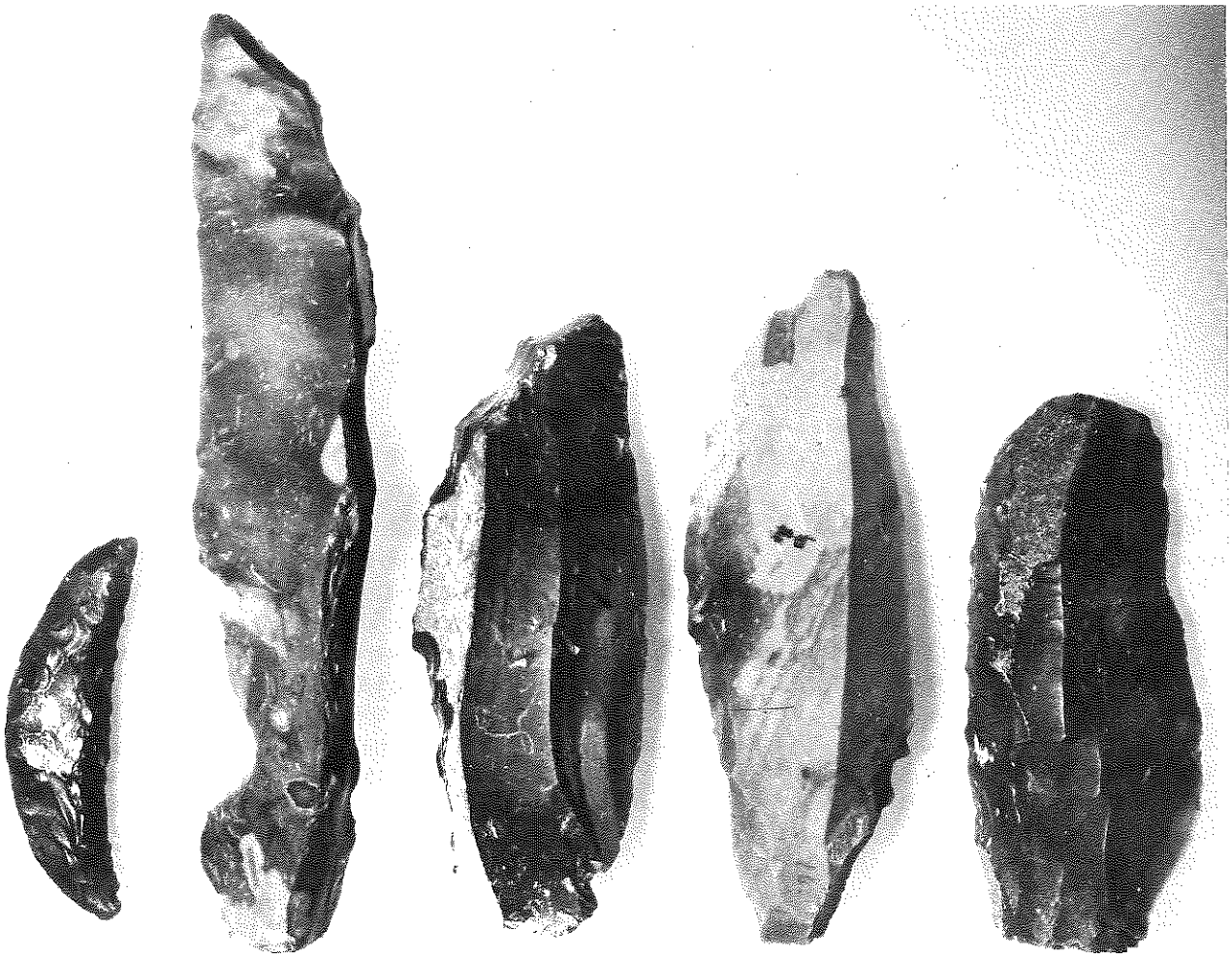


Fig. 12. Examples of flint pruning knives and sickles registered as stray finds from the Ruuthsbo collections. Scale 75%.

arable fields were when possible not taken up in grasslands, but that grasslands were a final stage in a succession from virgin forest to arable to grassland and/or settlement interspersed with coppiced woods. While Rowley-Conwy postulates the use of permanent fields by the early Bronze Age (Rowley-Conwy 1981, pp. 85 ff.), the evidence suggests that arable fields were used only a few years before being turned over to grazing (Jensen 1987, p. 161; Thrane 1984, pp. 115 f.), even though we have some indication that manuring was practiced towards the end of the period (see below and Engelmark 1988). Fields were probably enclosed by withy fences to protect the crops from wandering grazers (Thrane 1984, p. 115). The large amount of hazel pollen from for instance the Krageholmssjö diagram (Regnéll 1991) may be related to a need for hazel branches, which are particularly suitable for this purpose (cf. Britnell 1982, p. 151).

The fields themselves were small; estimates range from 0.9 ha (Olsson 1991c) to 5 ha (Welinder 1977, p. 168) as the yearly harvested area in a mixed farming economy. Since c. 40 days/ha would have been required for tilling, manuring, and harvesting, a single family could not have managed a larger area (Enkell et al. 1979, p. 342; Jensen 1982, p. 227). At Teltge, northwest Germany, a late Bronze Age farm with fields 1575 sq m and 1750 sq m is known. Field sizes of 2500 to 6400 sq m are estimated for this period for Holland (Thrane 1984, p. 116).

4.3.1 Faunal component

By far the overwhelming majority of animal bones on sites where they are preserved come from domestic species (Table 5). Cattle still predominate, as they had since Neolithic times, making up c. 55% of the domestic faunal remains. Nyegaard (n.d.) suggests that by the end of the late Bronze Age, sheep, goats and pigs came to dominate over cattle. Sheep/goat now dominates over pig in most cases. An unusually high percent of horse bones can be seen at Hötofta. These, as well as dog and the other species, were probably part of the diet. Wild animals and marine resources make up only a very small part of the bone material, even at many of the sites located near the coast. Species such as deer, beaver, wolf (?), dolphin and fish are represented (Jaanusson 1981, p. 21, 1983, p. 165; M. Larsson 1987b, p. 55; Lepiksaar 1969, p. 187; Nyegaard n.d.; Strömberg 1982, p. 155; Widholm 1974, p. 85;).

