

THE GRÖDINGE INVESTIGATIONS - AN EXAMPLE OF INTERDISCIPLINARY STUDY AND COLLABORATION

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ABSTRACT

This paper will give an example of collaboration between archaeologists and geologists in the common aims of studying land use in a long-term perspective. The methods applied in this example yielded complementary data on the occurrence, duration and gradual changes in cultivation during the Early Iron Age, and also of the taxa used. Some of the difficulties involved in the correlation of the archaeological and paleo-environmental data are also discussed.

Introduction

The Grödinge investigations were initiated at The Central Board of National Antiquities' regional Department of Rescue Archaeology prior to the construction of a new railway southwest of Stockholm. The investigations started in 1985 and the last excavations were carried out in 1991. Five supposedly "Stone Age" sites were investigated. The results will be published in 1993 (Åkerlund et al. 1993). Some preliminary results are presented and discussed in this paper.

The point of departure was not a specifically defined research problem, but instead, a given, narrow transection of the landscape with sites we had not chosen ourselves. In this case, we were given the opportunity to investigate sites within the Södertörn area, known for its rich remains from the Stone Age. Earlier palaeo-environmental investigations in this area (Miller 1973, Miller & Robertsson 1981, Miller 1982) have shown that the environment here has changed considerably through time. These changes could mean that the inhabitants' reasons for choosing a certain site for settlement differed as time went on.

What do these Stone Age remains in a coastal region represent? Based on earlier archaeological studies, we know that most of the Stone Age sites in this area appear to be situated in close contact with the ancient shoreline (Arrhenius 1945, Welinder 1977, Olsson & Åkerlund 1987). Here, potential seasonality has been difficult to establish, and it is possible that information from only

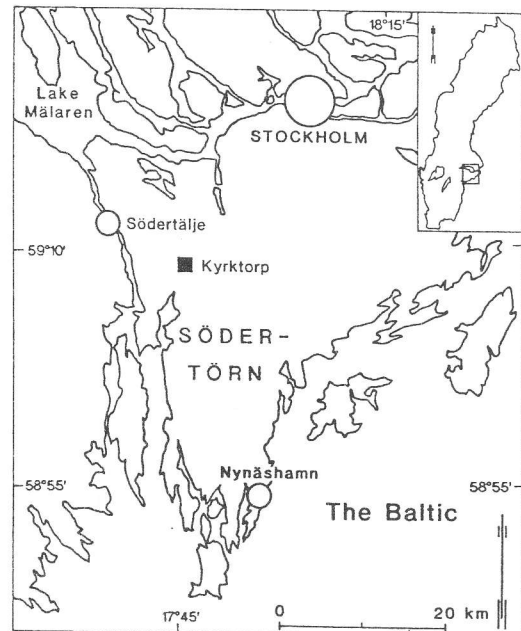


Fig 1. The Södertörn peninsula, with the Kyrkorp site marked.

a part of the annual cycle can be obtained from these sites. One of our aims of these investigations was to trace human activities through time and to see whether or not variations in land use could be evidenced for different periods. It was therefore deemed important to determine what actually had grown (both natural and cultivated) at the sites, and what may have been imported. In order to obtain this kind of information for

