Where have all the Settlements Gone? Field Survey Methods for Locating Bronze and Iron Age Settlements in a Cultivated Landscape

Olausson, Deborah

Published in:
Papers of the Archaeological Institute University of Lund

1988

Document Version:
Publisher's PDF, also known as Version of record

Where have all the Settlements Gone?

Field Survey Methods for Locating Bronze and Iron Age Settlements in a Cultivated Landscape

By DEBORAH OLAUSSON

Abstract

Olausson, D. 1988. Where have all the Settlements Gone? Field Survey Methods for Locating Bronze and Iron Age Settlements in a Cultivated Landscape. *Meddelanden från Lunds universitets historiska museum 1987–1988 (Papers of the Archaeological Institute University of Lund 1987–1988). New Series Vol. 7.*

The article is a description and evaluation of extensive and intensive field survey as a means of locating sites from the bronze and early iron ages in the cultivated landscape of southern Sweden. It includes a discussion of other field survey efforts and recommendations about survey technique. Surface survey in December proved to be a fairly successful means of locating bronze age remains in clay till soils.

Deborah Olausson, Institute of Archaeology, University of Lund, S-223 50 Lund, Sweden.

1. Problems and aims

The following is a discussion and evaluation of field survey efforts used to locate evidence of landuse dating to the bronze and early iron ages in the heavily cultivated landscape of southern Scania. These efforts were carried out as part of the interdisciplinary project "The Cultural Landscape During 6000 Years", whose aims are to describe long-term changes in society and in the landscape in southern Sweden, and to analyse the causes behind these changes ("The Cultural . . ." 1983, p. 3). The focus of the project is the area around the town of Ystad (Fig. 1): roughly 280 square kilometers.

The project's temporal focus, from the early neolithic up to the present day, has been divided into more easily manageable units, where evidence for changes in landuse seen in the pollen diagrams forms the starting point for the division. Conditions during the bronze and early iron ages are the focus of the author's work, carried out in collaboration with Sten Tesch since 1984. These temporal divisions are a practicality; the aim of the project is to provide a continuous description of changing landuse patterns throughout the 6000 year period.

Thanks to extensive rescue excavations, a great deal was known about the nature and extent of prehistoric settlement along the coast and its extension on the "Plain of Ystad", a sandy zone to the east of Ystad (Tesch 1983) at the commencement of the project in 1982. Plots of the location of graves from the bronze and early iron ages, as known from the Swedish Register of Ancient Monuments and from earlier excavation activity, also indicated that settlement was concentrated to the sandy coastal zone (e.g. Hyenstrand 1979; Stjernquist 1983, Fig. 1), which is narrow to the west of Ystad and widens to 9 km to the east. The question facing us at the commencement of the project, then, was whether this pattern reflected actual landuse during the bronze and early iron ages, or whether it rather reflected areas of modern exploitation leading to rescue excavation, which in turn had resulted in the discovery of settlements from the period solely in these areas of modern expansion. The task at hand was to describe patterns of bronze age and iron age landuse

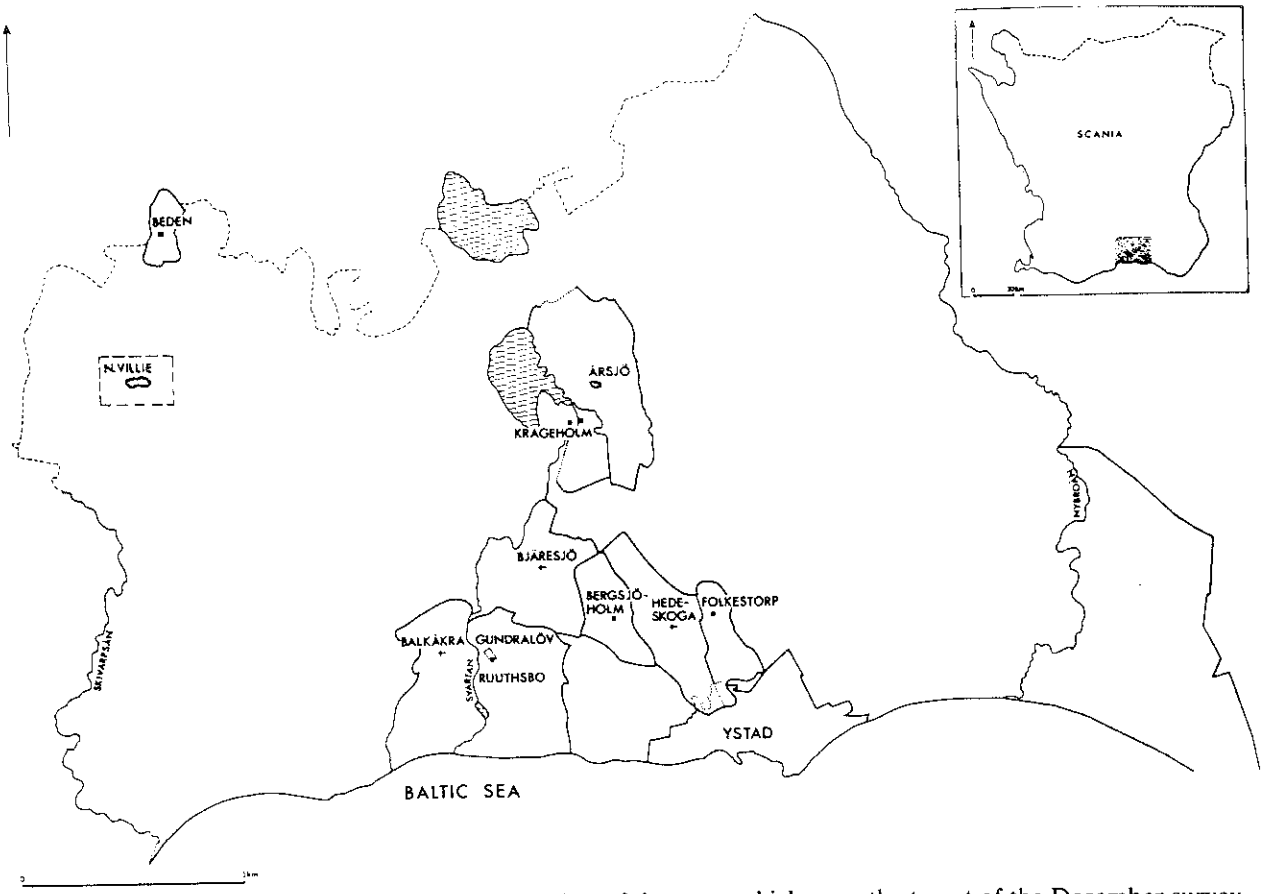

Fig. 1. Map of the project area, showing the location of the areas which were the target of the December survey.

in the regions *outside* of the sandy coastal zone.

Carrying out such a task is no easy matter, given the size of the area (about 230 square kilometers, of which c. 75 % is subject to modern cultivation (Lewan 1983: 1)). The work carried out by the author was initiated in 1984 with the study of available maps, including the geological soils map, the topographical map, the Ordnance Survey Map from c. 1810, Arrhenius' map of phosphate values (Arrhenius 1934) and 18th century cadastral maps. Known ancient monuments which could date to this period were plotted from the Register of Ancient Monuments. Museum collections and archives from the Historical Museum in Lund, Ystad's Museum, and the National Museum in Stockholm were also examined (cf. Olausson n.d. for a more detailed discussion of methods).