Table 5. Fauna from Swedish Late Bronze Age settlement sites.

Fauna	A	B	C	D	E	F
Cattle	40.8	54.9	54.4	19	57.0	51.8
Horse	2.7	27.3	1.7	12	1.5	5.5
Pig	21.6	7.8	12.3	29	16.0	14.5
Sheep/goat	18.0	7.2	22.6	38	25.0	25.5
Dog	5.3	1.1	2.1			1.8
Red deer	7.9	1.1	1.4			
Roe deer	1.9					
Bear	0.2					
Beaver	0.6		1			
Fish	0.2		2.4			
Wolf?			2.1			
Σ	99.2%	99.4%	100%	98%	99.5%	99.1%

A=Ängdala, B=Hötofta, C=Kvarnby, D=Valleberga, E=Hallunda, F=Fosie.
Information from Jaanusson 1981; Lepiksaar 1969; Nyegaard n.d.; Strömberg 1982; Widholm 1974.

The domestic animals were probably allowed to graze outdoors for most of the year (Kristiansen 1978a, p. 32; Ryder 1981, p. 153; Welinder 1977, p. 154), although the increasingly cooler climate towards the end of the Bronze Age may have forced cattle indoors during the coldest months. Unenclosed grazing would have effectively forestalled the worst attacks of the parasites which are the bane of enclosed grazing today (Barker 1985, pp. 41 f.). Tethering the animals or enclosing the cultivated fields were means of protecting the growing crops. The decline of pig and the rise of sheep and goats may be due to the regression of forests (Kristiansen 1988, p. 103; Nyegaard n.d.; Ryder 1981, p. 182).

Sheep prefer open grassland to forest grazing (Ryder 1981, p. 193), while cattle can subsist on leaves and branches from the forest as well as grass (Kristiansen 1988, p. 73). Forest fodder is suitable as winter fodder and is an efficient supplement to grass. At least 5500 sq m per head of cattle is required if only grass is available (Hvass 1985, p. 184). But in a well developed forest pasture, 20 to 30 head of cattle can be fed on one square km (Fleming 1972, p. 182). A landscape type containing both open grassland and trees was therefore optimum for the Bronze Age farmer (Kristiansen 1978a, p. 325; Poulsen 1983, p. 153). The practice of coppicing was the most efficient means of harvesting these resources. By girdling a number of trees, a grassy area is created. The light reaching the ground favors grass production. In the partially open forest, little effort need be expended for gathering winter fodder. Trees can be felled and twigs, ivy and mistletoe can be cut down and easily consumed by the roaming livestock (Göransson 1988, p. 42; Kristiansen 1988, p. 73). In the very long run, overgrazing will lead to a common, i.e. an area with heavily grazed vegetation which is very sensitive to drought. Once this stage is reached, winter fodder must be gathered and the demand for labor is dramatically increased (Göransson 1988, pp. 42 f.; Kristiansen 1978a, p. 325; 1988, pp. 70 f.; Tesch 1983, p. 39).

4.3.2. The late Bronze Age landscape

Pollen analysis indicates that by the late Bronze Age the landscape in England and indeed in northern Europe as a whole was quite open, continuing a trend which had begun in the early Bronze Age or perhaps even earlier (see above). Fleming (1972, p. 186) describes three main routes leading to the development of open country: 1) Large scale clearance and permanent settlement using contiguous garden areas. This includes a permanently cleared core area for which more sophisticated agricultural techniques need to be developed, and an outer zone of forest, which would be gradually depleated by browsing and felling for timber and firewood. 2) Forest fallow succeeded by bush fallow and then by grass fallow because of population pressure. 3) Deforestation and exploitation of poor upland soils, podsolization being accompanied by the development of moorland vegetation with or without additional grazing pressure. In any case grazing pressure was no doubt an important contributory factor leading to the decline of grasslands ("the Jakobsen model": Göransson 1988, p. 42). Phillips speculates that the decrease in the size of animals like cattle and pig from the Neolithic to the Iron Age in Europe is due to increased pressure on grazing space (Phillips 1980, p. 191).

Grazing pressure is thus one means by which the landscape was opened up and kept open. In some areas there is also evidence that fire was used for this purpose (Britnell 1982, p. 151; Scaife 1987, p. 154; Welinder 1977, p. 45) as it had been during the preceding Neolithic (Andersen 1988). Some of the grass turves in Lusehøj contained charcoal (Thrane 1984, p. 98). Charcoal is also present during the late Bronze Age in the Bjärsjöholmssjön diagram (Gaillard & Göransson 1991). Periodic cultivation also played a part in developing and maintaining the Bronze Age open landscape (Digerfeldt & Welinder 1985, p. 113; Scaife 1987, pp. 154 ff.).

The pollen evidence from the western area corresponds to the pattern seen elsewhere. In the inner hummocky zone, there is evidence for periodic grazing leading to an opening of the landscape during the Bronze Age. Cultivation is not seen here before the Subatlantic period (Regnéll 1984, p. 12). The immediate surroundings of the Bjäresjö Lake were almost treeless by the later part of the Bronze Age (Gaillard & Berglund 1987, p. 9).

When properly maintained, the system of pruned woods and grasslands is a harmonious system which can last for a thousand years (Göransson 1988, p. 80; Kristiansen 1978a,

p. 325). Overgrazing however leads to the formation of a common, which is sensitive to drought. As the forest retreats, more effort must be expended for gathering winter fodder. The wetter and cooler climate of the late Bronze Age could initially have favored open vegetation over forest growth. For a time at least the loss of forest products could have been compensated by the lusher grass growth (Hedeager 1988, p. 176). It is possible that the retreat of the forests was such a gradual one that it was not noticeable to the inhabitants of the area, who continued with essentially the same agricultural practices as before (Olausson 1992).

We note in any case the appearance of stalls or evidence for stalling in houses from the late Bronze Age in most of northern Europe at this time (e.g. Becker 1982, p. 58; Draiby 1985, p. 154; Fenton 1981, pp. 213 f.; Jensen 1988, p. 160; Leth-Larsen & Nielsen 1987, p. 50; Müller-Wille 1977, p. 216; Näsman 1987, p. 82; Tesch 1991). Näsman (1987, p. 82) has also suggested that certain structures on late Bronze Age settlement sites were used for storing hay or grain.