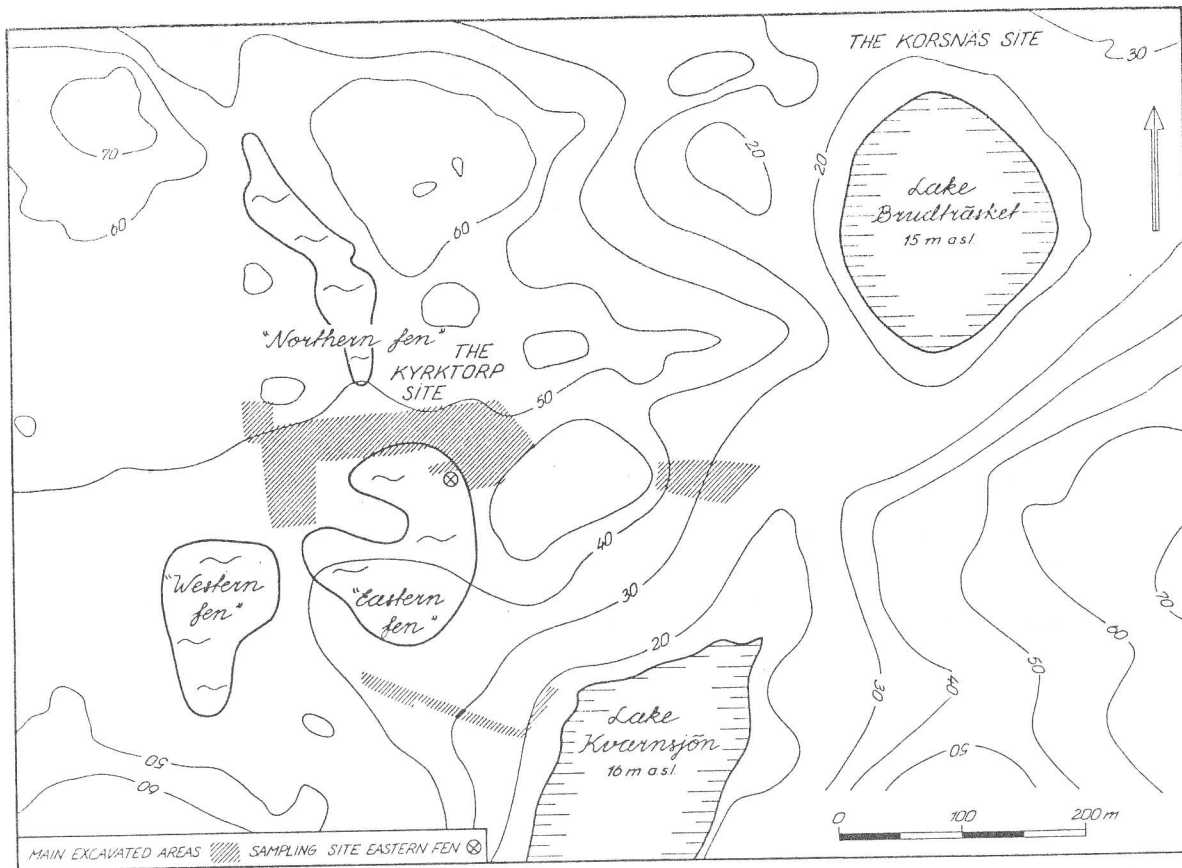


Fig 2. The Kyrktorp area is a mosaic landscape where the archaeological sites were most often situated on various slopes. The area is rich in sedimentary basins at different altitudes.

a specific site at a specific time, one needs a local pollen diagram within the archaeological context, that comes from the site in question (Madsen 1985). A sampling site with these qualities is usually difficult to find. Such a sedimentary sequence would show stratigraphical changes through time, which might not be the case with the archaeological remains. Most sites here show traces of successive occupation, where artefacts and features from different archaeological periods are found mixed together. This creates a problem when dating and interpreting the ecofacts. Therefore, it seemed necessary to try and correlate the archaeological and palaeo-environmental data against each other. Collaboration was initiated between the archaeologists and the geologists, as the problems dealt with in these investigations were of common interest for the archaeologists as well as the geologists at the Department of Quaternary Research, Stockholm University ("Development of the Holocene Landscape in the Eastern Svealand", Brunnberg et al. 1985). Other disciplines were later integrated in the investigations.

The Kyrktorp Example

Background

The Kyrktorp site (fig 1) was judged as having exceptionally good qualities for the possibility of studying landscape development and human activities in an extended time perspective. The site is situated within the Uppsala esker system and has a varied topography. The eastern part of the site is located in a valley, close to modern lakes. The middle and western parts are situated in a basin surrounded by outcrops of bedrock, where several fens, probable kettle holes, are present (fig 2). These fens (known as the "Eastern", "Western" and "Northern" fen) provided us with the opportunity of obtaining local pollen diagrams. Investigations from the "Northern fen", focusing on the study of shore displacement, have been published elsewhere (Risberg 1991).

At Kyrktorp, small areas were excavated intensively and here, interest was focused on "closed contexts", that is, features. These investigations were complemented by extensive investigations of larger areas. Small test trenches were excavated outside the exploi-

tation area in order to delimit the site and obtain comparative information. Phosphate mapping was also used in an attempt to delimit the site and to trace the ancient shorelines. Charcoal and charred seeds from the features have been dated by the radiocarbon method. Some of the datings were obtained by using the conventional method, while others were obtained by using the tandem accelerator technique.