In conjunction with the compilation of this material, surface survey was initiated in the spring of 1985. Survey work was carried out on three main occasions: March–April 1985, April–May 1986, and December 1986. The aim of the survey work was to locate bronze and early iron age remains in the hummocky moraine landscape zones located inland from the sandy coastal zone. Excavation to investigate several possible settlements was conducted in the fall of 1985 and 1987.

2. Field survey in Scandinavia – a short history

The technique of scanning the modern land surface for prehistoric remains is widely known and has many names: site survey, ploughzone archaeology, etc. One of the

earliest programs of systematic surface reconnaissance in Scandinavia was carried out by Mathiassen in the 1940s. Mathiassen advocated a three-point strategy for locating prehistoric remains in the landscape: 1) registration of known monuments and finds in museums, 2) interviews with the farmers and landowners in the area, and 3) systematic search of the surface. His pioneer study of the northern part of Ringkøbing Amt resulted in the identification of 6500 archaeological points of interest (Mathiassen 1948, pp. 3 ff.).

The Southwest Funen Project, led by Henrik Thrane, has also yielded a great deal of useful information about profitable surface survey methods applicable to Scanian conditions. In this project, repeated survey of an area of 490 square kilometers on southwest Funen has yielded settlement sites from most of the prehistoric periods (Thrane 1976, 1978; Jacobsen 1984).

In Sweden, surface survey to identify ancient monuments and settlements has been going on since 1938 (Lundberg 1980). The aim of this work is to provide a picture of the distribution of these remains for virtually all of Sweden except the high mountains – a sizeable order. The realities of limited economic resources have meant that total and even coverage has not been possible (cf. Gren 1986, p. 52). Nevertheless, the Swedish Register of Ancient Monuments is a unique effort and the survey work provides valuable insight about both the possibilities and pitfalls of surface survey (*Inventering* 1969).

Further development of the method has been carried out by another member of the project, Mats Larsson. Larsson, in searching for evidence for neolithic landuse, has carried out systematic surface survey under the auspices of the project since 1982. In survey work mainly carried out during the early spring months, Larsson and his assistants have walked over most of the available project area to the east of Ystad. Larsson then used the information gained from this work to concentrate efforts in the western part (Larsson & Larsson 1984, pp. 20 f.; Larsson & Larsson 1986, p. 11).

3. Fieldwalking – methods and results

Vorting (1984, p. 201) makes a useful distinction between intensive and extensive survey. In intensive survey, an area is evenly reconnoitered at a steady speed, regardless of the terrain and the frequency of finds. Extensive survey involves passing lightly over unlikely areas, but carrying out a more thorough search in localities where finds would be expected (this is also termed "judgement sampling" by Cherry & Shennan 1978, p. 23).

Modified versions of both these types of survey were carried out in the survey program under discussion. The spring campaigns of 1985 and 1986 should be characterized as mainly intensive survey, while the survey in December 1986 was more directed and limited.

Intensive survey – March–May

> Strong will is needed to overcome the impediments to sensible observation that occur when the individual fieldwalker is confronted with a 30 ha field on a north-facing slope with heavy clay soil in the rain, next to a busy road (Barcham 1985, p. 45).

Site survey is a skill which requires intuition, natural talent, and training. In order to gain the necessary training I was generously invited to join Mats Larsson during the latter part of his spring campaign in April 1985. During the ten days in which I participated in this survey, an area of approximately four square kilometers of open fields was surveyed by a work force of three experienced surveyors plus the author. The areas covered were open fields located in various parts of the western project area. Both the coastal zone and the inland hummocky zones were represented. Soils from sand to heavy clay till were surveyed. The

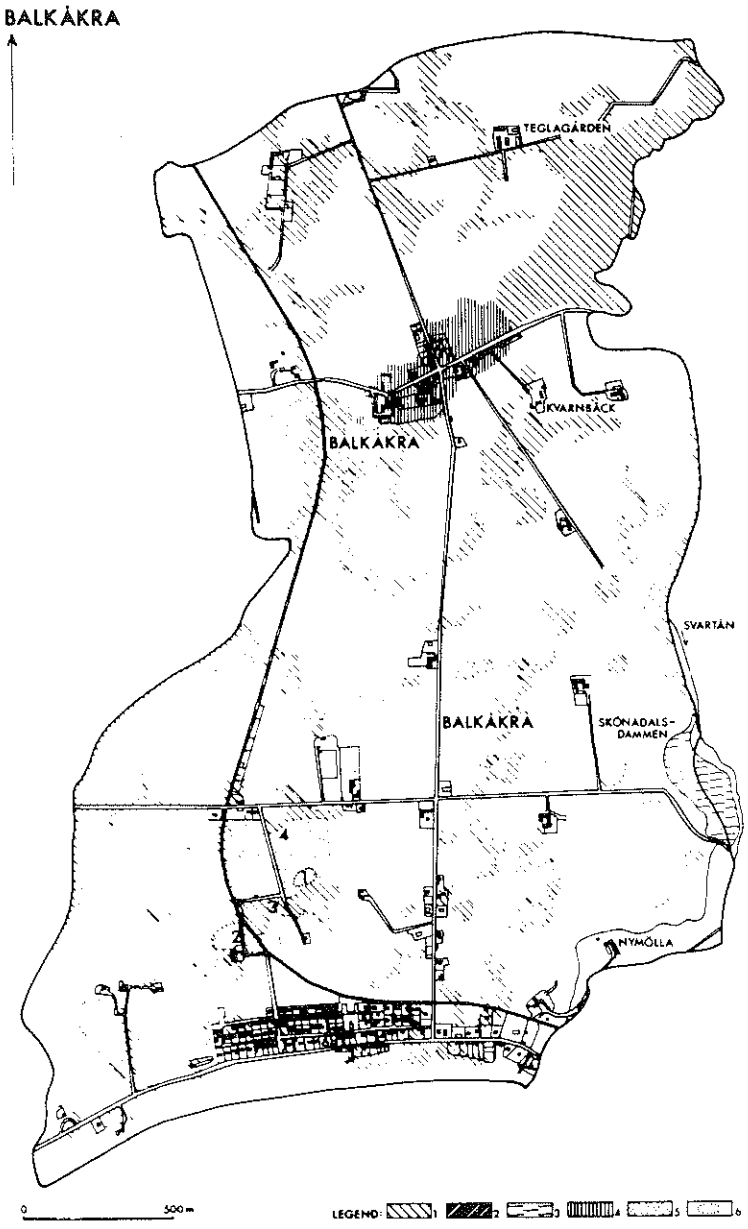

Fig. 2. The village of Balkåkra. Landuse is shown according to a cadastral map from 1783, projected on the modern Economic Map. (1=Former wetland/ pastureland, 2=former forest, 3=open water, 4=former area of village or manor, 5=field survey, 6=area without clear boundaries found during field survey; see Table 1 for a key to the numbers.)

fields were in various stages of the yearly agricultural cycle, although autumn-sown fields on which growth was already advanced were not surveyed.

Survey was intensive but not systematic (in the sense defined by Foard 1978, p. 358). Each surveyor walked more or less at random across the field and no effort was made to set up traverses or to maintain any particular distance between surveyors. Where concentrations of worked flint or other presumably prehistoric phenomena were noted, attention was concentrated on the spot in order to delimit boundaries. A simple hand drill was occasionaly used to check subsurface conditions.