Winter stalling requires an investment of labor for collecting and transporting fodder, but it also means output in the form of manure. Poulsen calculates that winter fodder for six grown cattle requires six tons of leaves or 24 ha of forest (Poulsen 1983, p. 151). There are several tool types in the Bronze Age repertoire which may be evidence for the collection of leaf-fodder or hay. Kristiansen suggests that flint flake axes or bronze socketed celts could have been used for this purpose (Kristiansen 1988, p. 56, p. 90). The flint pruning knives known from this period are also thought to have been used for this purpose, although Austad (1988, p. 11) notes that in contrast to hay collectin, which requires sharp sickles or scythes, leaf-fodder can be collected without tools. Björhem and Säfvestad (1983, p. 18) propose that the occurrence of flint pruning knives at the end of the late Bronze Age is connected with a need for winter stalling due to climatic change. Several such knives are known from the Ruuthsbo collection (Fig. 12; Wyszomirski 1979) and one was found at the Ruuthsbo site in a pit containing late Bronze Age pottery (Fig. 6). While bronze sickles are not as efficient as the iron scythes which appear in the Iron Age, experiments by Harding have shown that they could be used for harvesting hay (Harding 1976, p. 516). Therefore the lack of scythes in the Bronze Age cannot be used as an argument against permanent winter stalling (Hedeager 1988, p. 164).

Along with evidence for winter stalling, we find the first signs of the use of the manure which results from this practice. On the British Isles, the first suggestion of the manuring of crops comes from a manure tank in a Bronze Age cowhouse at Jarlshof, Shetland (Ryder 1981, p. 198). Manuring the fields closest to the settlements is suggested even as early as late Neolithic times in the Hagestad area (Strömberg 1982, p. 111; cf. Jarman et al. 1982, p. 142). The ard was however incapable of ploughing manure under the surface of the fields (Stumman Hansen 1979, p. 68). The presence of fat hen in the flotation sample at Bjäresjö led Engelmark to conclude that manuring may have been practiced here, even though each field was used for only a short time (Engelmark 1988).

4.3.3. Settlement and subsistance

We have proposed that most of the late Bronze Age settlements in the western area were located in the primary settlement zone. While we have little direct evidence, we have further assumed from parallels with other south Scandinavian sites that a mixed economy combining cereal cultivation with animal husbandry was practiced. Such a pattern dictates that the arable fields and at least some grazing land be located as near to the settlement as possible. Further, if we assume winter stalling was practiced, then sources of winter fodder should also be located nearby. Of the alternatives arable fields, fodder-producing forest or meadow, and pasture, the first two require labor input for cultivation and/or harvesting and transportation. Thus if one must choose to remove one of these three functions from the vicinity of the settlement, moving livestock to another area for summer grazing would be the alternative which required the least effort.

The 4.5 km wide primary coastal settlement zone offers a gradient of natural zones, from the coastal meadows on the sandy soils at the coast, to the clay till soils in the outer hummocky landscape inland, to the more forested area of the inner hummocky landscape even further inland. Sandy soils have rough grazing rather than arable potential. Their value as grazing would have been limited by their extreme permeability, as they would be too dry during early spring and most of summer to sustain much plant growth. In winter, grazing would have been inhibited by glazed frosts. The main value of sandy soils is that they warm up quickly in the spring and carry an early flush of vegetation which is available towards the end of May. Sandy soils could provide first grazing at the end of the winter lean period, but will not have contributed greatly to the year-round grazing requirements (Jarman et al. 1982, p. 108). Frödin describes how in more recent times horses and cattle were taken to the coast to be allowed to graze on the "salt meadows" there (Frödin 1957, p. 220). In the outer hummocky landscape, the clay till would have supported lush growth for grazing later in the season (Strömberg 1985, p. 79), as well as providing good agricultural soil.

Lundmark has proposed a model for the island of Gotland which seems to fit the evidence from the Ystad area as well. He suggests two zones of landuse here: the coastal zone, which was apparently divided up among discrete groups of people, and the zone of fertile soils inland. The inland zone was used for grazing. Each group had its own base at the coast where intensive cultivation, fishing and some grazing took place. Rights to the grazing in the inland zone were either divided up among the coastal groups, or collectively held (Lundmark 1986, pp. 38 ff.). A very similar pattern has been suggested by Thrane on the Danish island of Funen (Thrane 1984, p. 179). I would like to suggest that we have the same pattern here in the western area. The primary settlement zone here was by the late Bronze Age colonized by dispersed groups who had laid claim on the resources in this zone and on those at the coast. The area inland from this zone, however, was not " spoken for" and it provided additional pastoral resources and occasional sup-