The geological investigations included the mapping of Quaternary deposits, the levelling of isolation thresholds and stratigraphical coring in several fens. A core from the "Eastern fen", located close to the site, was chosen for analysis with the intention of providing information on the development of the natural environment thus making it possible for us to study human impact at the site. This core was dated using the tandem accelerator technique in order to obtain greater precision, but unfortunately there are relatively few datings. The chronology of the core is somewhat uncertain, because of the limited number of datings and because of variations in the material dated (gyttja, peat).

A small trench was also excavated close to the coring point in the "Eastern fen" with the intention of tracing a potential cultural layer in the fen in addition to making a correlation of the archeological and geological data possible. A comparison of the datings from geological and archeological materials has been presented elsewhere (Åkerlund et al. 1992).

Results

A summary of the results is presented in fig 3.

Traces of human activities were found over a large area, at least 150,000 m², by applying the above mentioned archeological methods. We have not been able to delimit the site.

Mesolithic features, dated using the radiocarbon method, were found at high levels in the western part of the site in association with large quantities of quartz debitage. For the Mesolithic, the pollen diagram reflects a regional development showing first a more open archipelago and later a small bay. A tentative interpretation of the diagram implies that there are no obvious traces of human activities in the area, in spite of the fact that the horizontal distance between the core and the site is only about 20 meters.

No remains from the Early Neolithic have been found in either source at the Kyrkorp site. However, sites from this period have been found in the area, e.g., at the nearby shorebound site at Smällan. Middle Neolithic

pottery and dated features were found in large quantities in the eastern part of the Kyrkorp site in addition to a few remains also found in the western part. Bones found in features include mainly fish and seal. The more well-preserved bones from the nearby contemporary site at Korsnäs (fig 2) also yielded a large amount of bones from fish and seal but, at the same time, also some bones from large land mammals (Aaris-Sørensen 1978). At Kyrkorp, few charred seeds indicative of gathering activities were recovered with the exception of carbonized hazelnut shells. One carbonized seed from wheat (*Triticum*-type) from the eastern part of the Kyrkorp site was dated to the Middle Neolithic.

During the Neolithic the lithology of the core in the "Eastern fen" reflects a lake/fen stage (possibly with a short marine phase at the transition Mesolithic - Neolithic), which would mean a more "local" sampling site than before. However, there are no obvious traces of human activities evident in the core at this stage either. Does this core not reflect more than the western parts of the site? Is it, in this case, "too local" to reflect the intensive activity in the eastern part, as traced in the archeological remains? Earlier investigations at the nearby Korsnäs site indicated that environmental changes could be traced near this Neolithic settlement. No evidence of cultivation was found in that sediment core. It was sampled in a basin, at that time a part of the Litorina Sea, and was situated closer to the site in question (Miller & Robertsson 1981). The carbonized seed of wheat found at Kyrkorp, is no indication of whether or not cultivation took place on this specific site, in this area, or if the seed came from another region.

Later, possibly during the Late Neolithic or during the Bronze Age, there is, according to the pollen diagram, an initial stage of vegetation clearance at Kyrkorp which is followed by typical pollen from herbs indicating grazing. No traces of human activities, however, can be observed in the archeological sources. The site was probably an outlying area. This is in accordance with the few recorded ancient monuments from the Bronze Age in the vicinity (Mörkfors & Ullén 1988). Grazing during the Late Neolithic and cultivation during the Bronze Age has been traced e.g. in western Södermanland, in the area of Eskilstuna (Damell & Pahlsson 1982).

As in numerous other investigations of Stone Age sites in eastern middle Sweden, remains from the Pre-Roman Iron Age and Roman Iron Age were found. Since large areas were excavated, there were good possibilities of identifying these archeological traces. Features and pottery were found in all parts of the excavated area, with a slight increase in the western