During 1985 the members of the project designated four core areas for more intensive study. These were the Plain of Ystad, the area around the village of Bjäresjö, lake Krageholmssjön, and the area around Beden in the northwestern part of the area (Fig. 1). During the spring of 1986, the author carried out independent survey at several spots around the village of Bjäresjö and at the coast. An area of 1.9 square kilome-

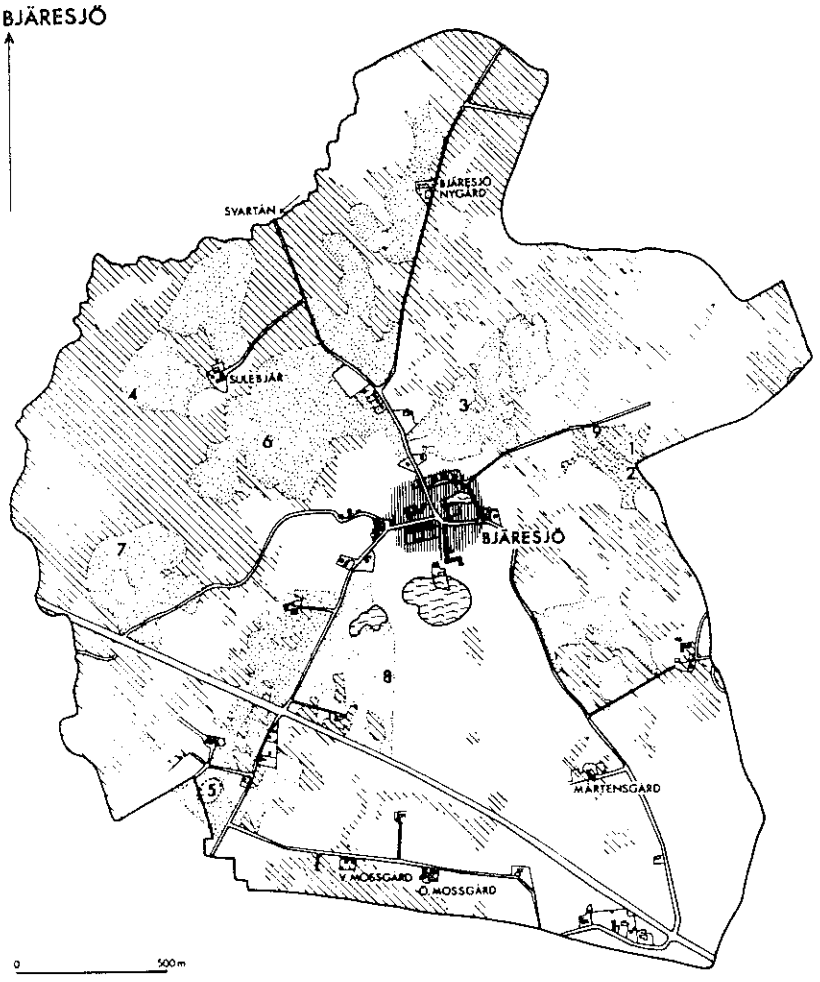

Fig. 3. The village of Bjäresjö. Landuse is shown according to a map from 1809–10, projected on the modern Economic Map. (Legend according to fig. 2; see Table 1 for a key to the numbers.)

ters was surveyed in six days by the author, accompanied by three inexperienced surveyors for two days. This survey resulted in 3.3 kg of worked flint, including one intact hollow-ground axe blade of flint. One hearth containing one sherd of late bronze age ware was noted at Sulebjär (point 4, Fig. 3). This was the only concrete evidence for bronze age activity gained during this survey.

In summary, survey in the spring, while favourable for finding neolithic sites (Larsson & Larsson 1984, p. 22; 1986, p. 12), proved to be less successful for locating bronze and iron age remains in clay soils. Worked flints are virtually indestructible and the presence of datable types in the ploughsoil has proved to be a viable means of locating stone age sites (cf. Gren 1986, p. 51). However, bronze and iron age sites are more elusive. One reason may be that bronze age flintwork is difficult to distinguish from poor quality stone age work; thus some sites classified by their surface collections as stone age may in fact be bronze age (cf. Thrane 1985, p. 146).

Other indications of prehistoric activity which can occur on the surface include ploughed-up hearths, occupation layers, fire-cracked rocks, and potsherds. Each of these find categories is associated with its own particular difficulties. These will be discussed in more detail later. It is sufficient here to mention that during survey work in the spring flint was the overwhelming find category, while evidence for hearths, pottery, and fire-cracked rocks was less evident. Spring survey appeared to be an unprofitable means of discovering bronze and iron age activity, at least in clay soils.

Extensive survey – December

During the summer of 1986 I had the opportunity to visit Erland Porsmose at Kerteminde Museum in Denmark. In connection with the project "The Origins and Development of the Rural Village", Porsmose has been very successful in locating remains from the later prehistoric periods in northeast Funen. As the soils and topography of the region are quite similar to those of the Ystad region, it seemed worthwhile to try the method here.

Porsmose found survey in December to January to be the most advantageous. By this time autumn ploughing and harrowing has brought new phenomena to the surface, and the autumn rains have washed off stones and artifacts. Most importantly, perhaps, the snow and freezing/thawing which are common to the maritime winter climate on Funen have not had a chance to destroy the fragile potsherds ploughed up during the fall. Porsmose also cautioned that surveyors should ignore flint, as flint tends to blind the surveyor who should instead be looking for pottery, soot, and fire-cracked rocks if bronze and iron age sites are sought.

In preparation for the survey, areas of open water, wetlands/pasturelands, and forest were copied from the 18th and 19th century cadastral maps made in connection with land reorganization in Sweden. The maps used were not always the earliest available, but were chosen as they were the clearest and most complete for the villages in question. Since large areas of pastureland were put under cultivation between 1700 and 1800, the use of older maps might have resulted in larger areas of "former wetland/pastureland" than are shown here. (I would like to thank Mats Ridersporre for pointing this out.) Areas of open water, wetlands/pasturelands, and forest were then photographically reduced and projected onto the modern Economic Map at a scale of 1:10000. These areas were assumed to have been unsuitable for settlement during prehistoric times and were generally not surveyed. As Porsmose pointed out after the survey was finished, however, it was probably a mistake to have excluded areas of dryland forests from the survey, since bronze and iron age settlements have been found in such areas (although not in wetland forests) (personal communication, E. Porsmose). Attention was concentrated on areas shown as cultivated fields and at the boundaries to wetlands.

The three core areas in the western part of the Ystad area (Fig. 1) were the target of the survey. The author and one experienced surveyor covered an area of ten square kilometers in 15 days. Virtually all fields which were open at the time of the survey in the eight village territories (Fig. 1) were walked. Some attempt was made to maintain a distance of about 50 meters between transects, although consistency was by no means always maintained.

The results of this survey were considerably more positive than spring survey had been (Table 1). Remains of at least 70 ploughed-up hearths/cooking pits (it is impossible to distinguish between these alternatives from surface indications) and a number of concentrations of fire-cracked rocks were observed, and 418 g of pottery were recovered. Some flint was also recovered, including an intact hollow-ground axe blade found on the first day, but this category of finds was not common. It was often possible to see how the plough had turned over a hearth virtually intact, with clear boundaries and a contents of charcoal, soot, fire-cracked rocks and occasionally pottery visible in the furrow. As much charcoal as possible was collected for C-14 dating.