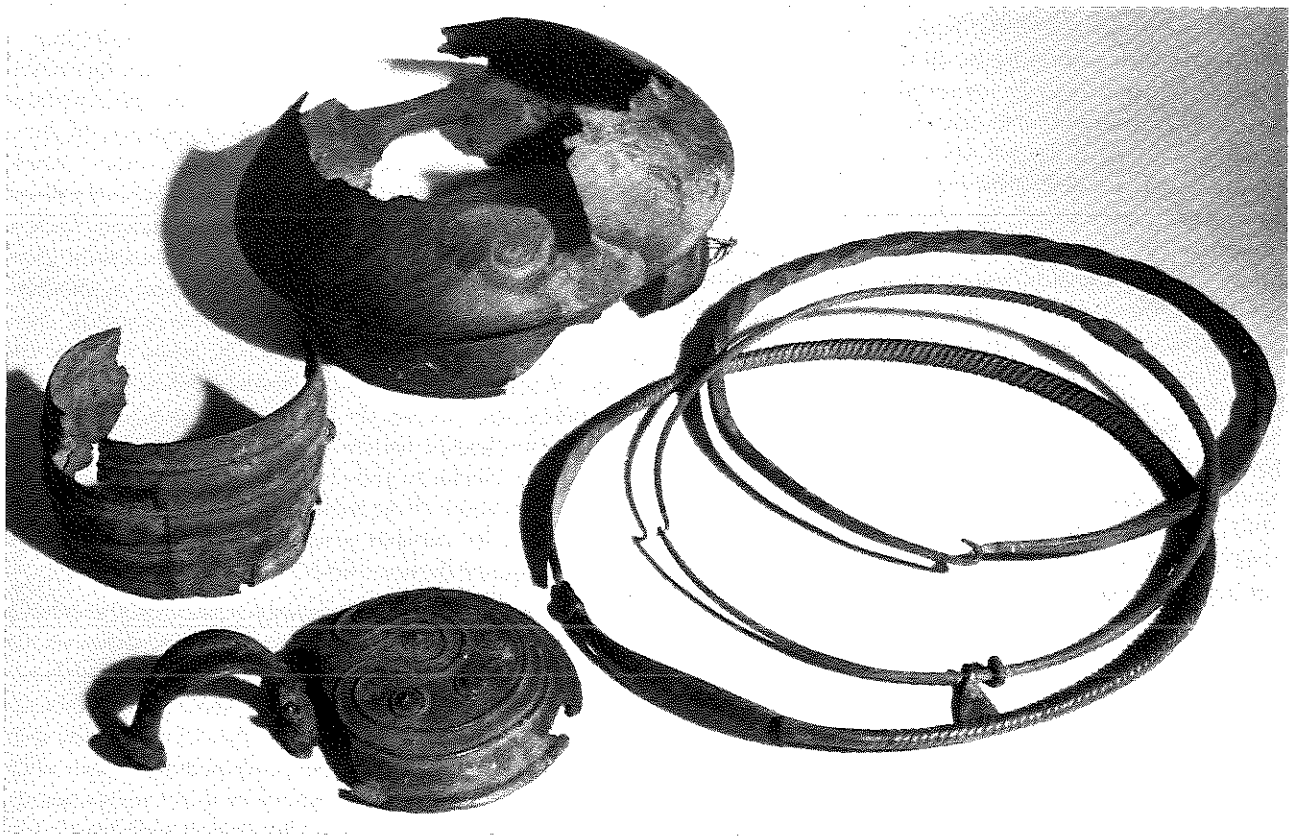


Fig. 13. A hoard containing six late Bronze Age bronze objects. This rich hoard comes from the parish of Sövestad (see Fig. 1) and along with the hoard from Hästhögsbacken ("B" in Fig. 11), it indicates activity even this far inland by the late Bronze Age. LUHM 12609. Scale 87%.

plementary nourishment through hunting and fishing in the lakes and forests which still existed there. This would explain the inner hummocky zone's lack of burial, the pollen evidence for an open landscape, and the existence of scattered stray finds and rich hoards (Fig. 13) which can be found here. Such a pattern has also been suggested for northwestern Zealand (Kristiansen 1978a, p. 331).

4.3.4. Transhumance

It is difficult to say whether the grazing resources inland were exploited as an established part of the yearly cycle, or whether they were used more sporadically as the need arose. The pollen evidence inland suggests that grazing episodes were separated by enough time that birch and hazel began to recolonize before renewed clearance set in (Regnéll 1991). A system of yearly transhumance was practiced in especially the northern parts of Sweden from the Middle Ages (Berg 1935, p. 226). Pounds relates how medieval settlements lay close to the coast, on lower and more sheltered land. Here were small, enclosed fields where oats, rye, and above all hay were grown. Animals were grazed on high plateaux and in forests during summer months, when the cultivated lands in the lowlands were bearing crops of hay or grain. In the autumn the animals were brought back to their lowland quarters for the winter (Pounds 1974, p. 174). The normal distance from farm to *fäbod* (=summer pasture) was 5 to 12 km, although some could lie 60 to 80 km away and took several days to reach (Nyman 1963, p. 58; Thyselius 1963, p. 44; cf. Chang & Koster 1986, p. 120; Jarman et al. 1982, p. 42). The distance from the coast to the hearths found east of Lake Krageholmssjön is 8.5 km. The *fäbod* lands could also be used to provide winter fodder, either leaves and twigs or hay, which was stored in huts at the *fäbod* and transported to the farm on sleds during the winter (Berg 1935, p. 226; Thyselius 1963, pp. 125 f.). In some cases the ownership of pastures and the buildings on them was collective (Nyman 1963, p. 29).

Hyenstrand has noted that an economy based on animals is especially sensitive to division due to growth, since the number of animals is related to the size of the grazing areas and the availability of winter fodder. Further, it is easier to regulate arable land than to regulate pasture (Hyenstrand 1974, p. 38). True pastoralists do not usually have territories, since it is the animals themselves which are valuable (Tringham 1972, p. 468). I would suggest that the mixed Bronze Age economy represents a situation in which rights to land for farming and winter fodder production were regulated by the late Bronze Age. Rights to grazing on the increasingly more extensive grasslands were regulated in the primary settlement zone only. In the inland zone where forest growth was still fairly widespread, resources were open to those who needed them. There are some indications that cattle may have represented wealth to their Bronze Age owners. We have

seen how in the Danish early Bronze Age oak coffin burials the corpse was often wrapped in a cowhide. Perhaps we have here the clue to why we find grasslands expanding at the expense of the open forests and coppiced woods which had previously provided the optimum situation. We see evidence for a rise in human population from the early to the late Bronze Age in the western area (see p. 17), and we can suggest that livestock represented a measure of value to members of the late Bronze Age society (Olausson 1992). Therefore, attempts were made to increase the number of cattle, whether or not more were needed to fulfill subsistence needs (Hjort 1983, p. 38). Ethnographically, we note that herd expansion is a basis for pastoral value, and is often practiced whether or not there is opportunity for corresponding expansion of pastures, so that it is in this adaptation that over-exploitation of the natural range is most likely to occur (Paine 1971, p. 169).

The same arguments which were used in discussing the reasons that the coast was attractive during the early Bronze Age are applicable to the late Bronze Age. We have direct evidence for the exploitation of marine resources from the Scanian sites of Sandeplan to the west (Bergenstråhle & Regnell 1985, p. 76), from Hötofta (Lepiksaar 1969), from Fosie IV (Björhem, pers. comm.) and from Skamlebæk in Denmark (Lomborg 1977, p. 129). We also have evidence for fishing in the western area in the form of a pike tooth from the refuse pit at Bjäresjö. At the Bjäresjö site, as is true of the other sites, aquatic resources should have played a supplementary part in an otherwise normal terrestrial Bronze Age subsistence pattern.