In twelve cases there was sufficient charcoal for dating the hearth (Table 1). The results were positive – five of the dates indicating bronze age and seven dating to the late iron age. Several of the hearths could be dated by their pottery – five contained the rusticated pottery common to the bronze age.

TABLE 1

Village/estate	No.	Type[1]	Charcoal	Artifacts	Pottery No.	Pottery Wgt.	Date
Balkåkra	1	3 hearths	X	2 cores, 5 flakes			
	2	1 hearth					
	3	1 hearth					
	4	1 hearth					
Boden	1	fire-cracked rock					
	2	cairn					
	3	cairn					
Bergsjöholm	1	fire-cracked rock					
	2	1 hearth					
	3	1 hearth					
Bjäresjö	1	1 hearth		burnt flint			
	2	1 hearth		burnt flint, 2 flakes	4	13 g	
	3	1 hearth	X		1	6 g	Ua-795: 1095±100 BP*
	4	1 hearth	X				Ua-495: 2620±95 BP
	5	4 cooking pits, 1 pit-house	X		9 rusticated	47 g	Ua-496: 1545±95 BP
	6	1 hearth					
	7	2 hearths					
	8	findspot		1 hollow-ground axe			
	9	fire-cracked rock					
Gundralöv	1	fire-cracked rock		5 flint flakes			
	2	fire-cracked rock					
	3	2 hearths	X	burnt flint, 4 blades, 1 scraper, 23 flint flakes			
	4	fire-cracked rock					
	5	1 hearth	X				
	6	fire-cracked rock					
	7	fire-cracked rock					
	8	fire-cracked rock		1 scraper			
	9	fire-cracked rock		1 scraper, 5 flint flakes			
Hedeskoga	1	1 hearth		3 flint flakes	17 rusticated	90 g	Bronze Age
	2	2 hearths			1 rusticated	16 g	Bronze Age
	3	2 hearths	X		9 rusticated	41 g	Ua-796: 3025±100 BP
	4	2 hearths					
	5	2 hearths					
	6	fire-cracked rock					
	7	2 hearths					
	8	2 hearths					
	9	1 hearth	X				Ua-497: 2670±80 BP
	10	fire-cracked rock		burnt flint, 1 flint flake 1 dagger frag			Late Neol/ Early Bronze Age
	11	1 hearth					
	12	1 hearth		2 flint flakes			
Kragsholm	1	fire-cracked rock		5 flint flakes			
	2	1 hearth	X				
N. Villie	1	1 hearth			1	8 g	
	2	hearths, fire-cracked rock, occupation debris		1 bronze fibula, 1 whetstone, horse tooth	14	172 g	Migration Period
Årsjö	1	2 hearths	X				Ua-794: 1355±100 BP
	2	1 hearth	X		1 slipped	15 g	Ua-793: 1540±100 BP
	3	findspot		1 bead			Viking Age
	4	1 hearth		1 frag thinbutted flint axe, 1 blade			Neolithic
	5	2 hearths	X				Beta-20907: 1510±100 BP
	6	2 hearths	X	1 core			Ua-792: 1460±100 BP
	7	2 hearths	X				
	8	fire-cracked rock		2 blades			
	9	1 hearth	X				Beta-20908: 1410±130 BP
	10	1 hearth	X				Ua-791: 2565±90 BP
	11	1 hearth			2	10 g	
	12	2 hearths	X				Ua-790: 2905±90 BP
	13	2 hearths	X				
	14	hearth + occupation layer					
	15	1 hearth					
	16	1 hearth					
	17	1 hearth					
	18	1 hearth					
	19	2 hearths					
	20	fire-cracked rock					
	21	1 hearth					
	22	2 hearths					
	23	hearth ?					
	24	2 hearths					

[1] The term "hearth" is used loosely to designate a limited area containing charcoal, soot, and fire-cracked rock. "Fire-cracked rock" designates an area containing fire-cracked rock but no charcoal or soot.

* C-14 dates are uncalibrated.

The site of the former village of Norra Villie (Fig. 4) was unique in the amount of finds. Large quantities of pottery, a whetstone, and even a Vendel Period bronze fibula had been ploughed out of the slope and lay on the surface awaiting our discovery.

We also plotted concentrations of fire-cracked rocks when they occurred. On one

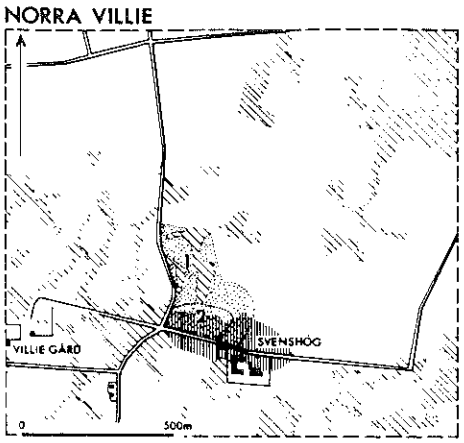

Fig. 4. The area of the former village of Norra Villie, now totally obliterated. Village extent is drawn according to a map from 1791. (Legend according to fig. 2; see Table 1 for a key to the numbers.)

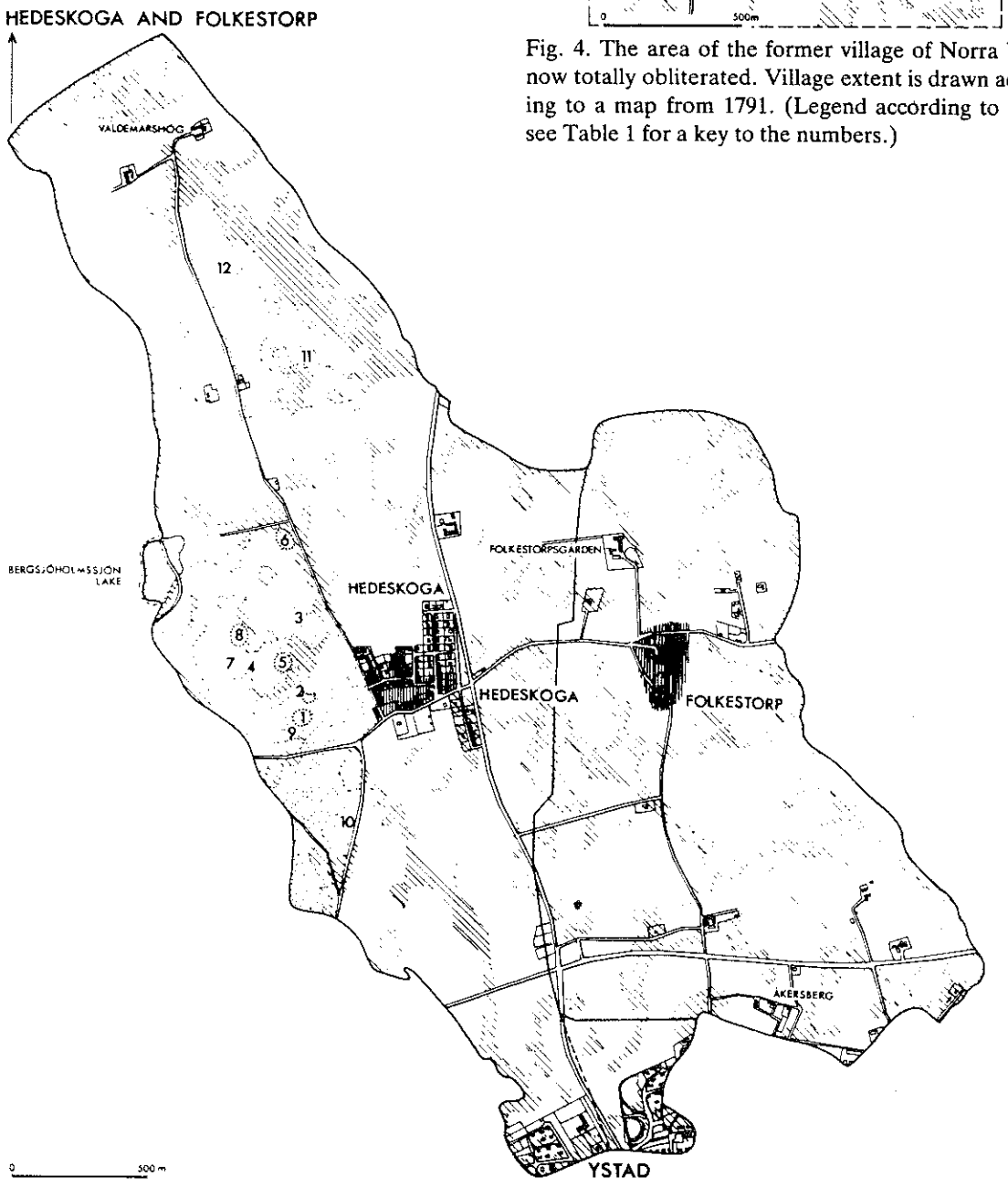

Fig. 5. The villages of Hedeskoga and Folkestorp. Landuse is shown according to a cadastral map from 1806. Only the accessible parts closest to the lake Bergsjöholmssjön were subject to survey. (Legend according to fig. 2; see Table 1 for a key to the numbers.)

occasion we noted an area of sooty, fire-cracked rocks about two meters in diameter, which from a distance appeared to be a hearth. Closer inspection showed that the soil itself bore not the slightest sign of soot or charcoal, however. The observation led us to believe that in many cases limited concentrations of fire-cracked rock are locations for ploughed-up hearths/cooking pits which have been in the ploughzone for several seasons. The soot and charcoal in the soil have disappeared as the result of ploughing and weathering, and only the stones remain. More diffuse distributions of fire-cracked rocks may also be due to more modern activities, such as manuring (Foard 1978, p. 363; Haselgrove 1985, p. 14) or soil improvement (Gustawsson 1949, p. 154).

Without excavation, it is risky to venture an interpretation of these finds. I would suggest that areas with concentrations of hearths, such as at Årsjö 6–10 (Fig. 7) or Hedeskoga (Fig. 5) indicate a permanent or long-lasting settlement, while isolated hearths represent short-term occcupation or special purpose sites.

A brief excavation campaign was made possible in the fall of 1987. For practical reasons it was unfortunately not posible to investigate at Sulebjär 4 (Fig. 3) or Årsjö 6–10 (Fig. 7). However, several test trenches were dug at Hedeskoga 1, 2, 3 and 9 (Fig. 5) and at Bjäresjö 5 (Fig. 3). In spite of the promising surface indications at Hedeskoga, almost no subsurface features were evident, although charcoal from two features could be dated to the bronze age (ß-24420: 3430±150 B.P.; ß-24421: 2720±70 B.P.). At Bjäresjö 5 the excavation revealed 16 cooking pits (ß-24419: 3380±150 B.P.; ß-23940: 3030±100 B.P.; ß-23938: 2570±80 B.P.; uncalib.) and a refuse pit containing 10 kg of late bronze age pottery. The cooking pits, with a depth of 50 cm below the ploughzone and containing up to 150–250 liters of fire-cracked rock plus soot and charcoal, can be expected to leave traces on the surface for many seasons before the plough destroys them. As these are normally dated to the bronze age (Thrane 1974), they are a promising means of locating bronze age activity.

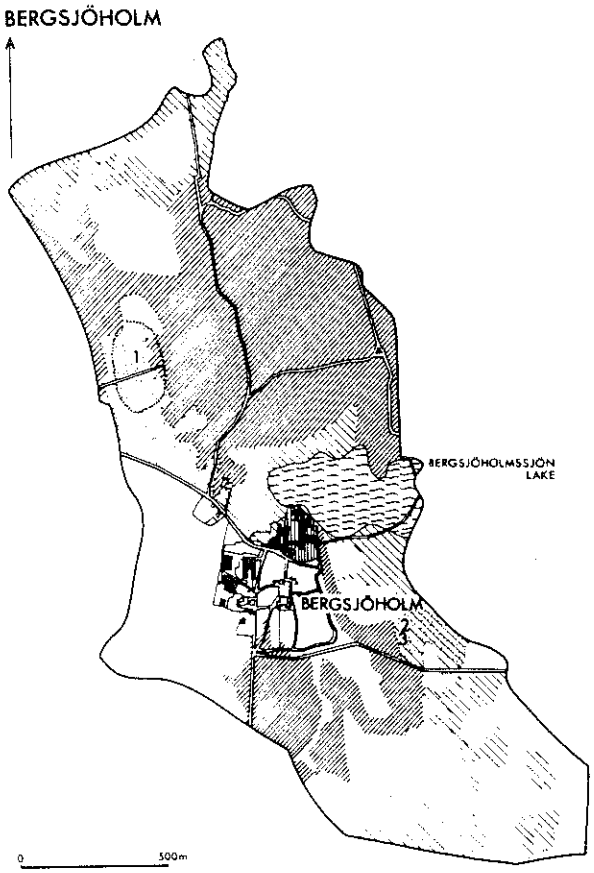

Fig. 6. The Bergsjöholm (Bjersjöholm) Estate. Land-use and hydrological conditions are shown according to a cadastral map from 1698, projected on the modern Economic Map. (Legend according to fig. 2; see Table 1 for a key to the numbers.)

4. Evaluation and conclusions

Field survey in the late autumn proved to be a fairly successful means of finding bronze and late iron age sites in the clay till soils of southern Scania. Early iron age sites, however, remain elusive. Bronze age sites can best be recognized by ploughed-up hearths and by sherd concentrations. While such phenomena can also survive the vagaries of winter to be found in the spring, the chances of finding them, at least in clayey soil, are probably better before winter has set in. I