4.3.5. Cemeteries and settlements

Relocation of settlement from the coast further inland during the late Bronze Age has been noted for Östergötland (Fernholm 1982, p. 54) and the northwest Scanian coast (Thurborg 1985, p. 37). Since we have so little information about actual settlement locations, it is not possible to determine if this pattern fits here as well. The pollen evidence for an open landscape and cultivation in the outer hummocky landscape, the presence of barrows, and the pits and hearths in the zone speak in favor of settlement somewhat inland from the coast. The coastal cemeteries, however, seem contradictory. One way to reconcile this contradiction is by suggesting that the cemeteries functioned, as did the ship-settings on Gotland (Lundmark 1986), as a fixed point in a group's perceived territory, and perhaps were a means of claiming the resources at and inland from the coast.

In rural areas of Crete, chapels and cemeteries are associated with the lands of individual families and support their claims to these lands, serving as focal points in a landscape which is dominated by a dispersed settlement pattern (Chapman 1981, p. 81). I suggest that burial mounds and the flat-earth cemeteries served the same purpose during the Bronze Age in the area to the west of Ystad (Cf. Thrane 1980, p. 169). In a pattern which is common for Scanian prehistoric cemeteries, those at Svarte contain graves from the late Neolithic to the Roman Iron Age, demonstrating spatial continuity here (Olausson 1987, p. 130; Stjernquist 1961, p. 143; Strömberg 1975a, pp. 242 f.; 1982, pp. 159 f.; Tesch 1983, p. 51).

Most of our current evidence points to a settlement pattern in which the primary domestic site was moved every two to three generations (e.g. Jensen 1981, p. 52; 1987b, p. 46; Müller-Wille 1977, p. 173, pp. 215 ff.; Näsman 1987, p. 83; Stjernquist 1983, p. 152; Säfvestad & Björhem 1989, p. 53). Movement meant abandoning the old site, which after years of accumulated household waste was naturally fertile and a likely location for cultivation (Thrane 1984, p. 117). This movement was by no means a courageous trek into new, uncolonized areas. Rather, it occurred in a limited and familiar area (Nielsen 1982, p. 136; Thrane 1971, p. 162; Thurborg 1985, p. 57; Welinder 1977, pp. 115 f.). There is an important increase of efficiency, an economy of effort, which results from intimate knowledge of the surroundings (Dennell 1983, p. 174; Jarman et al. 1982, p. 37) . Within each resource area, a cycle of landuse can be postulated from the first colonization by ring-barking. Plots of land were used in some succession involving domestic site, cultivation, grazing, and, in some cases, barrow erection which finally removed the plot from cultivation (Kristiansen 1988, p. 47; Mercer 1981, p. xvii; Thrane 1984, p. 116). Such a pattern was not unknown during the Neolithic period (Kristiansen 1988, pp. 60 ff.; Madsen 1988, p. 332). However the use of soil improvement, winter stalling, and a denser settlement pattern now meant that the resource area had shrunk and the trend toward agricultural intensification, whose tempo increased during the succeeding Iron Age, had its roots in the Bronze Age (Jensen 1982, pp. 153 f.; Tesch 1991).

In an economy based on mixed farming, the most economical pattern means placing settlement modules at regular intervals in the landscape. Arable fields are as close as possible to settlement (Chisholm 1962; Jarman et al. 1982, p. 30), while grazing lands can be farther away (Poulsen 1983, p. 155; Thrane 1984, p. 117). The evidence from the Ystad area points to settlement modules consisting of single farmsteads. Such farmsteads could have housed an extended family of 10 to 20 persons (Table 4; Ethelberg 1982, p. 166; Jensen 1981, p. 54; Strömberg 1975b, p. 71) and would have been largely self-sufficient for most of the year. Kristiansen notes that settlement concentrates into several larger agglomerations, surrounded by small concentrations at a distance of 5 to 10 km, on northwest Zealand during the late Bronze Age (Kristiansen 1978a, p. 331). In this context, we note that Svarte lies 7.5 km east of a clump of barrows at Abbekås, and 12 km west of the central area at Köpinge on the Plain of Ystad (Fig. 16). Jensen has also pointed to the need for central places of a higher order where ceremonial activities or other centralizing functions would have taken place (Jensen 1981, p. 54). The ritual center marked by the Kivik stone cairn, c. 45 km away from Svarte, may have represented such a center in the contemporary Bronze Age society.

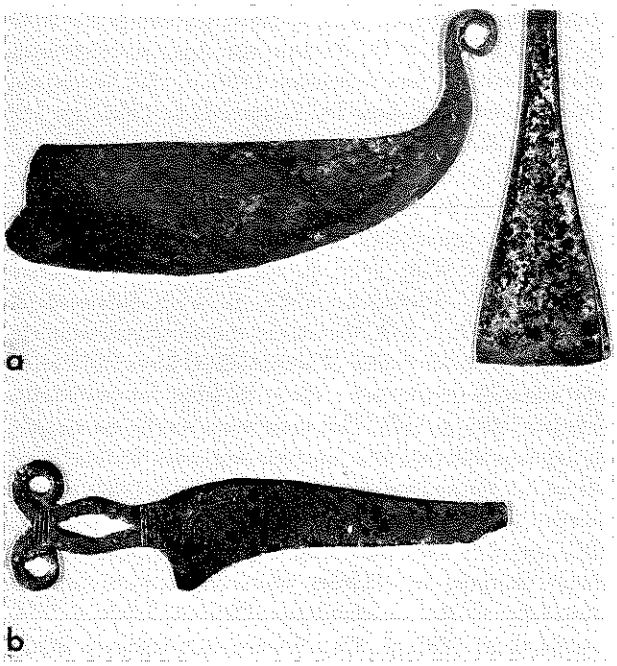


Fig. 14. Examples of bronze artifacts from two of the late Bronze Age burials at Svarte. a: LUHM 20153:14. b: LUHM 20153:51. Scale 100%.

4.3.6. Surplus

There is much evidence from the western area in support of the idea that the late Bronze Age farmers, or at least some of them, were able to live comfortably and produce a surplus. The bronze work in the graves at Svarte (Fig. 14) shows for instance a high level of craftsmanship. As was true for the early Bronze Age, we note an extraordinary imported item, the Bjärsjöholm vessel (SHM 7993; Fig. 11 "D"). The vessel was discovered during peat cutting in the former lake in 1886. It was probably imported from Italy (Montelius 1889; Thrane 1965).