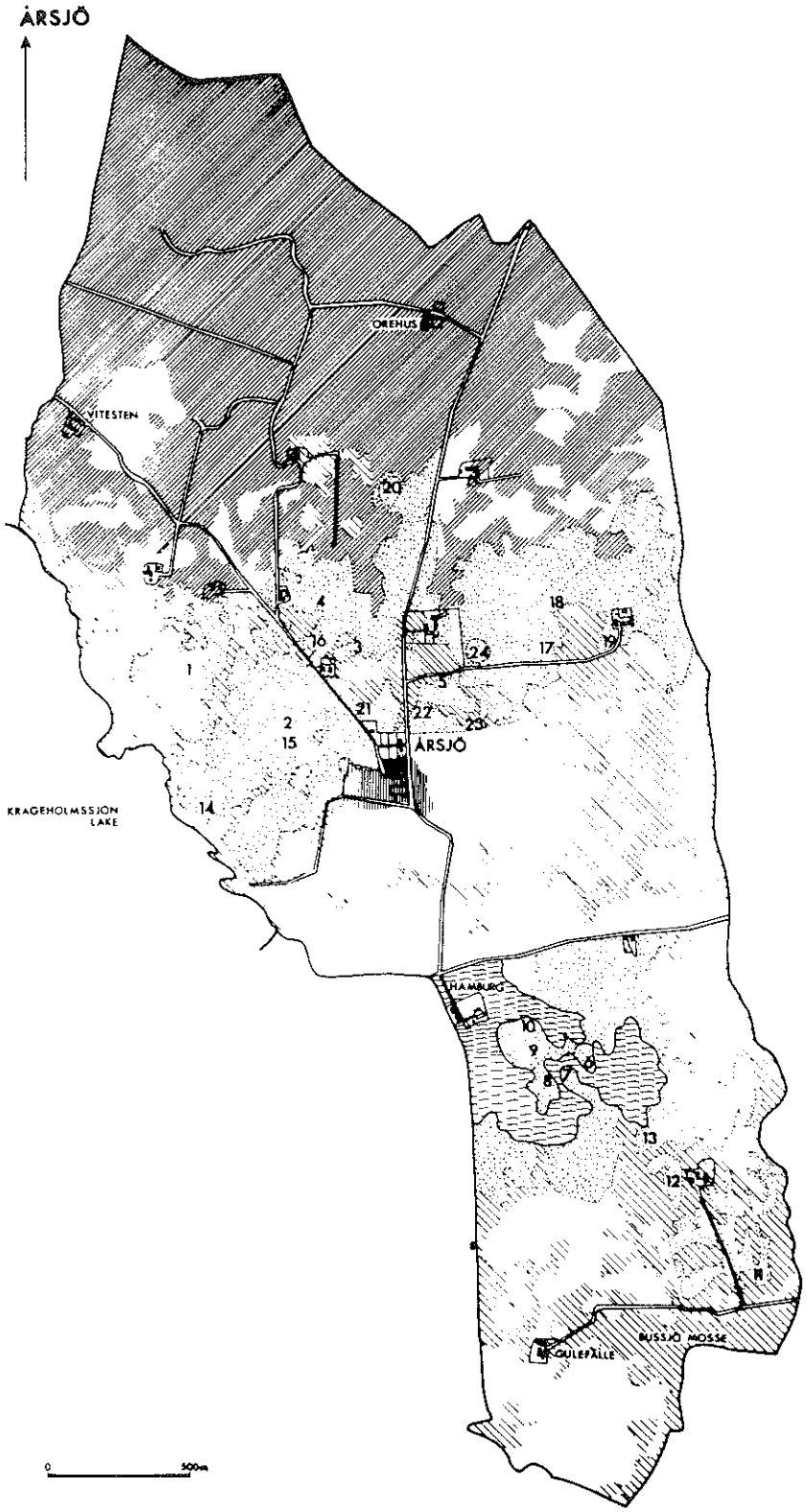

Fig. 7. The village of Årsjö. Landuse and hydrological conditions are shown according to a cadastral map from 1769–70, projected on the modern Economic Map. (Legend according to fig. 2; see Table 1 for a key to the numbers.)

would suggest on the basis of my own results and discussion with Mats Larsson that the expansion and contraction of water-soaked clay soils during the winter causes the rapid deterioration of fragile prehistoric pottery occurring in such a matrix. Pottery in well drained sandy soils is not as affected by freeze/thaw cycles and is more likely to survive the winter and be visible in the spring. Results by Jacobsen (1984, p. 189) and Larsson (Larsson & Larsson 1984, p. 24) confirm this observation. Thrane has noted that, in general, pottery sites are rare in surface survey. If the same ploughsoil has been cultivated for several generations, the less resistant objects such as metal and pottery will disappear, leaving only flint and stone.

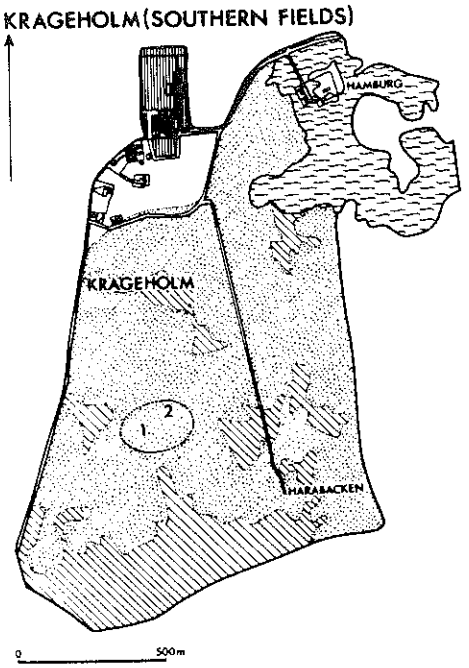

Fig. 8. Part of the land belonging to the Krageholm Estate. Landuse and hydrological conditions are shown according to a map from 1764, projected on the modern Economic Map. (Legend according to fig. 2; see Table 1 for a key to the numbers.)

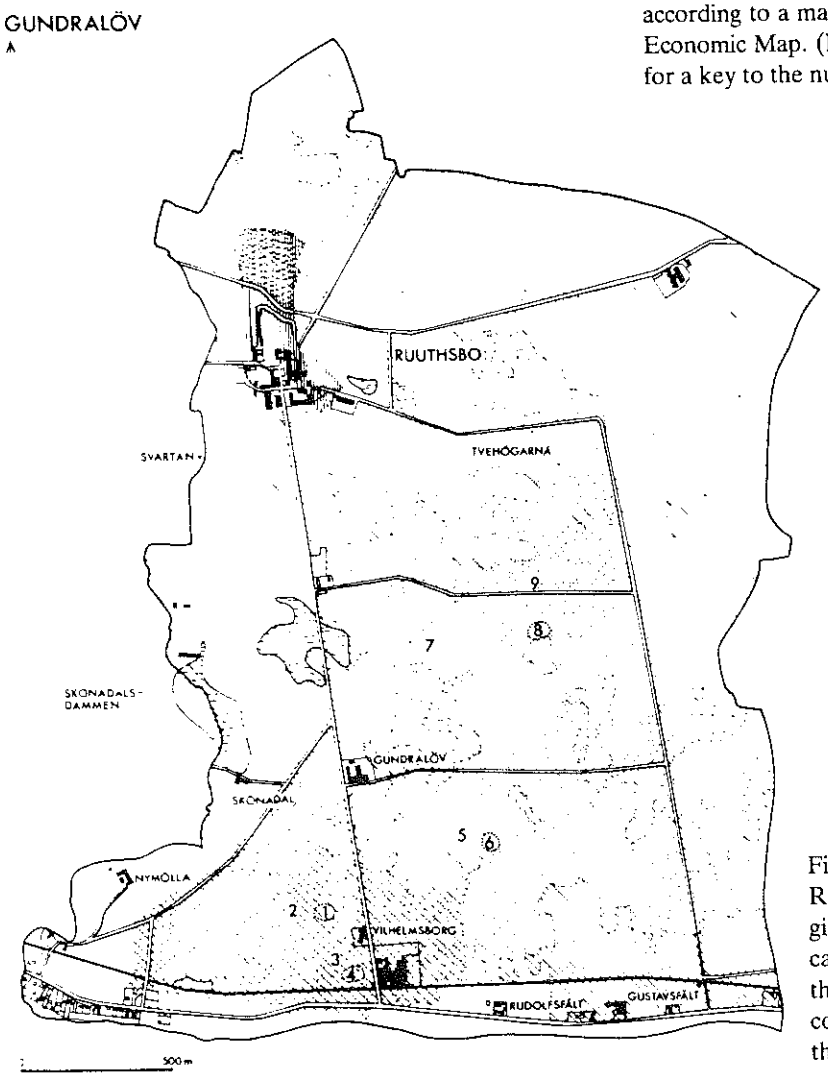

Fig. 9. The village of Gundralöv and the Ruuthsbo Estate. Landuse and hydrological conditions are shown according to a cadastral map from 1761, projected on the modern Economic Map. (Legend according to fig. 2; see Table 1 for a key to the numbers.)