We see indications of wealth inland as well, in the form of two rich hoards from Sövestad parish. The first, dated to period V, included a bronze hanging vessel, a fibula, one bracelet and three necklaces (Fig. 13; Baudou 1960, p. 38). It is not clear whether a find from a hill called "Hästhögsbacke" is a hoard or an urn burial (Fig. 11 "B"). The urn, buried in the hill, contained one bronze toggle pin, one necklace, two bracelets, one bronze ring and two bronze wires, plus "some ash-like material", but no bones (SHM 13224; Baudou 1960, p. 37). Whether burial or hoard, the presence of such wealth inland lends support to the idea that late Bronze Age inhabitants were active here and perhaps were making a territorial statement. There are also 8 stray finds of bronze socketed celts from the inland zone. Like the hoards, these cannot be used to support a claim of settlement in the area, but they do bespeak late Bronze Age activity here (Bergström 1980, p. 39).

We also have evidence for bronze working, in the form of a bronzesmith's hoard from Ystad (Fig. 11 "C"; YM 1388-1415; Oldeberg 1927; Olausson 1992). The hoard contained 28 bronze objects and bronze lumps. This find illustrates that bronze working was practiced here in the western area. It is possible that the area was an important link in bronze production and trade. As at Hallunda, bronze working may have been part of the means of subsistence for the inhabitants of the area (Jaanusson 1981, p. 30). The bronze sword from a bog in V. Nöbbelöv parish (Fig. 15) is another example of the valuable bronze objects to be found in the western area.

In conclusion, we see a pattern of continuity and growth in the western area during the late Bronze Age. The primary settlement zone we have demarcated for the early Bronze Age is still the area where most settlement and subsistence activity takes place. We have been able to glimpse a picture of dispersed settlement in this zone, which due to continuous grazing and mobile arable fields and settlement, plus the building of barrows, is now quite open. Some idea of territoriality has been suggested for this zone and its coastal resources.

We find evidence in the pollen diagram from Krageholmssjön that the areas used for grazing and even cultivation have apparently increased here during the late Bronze Age. However we have little in the archaeological record from the area to support a hypothesis of permanent settlement, comparable to that in the primary settlement zone, here in the inland. To account for this discrepancy, we have sugggested that the inland areas were used for extensive grazing, perhaps in a system of regular transhumance such as was practiced in other areas of Sweden from at least the Middle Ages.

An economy based on mixed farming has been suggested for the late Bronze Age here. Again the sea would have been an important resource, as were the forests and meadows inland from the primary zone. The subsistence base was apparently generous, providing a surplus which meant that high quality bronzes could be produced here or imported to the area.

Fig. 15. A late Bronze Age bronze sword, found in a bog at V. Nöbbelöv, in the southwestern part of the project area. LUHM 3395. Scale 24%.

5. Expansion, regression or *status quo* – reexamining the models

Six years of investigation in the Ystad Project have not altered the conclusion that the Plain of Ystad was a primary focus of settlement during the prehistoric period (Tesch 1983, pp. 18 f.). Thanks to the project, we now have greater knowledge of the nature of Bronze Age settlement there (Chap. 5). The result of the work in the western area has been to offer a more variegated picture of settlement here, and to suggest that the area was more than a marginal satellite to the Plain of Ystad. The major components which have changed this picture are:

Barrows. Study of maps and other archival data, plus the work done by the CBNA, who revised the Register of Ancient Monuments here during 1985-87 (Tronde 1987) has greatly increased the number of barrows registered in the western area (compare Tesch 1983, Table I with Table 1 here). These additions mean a changed picture of the intensity of Bronze Age settlement.

Excavated indications for settlement. The project has had only limited success in locating Bronze Age settlement. In spite of our efforts, we still have no structural remains of Bronze Age date from the western area. Arguments for the nature of settlement have therefore relied on logical arguments, evidence from pottery and flotation analyses from excavated sites, and analogies with other similar areas.

Survey evidence. Much effort was devoted to finding a survey method which would enable us to locate Bronze Age settlement. Field survey in December proved to be a promising method for finding Bronze Age sites, especially in clay soils. It also proved possible to date many of the hearths found during survey by radiocarbon analysis or pottery content. Many of the points located in figs. 9 and 11 are the result of this work.

Analysis of the burial complex at Svarte. The intention of this study was to compare a Bronze Age cemetery from the western area (Svarte) with one from the Plain of Ystad (Piledal) to see if indications for a central place/periphery dichotomy could be found. A lack of qualitative differences was taken as evidence that the two areas belonged to the same cultural complex (Fig. 16; cf. Olausson 1989). It was argued that no distinction between center/periphery was evident here (Olausson 1987, p. 141).

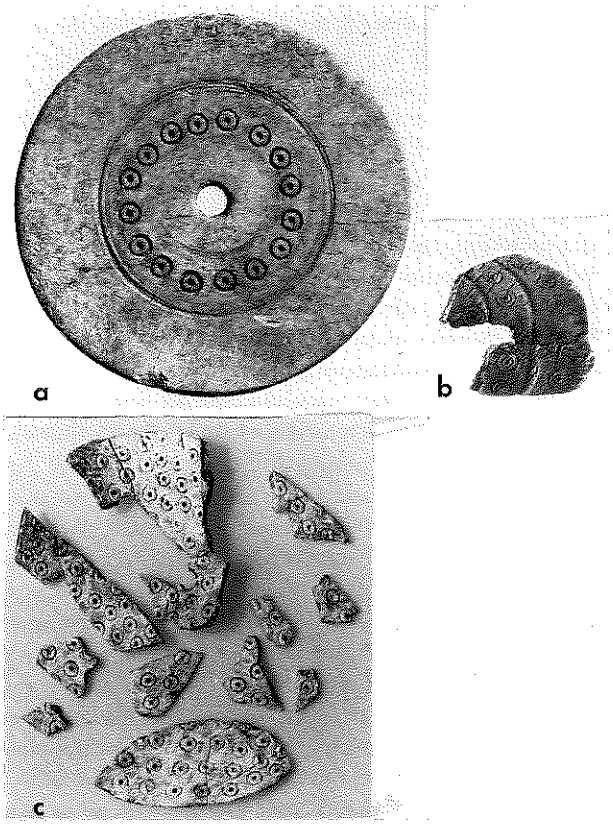


Fig. 16. Bone objects with similar decoration from late Bronze Age burials in the project area. a: from Svarte (LUHM 20153:24; Stjernquist 1961, Pl. XLVI). b: fragments from another burial context at Stora Köpinge 21:2. c: burned fragments from grave A31 in the cemetery at Piledal (cf. Olausson 1987), to the east of Ystad. Scale 89%.

5.1. The Bronze Age cultural landscape

The archaeological evidence from Denmark and Scania favors the view that there was a smooth and continuous developmental sequence here from the late Stone Age, throughout the Bronze Age, and into the early Iron Age. Looking back, we find a smooth transition in burial forms, the spatial patterning of finds, many flint tool types, etc. from the late Neolithic into the early Bronze Age. Strömberg points out repeated evidence for barrows being built on late Neolithic cemeteries in the Hagestad area (Strömberg 1984, p. 63). Continuity in burial traditions has been shown for other areas as well, with many authors pointing to close spatial and presumably ideological proximity in burial customs (e.g. Hansen 1923, p. 46; Magnusson 1985, p. 17; Strömberg 1954, p. 358; 1975b, pp. 15 f.). Strömberg finds good agreement in the location of settlement from the late Neolithic and throughout the Bronze Age (Strömberg 1982, p. 162).

Many authors have stressed the continuity evident during the Bronze Age itself. Hulthén, for instance, has pointed to continuity and stability in the ceramic craft for these periods in the Hagestad area (Hulthén 1977, p. 201, cf. Jensen 1966, p. 61), while Strömberg (1954, p. 373) cites the conservative nature of flint tool types as another sign of Bronze Age continuity.

Looking at the broader picture, many authors argue that the pattern of settlement remained largely unchanged during this period (e.g. Baudou 1985, pp. 75 f.; Jensen 1981, p. 64; Kristiansen 1975, pp. 83 f.; 1978a, p. 324; T. Larsson 1986, p. 23; Magnusson 1985, p. 25). Kristiansen (1978a, p. 324) notes also that no changes in the agricultural strategy are evident during the Bronze Age.

Comparison of figures 9 and 11 shows that this pattern is evident in the western area as well, although there are some changes to be seen at a finer level of detail. On the basis of the available evidence, we have concluded that the area which was regarded as the primary settlement zone re-

mained the same throughout the period. We note however that this zone has expanded inland somewhat by the late Bronze Age, and that there are certain indications for increased settlement density in the primary settlement zone. The traces further inland have been taken as indications of activity of a more sporadic nature.

Using at times rather extreme sleight of hand, we arrived at a minimum contemporary population estimate of 155-465 for the primary settlement zone during the early Bronze Age. An estimate based on known late Bronze Age flat-earth burials yielded 160 individuals. Estimates for the late Bronze Age contemporary population for the western area buried as secondary burials in barrows range from 214 to 642 individuals, which together with the flat-earth burial estimates yields an estimate for the contemporary late Bronze Age population of 372 to 793: a doubling from the early Bronze Age. These figures can be criticized as being so speculative as to be useless. The greatest sources of uncertainty lie first in guessing how many barrows originally existed and second in estimating the number and dating of secondary burials contained therein. To circumvent these problems, we can note that there are 105 barrows (early Bronze Age) and 219 flat-earth burials (late Bronze Age) known from the western area, and consider these minimum figures. While we would not like to make any claim of numerical accuracy, we would argue that the data do at least show an increase in population during the course of the Bronze Age here.

An expansion of settlement can take two different forms: "implosive", where settlement density increases in the existing settled area, or "explosive", where settlement occurs in previously non-settled areas (Berglund 1985, p. 4; Hyenstrand 1974, p. 37; Sporrong 1983, pp. 72 f.). Initial colonization of an area is explosive. Succeeding expansion is implosive, until the area's carrying capacity is reached (Hodder & Orton 1976, p. 86). Kristiansen has discussed causes for change in late Bronze Age society as follows: The refusal to exploit new land in eastern Denmark, despite a buildup of population and the prospects of a crisis, must have been deeply rooted in the social system. The areas of higher potential productivity were densely forested and their exploitation not only demanded hard and unfamiliar pioneer work of forest clearing, but also a temporary change of subsistence base, altering or breaking up former relations of production. But the tendency to build up denser populations within more restricted areas should also be taken into consideration. There could hardly be any economic reason for this; rather the settlement concentrations were a result of growing political tensions and increasing warfare, perhaps in the first instance caused by fights over land, which was becoming more scarce, later propelled by the new set of economic constraints imposed by the clustering (Kristiansen 1978a, pp. 179 f.).

The increase in population we see in the western area apparently did not cause expansion into the more marginal areas further inland. Late Bronze Age farmers would in fact probably have considered such a solution the least attractive option. New settlement territories would instead have been established within the primary settlement zone whenever possible. There are many reasons, both rational and irrational, for this behavior. Based on the pollen evidence, the Quaternary geologists have suggested that the primary settlement zone was largely open grassland by the early Bronze Age (Gaillard & Göransson 1991). More effort would therefore have been required to clear previously unexploited and therefore still forested areas of the inner hummocky landscape, than to expand into as yet unclaimed parts of the primary settlement zone. The critical feature of ecological control is that it is much easier to maintain it than to regain it once it is lost. Between 3 and 10 times more work is required to bring a piece of land under ecological control than to maintain control over it (Emanuelsson 1988, p. 116). In addition to such practical considerations were the equally important social and ideological ties which created strong bonds to existing areas of settlement. It is reasonable to assume that every effort was made to maintain proximity to the ancestors' graves and to the important social network of family and friends which must have provided these dispersed household units with a sense of community. Proximity to the sea may also have been a factor which meant that the inner hummocky landscape zone was regarded as a zone to be used for settlement only after the primary settlement zone was "full". We have noted above that what evidence there is for Bronze Age settlement indicates increased activity in the primary settlement zone in the late Bronze Age. We have also noted that there is evidence to indicate that the inner hummocky landscape zone was being more heavily used during the late Bronze Age than previously. We further note the spatial distribution of the barrows in the primary settlement zone. Without excavation, it is not possible to determine the temporal sequence of barrow construction here, but we may suggest that the building of barrows during the early Bronze Age meant that most of the primary settlement zone was being claimed. We suggest a process of consolidation and solidification by the late Bronze Age, whereby the previously more mobile settlement pattern became more sedentary. Whenever possible, expansion was to unclaimed parts of the primary settlement zone, which the extensive form of agriculture and grazing from preceding periods had transformed into open grassland, and where proximity to kin and ties to the ancestors could be maintained. When necessary, the resources in the more untamed inner hummocky landscape could be exploited. A similarly "implosive" development has been suggested for the late Bronze Age in Jutland (Nielsen 1982, p. 136) and England (Ellison 1981, p. 425; Mercer 1981, pp. xviii f.). "Explosive" expansion into previously uncolonized areas appears to have occurred earlier in Scania, in the Neolithic (Gaillard 1985, p. 8; M. Larsson 1987a, p. 59; Mercer 1981, p. xv; Strömberg 1982, p. 218; 1985, p. 79). Here a combination of a new subsistence strategy and population increase were the driving forces (Kristiansen 1987a, p. 46; Madsen 1988, p. 331). The previously extensive agricultural practices and low settlement density might have also contributed to an explosive, rather than implosive, expansion.