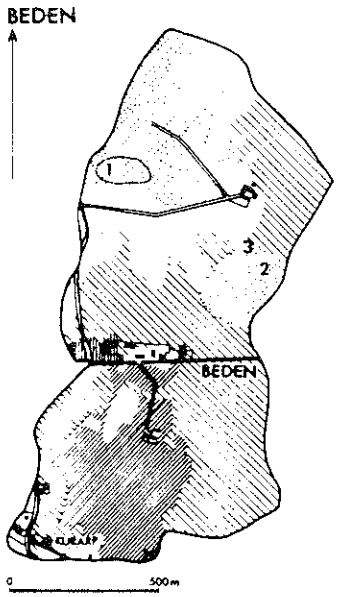

Fig. 10. The village of Beden. Landuse is shown according to a cadastral map from 1750, projected on the modern Economic Map. (Legend according to fig. 2; see Table 1 for a key to the numbers.)

Only when the plough depth is increased will layers with new contents of pottery be churned up. The former situation has existed in Denmark since the Viking Age, which explains why so few sites with pottery were found during Mathiassen's surveys. The latter situation now dominates following the introduction of deep ploughing during the 1950s. Thrane is optimistic that the second situation will produce pottery allowing us to locate sites datable to the late neolithic and bronze age (Thrane 1985, p. 146). Several authors have pointed out that pottery, when it is present, is a good indication of the location and state of preservation of a site (Thrane 1978, p. 114; Crowther 1985, p. 65). Hvass maintains that sites dating from the late Roman and early Germanic iron ages, as they contain little pottery, can seldom be found by means of surface collection (Hvass 1985, p. 195).

In general, survey experience has resulted in a consensus regarding the best conditions for survey, which may be summarised under the following points:

1. Soil conditions. The soil should be ploughed and/or harrowed, bringing subsurface features to the surface. It is difficult to observe soil coloration once plant growth has begun. Experience has shown that it is not worthwhile to survey fields where stubble is standing or has been turned by the plough (Mathiassen 1948, p. 7; Thrane 1978, p. 111; Foard 1978, p. 362; Jacobsen 1984, p. 191; Larsson & Larsson 1984, pp. 20 f.; Hodder & Malone 1984, p. 128).

2. Humidity. Dry conditions are a disadvantage in that dust can cover the surface and obscure features (Larsson & Larsson 1984, pp. 20 f.). Optimal conditions are after a period of c. 14 days or more of rain, when features and artifacts have been washed clean (Mathiassen 1948, p. 7; Ammerman & Feldman 1978, pp. 735 f.; Thrane 1978, p. 111; Jacobsen 1984, p. 191; Larsson & Larsson 1984, pp. 20 f.; Gren 1986, p. 58). Light rain is no hindrance during survey, although even a light covering of snow makes observation impossible. (We were more often hindered by snow during the spring survey than in December.)

3. Soils. Jacobsen (1984, p. 191) notes that prehistoric pottery found in heavy clay soil is generally in a rather bad state of preservation. However he found no correlation between the soil type and the discovery of the different categories of surface finds. Mathiassen notes that artifacts are easier to see in sandy soils, as the clay tends to stick to artifacts in clayey soils (Mathiassen 1948, p. 7). Callmer notes that modern farming, in which clay soils are subject to more thorough working, is more destructive of prehistoric artifacts in clay soils than in sand (Callmer 1986, p. 196). Pottery, itself a product of the clay soil, is in my experience less visible in the darker clay soils than in sand. The chances of seeing objects are better in homogeneous soils than in soils containing stones of various sizes (Gren 1986).

4. Light. Strong sunlight should be avoided, as the glare lowers visibility (Hodder & Malone 1984, p. 130; Gren 1986, p. 58). One disadvantage we noted in December was that visibility was markdely worse on sunny days since the low angle of

the sun caused long shadows and sharp contrasts. When cloud cover was too heavy, however, we found there could be too little light for observing color changes.

5. Personnel. Surveyors should have a natural instinct for the work. In addition, they should be trained in recognizing the archaeological phenomena which can be expected (Mills 1985, p. 43). They should also become familiar with the soils and farming procedures for the region they are to study (Barcham 1985, pp. 44 ff.). Mathiassen found that it was advantageous to use local inhabitants, as they had a familiarity with the land and its features, and they could return to the same places year after year (Mathiassen 1948, p. 7).

6. Repetition. Because there are few days when conditions are ideal, and because of variable growth on fields, the surface survey of a region should ideally be carried out over a period of several years for the most complete coverage (Mathiassen 1948, p. 7; Ammerman & Feldman 1978, p. 734).

7. Topography. Ploughing and erosion in undulating terrain mean the removal of high-lying constructions and the veiling of low-lying artifacts/constructions. Intensive modern manuring can also obscure surface features, even in flat terrain (Jacobsen 1984, p. 191).

8. Ploughing. Various studies have been carried out to determine the extent of lateral displacement from ploughing. While not fully in agreement, the results suggest that such movement is minimal on flat ground, but greater in sloping terrain. A maximum movement of 15 meters has been mentioned (Roper 1976, pp. 373 f.; Kouwenhoven & Terpstra 1979, p. 102; Taylor 1979, pp. 93 f.; Lewarch & O'Brien 1981, p. 309; Watt 1984, p. 160; Richards 1985, p. 38; Haselgrove 1985, p. 8; Hansen 1986, p. 5; Karsten 1986, pp. 74 f.; Gren 1986, p. 54).

9. Interviews. In the present paper, we have been concerned only with field techniques. However an integral part of survey should be interviews with local farmers, whose intimate knowledge of the land is often an invaluable help to survey. Larsson's survey program in the Ystad area has included interviews with most of the farmers in the area (Larsson & Larsson 1984, pp. 17 ff.).

The work described in the present paper is of course only a modest beginning. More excavation of the indications found needs to be carried out before the results can be fully evaluated. However, I think that the results so far are promising, and as such are worth trying in other situations where similar problems are being investigated.

Acknowledgements

I would like to thank Erland Porsmose for explaining his field methods, and Mats Larsson for sharing his experiences in field technique. I am grateful to Thomas Andersson for a sharp eye and never failing optimism during December survey, and to Ebba Sjöstrand, Björn Tägtström and Ulrik Skans for accompanying me for several days in the spring. Thanks also to Christina Borstam for redrawing the maps for publication, and to Inger Kristensson for photographic work. I would also like to acknowledge constructive comments by Erland Porsmose, Mats Larsson and Mats Ridersporre on earlier drafts of the paper.

References

Unpublished land survey maps, on file at the Lantmäteriarkiv, Malmö:
(oldest map available shown in parentheses)

Bjäresjö by, enskifte	1809 (1699)
Balkåkra by, storskifte	1782–83 (1745)
N. Villie by	1791
Hedeskoga & Folkestorps byar, enskifte	1806 (1777)
Bjäresjöholms säteri, beskrivning	1698
Årsjö by, beskrivning	1770
Krageholms säteri	1764 (1707)
Gundralövs by, beskrivning	1761
Bedens by, beskrivning över ägorna	1750

Published sources:

Ammerman, A. J. & Feldman, M. W. 1978. Replicated collection of site surfaces. *American Antiquity* Vol. 43, No. 4.

Arrhenius, O. 1934. Fosfathalten i skånska jordar. *Sveriges geologiska undersökning* Årsbok 28, Nr. 3.

Barcham, R. C. 1985. Reveries of the solitary walker. *Archaeological Review from Cambridge* Vol. 4, No. 1.

Callmer, J. 1986. To stay or to move. Some aspects of the settlement dynamics in Southern Scandinavia in the seventh to twelfth centuries A.D. with special reference to the province of Scania, Southern Sweden. *Meddelanden från Lunds universitets historiska museum 1985–1986* New Series Vol. 6.

Cherry, J. F. & Shennan, S. 1978. Sampling cultural systems: some perspectives on the application of probabilistic regional survey in Britain. In Cherry *et al.* (eds) *Sampling in Contemporary British Archaeology.* Oxford.

Cherry, J. F., Gamble, C. & Shennan, S. (eds.) 1978. *Sampling in Contemporary British Archaeology.* British Archaeological Reports British Series 50. Oxford.

Crowther, D. 1985. Exposure and attrition: an example of dryland archaeological visibility from Maxey, in the lower Welland Valley. In Haselgrove *et al.* (eds). *Archaeology from the Ploughsoil.* Sheffield.

The Cultural Landscape during 6000 Years. 1983. Report from the project Dec. 1983. University of Lund.

Foard, G. 1978. Systematic fieldwalking and the investigation of Saxon settlement in Northamptonshire. *World Archaeology* Vol. 9, No. 3.

Gren, L. 1986. Att inventera stenåldersboplatser i åkermark – exempel från Varaslätten och Falbygden i Västergötland. *Arkeologi i Sverige 1984.* Riksantikvarieämbetet Rapport 1986: 2.

Gustawsson, K. A. 1949. Kokstenshögar. *Fornvännen.*

Hansen, E. 1986. Ravnshøj Dyst. *Skalk* Nr. 5 1986.

Haselgrove, C. 1985. Inference from ploughsoil artefact samples. In Haselgrove *et al.* (eds) *Archaeology from the Ploughsoil.* Sheffield.

Haselgrove, C., Millett, M. & Smith, I. (eds). 1985. *Archaeology from the Ploughsoil.* Sheffield.

Hodder, I. & Malone, C. 1984. Intensive survey of prehistoric sites in the Stilo region, Calabria. *Proceedings of the Prehistoric Society* Vol. 50.

Hvass, S. 1985. Iron age settlements. In Kristiansen (ed) *Archaeological Formation Processes.* Copenhagen.

Hyenstrand, Å. 1979. *Arkeologisk regionindelning av Sverige.* Stockholm.

— (ed). 1980. *Inventori in honorem.* Stockholm.

Inventering av fasta fornlämningar. 1969. Riksantikvarieämbetet Fornminnesinventeringen Arbetsföreskrifter 1969. Stockholm.

Jacobsen, J. A. 1984. A contribution to the evaluation of archaeological field-surveying. *Journal of Danish Archaeology* Vol. 3.

Karsten, P. 1986. Jägarstenålder kring Yddingen. *Limhamniana* 1986.

Kouwenhoven, J. K. & Terpstra, R. 1979. Sorting action of tines and tine-like tools in the field. *Journal of Agricultural Engineering Research* Vol. 24.

Kristiansen, K. (ed). 1985. *Archaeological Formation Processes.* Copenhagen.

Larsson, L. & Larsson, M. 1984. Flintyxor, skoskav och massor av stolphål. *Ystads fornminnesförenings skrift* Nr. 29 .

— 1986. Stenåldersbebyggelse i Ystadsområdet. *Ystads fornminnesförenings skrift* Nr. 31.

Lewan, N. 1983. Ystadsområdet idag. Iakttagelser – intervjuer – intryck. *En arbetsrapport från Kulturlandskapet under 6000 år.* Lund.

Lewarch, D. E. & O'Brien, M. J. 1981. The expanding role of surface assemblages in archaeological research. In Schiffer (ed) *Advances in Archaeological Method and Theory* Vol. 4.

Lundberg, E. B. 1980. Det var så det började. In Hyenstrand (ed) *Inventori in honorem.* Stockholm.

Mathiassen, T. 1948. *Studier over Vestjyllands oldtidsbebyggelse.* Nationalmuseets skrifter, Arkæologisk-Historisk Række II. Köpenhamn.

Mills, N. 1985. Sample bias, regional analysis and fieldwalking in British archaeology. In Haselgrove *et al.* (eds) *Archaeology from the Ploughsoil.* Sheffield.

Olausson, D. n.d. The cultural landscape during the bronze and early iron ages in the districts of Ljunits and western Herrestad – a microstudy in the project "The Cultural Landscape during 6000 Years". *ISKOS.* In press.

Richards, J. 1985. Scouring the surface: approaches to the ploughzone in the Stonehenge environs. *Archaeological Review from Cambridge* Vol. 4 No. 1.

Roper, D. C. 1976. Lateral displacement of artifacts due to plowing. *American Antiquity* Vol. 41 No. 3.

Schiffer, M. (ed). 1981. *Advances in Archaeological Method and Theory* Vol 4. New York.

Stjernquist, B. 1983. Gravarna som källa till kunskapen om den yngre bronsålderns bebyggelse i Skåne. In *Struktur och förändring i bronsålderns samhälle.* University of Lund Institute of Archaeology Report Series No. 17. Lund.

Taylor, T. P. 1979. Soil mark studies near Winchester, Hampshire. *Journal of Archaeological Science* Vol. 6.

Tesch, S. 1983. *Ystad II.* Medeltidsstaden 45. Stockholm.

Thrane, H. 1974. Hundredvis af energikilder fra yngre broncealder. *Fynske Minder* 1974.

— 1976. Bebyggelsesarkæologi som metode. In *Bebyggelsesarkæologi.* Skrifter fra institut for historie og samfundsvidenskab Nr. 17. Odense.

— 1978. Nogle iagttagelser og problemer i forbindelse med Sydvestfynsundersøgelsen. In *Bebyggelseshistorisk metode og teknik.* Skrifter fra Historisk institut Nr. 23. Odense.

— 1985. Bronze age settlements. In Kristiansen (ed) *Archaeological Formation Processes.* Copenhagen.

Watt, M. 1984. Smørenge 1983. In *Arkæologi og geofysiske sporingsmetoder.* Working Papers The National Museum of Denmark 14. Copenhagen.

Vorting, H. C. 1984. Archaeological field survey and the Danish natural gas project. *Journal of Danish Archaeology* Vol. 3.