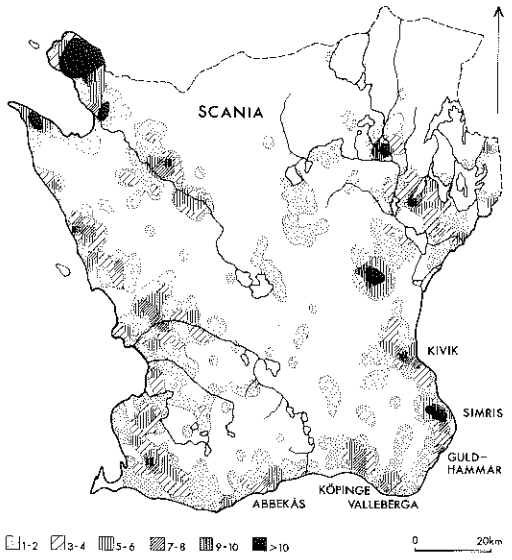
5.2. Re-examining the models

Comparing figures 9 and 11 with figure 2, we note that model II best fits the data on the Bronze Age use of the landscape here in the western part of the Ystad area. Actually we have found it difficult to distinguish between models II and III, due to the fact that our knowledge of the use of the inner hummocky landscape is meager. We have based our interpretation of a lack of permanent settlement in this zone on an apparent lack of burial here, and on analogies with other investigated areas, but it must be pointed out that since the surface indications have not been excavated it is naturally difficult to argue in favor of one of these two models at the expense of the other.

In addition to examining changes over time, our aim in this investigation was to explore whether there was evidence for ranking in the spatial pattern of settlement: a central place/peripheral place dichotomy. Using burial data and distribution of bronzes, T. Larsson attempted to locate areas of wealth concentration in southern Scania (T. Larsson 1986, pp. 103 ff.). On the basis of this evidence, he proposed that the coastal zone in southeastern Scania represented a central place, at least during the early Bronze Age (T. Larsson 1986, p. 121). Kristiansen (1987b, pp. 11 f.) distinguishes between two types of center/periphery relationships for Bronze Age Scandinavia: one based on organizational complexity and dependency on a *regional* scale; and one based on a direct center/periphery relationship on a *local* scale, where the central area exploits its hinterlands by ideological, political and/or economic means. He notes further that such local center/periphery structures tend to favor coastal farming populations with access to alliance networks and a richer production potential. Welinder has also tried to identify central and marginal areas for Scania (Welinder 1977, Fig. 5). Another example of hierarchical settlement organization on the local level has been suggested by Thrane for western Funen (Thrane 1980). In a pattern observed for e.g. Gotland (Lundmark 1986) Thrane suggests a territory c. 9 by 9 km, bounded to the north and south by seacoast and inland forests (Thrane 1980, Fig. 8). Within this area a number of mobile settlement units with a resource area of c. 1 sq km each, containing several barrows, would be found. The site of Kirkebjerg, to which the rich burial at Voldtofte Vestermark belongs, held a central-place function. Coastal sites would have contributed marine resources or were important as harbours.

5.3. Hierarchy of place

Based on the pattern of Bronze Age barrows, we can suggest that the whole coastal area of Scania made up the central area for Bronze Age settlement, while the inland areas were of more marginal importance (Fig. 17). If we examine the southeast corner of Scania in more detail, we find an apparent gradation of settlement on a more local plane as well. At the greatest order of magnitude is the large stone cairn and burial complex at Kivik. Considered to have been built during the middle Bronze Age, it probably



17. Map illustrating the density of Bronze Age burial mounds in Scania. Based on Hyenstrand 1984, Map 16.

served as a centralizing element even during the later Bronze Age. The size and costliness of the monument and the rock carvings at Simris 20 km south suggest that this was a ritual center of some magnitude (Kristiansen 1987b, p. 11; T. Larsson 1986, p. 121). Moving south, we find evidence at Valleberga 67 for unusual wealth in the contents of some of the early Bronze Age burials in the Hagestad area (Strömberg 1975b, p. 41). Bronze Age barrows, cemeteries, and settlements lie in a linear pattern which follows the coast at the transition from sandy soil to clay till (Strömberg 1982, Fig. 107). Strömberg has also noted that settlement/cemetery complexes here usually lie 0.5 to 2.5 km apart (Strömberg 1982, p. 109). To the west of the project area another agglomeration of barrows is present at the coast in conjunction with the outlet of the Skivarp stream at Abbekås (Hansen 1923-24).

Knots in the string of Bronze Age settlement/barrows are evident at regular intervals along the Scanian coast (Fig. 17): at Kivik, Simris, Guldhammar, Stora Köpinge, Svarte, Abbekås, etc. These are c. 10-15 km apart. There is some evidence in the ethnographic literature to suggest that places functioning as e.g. ceremonial or economic centers among non-industrialized societies tend to lie on an average 8.8 km apart, with a range from 5 to 15.1 km (Hodder & Orton 1976, pp. 57 f.; Hodder 1982a, pp. 40 ff.). Perhaps these "knots" represent a similar function in the Scanian hierarchy of Bronze Age settlement.

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