THE KYRKTORP SITE

Traces of human activities in prehistoric times

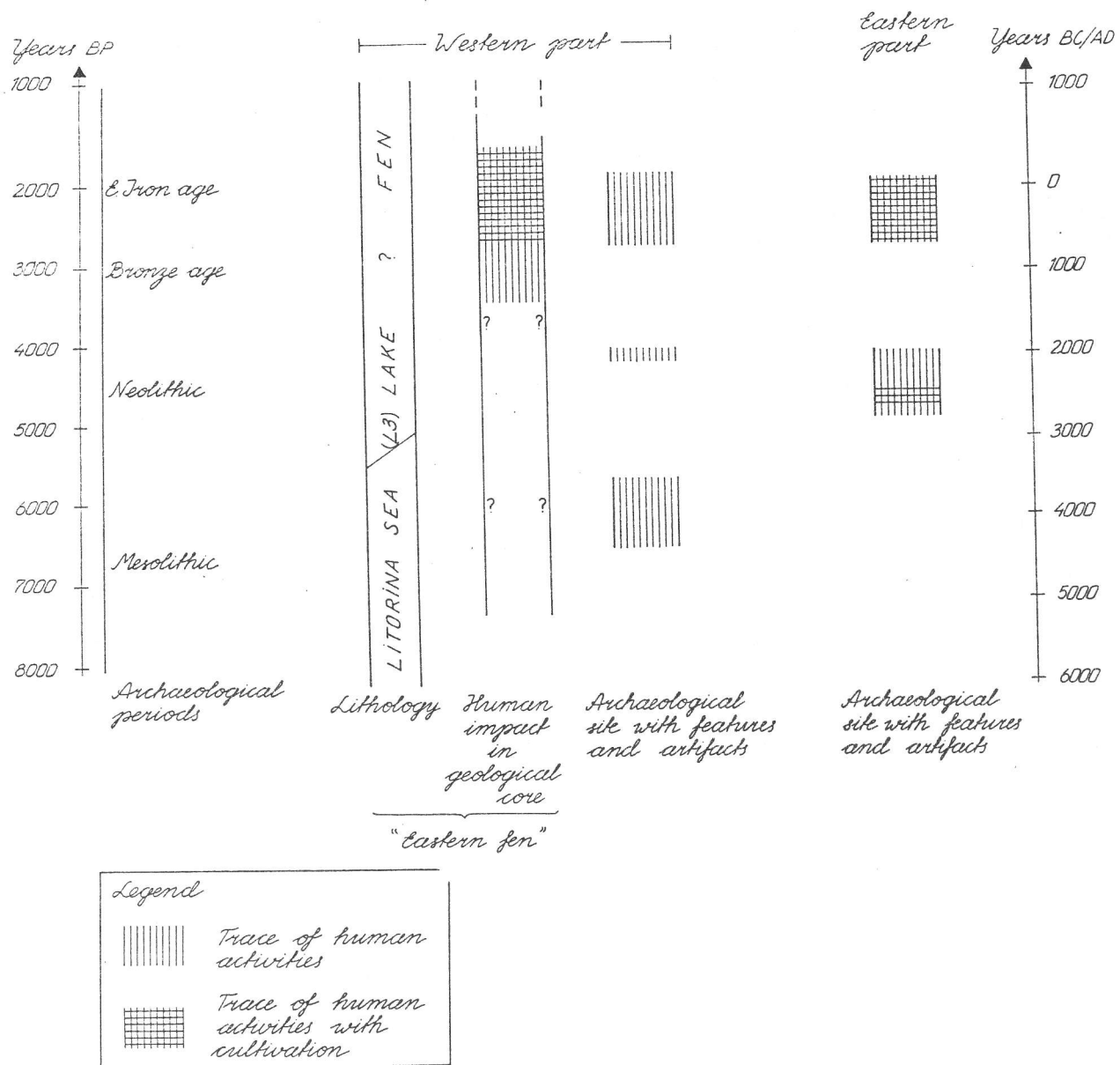


Fig 3. The information is correlated from different parts of the sites and from different sources; the geological core, the archaeological site in the western part of Kyrktorp (close to the coring point) and the archaeological site in the eastern part of Kyrktorp.

part. On the hilltop in the middle of the site remains of a hillfort were discovered. Remains of carbonized seeds of cereals, mostly barley but also naked barley, bread wheat and rye were found in features from this period. Seeds from herbs indicating grazing and hazel-

nut shells were also found. Remains of domesticated animals as cattle and sheep/goats were present. Indications of cultivation and animal husbandry were found throughout the site. Remains of ancient fields were uncertain and difficult to trace. Do the finds of carbon-

ized seeds mean that cultivation was part of the activities at the site, or were the seeds brought here from elsewhere?

During this period, indications of anthropogenic activities from the sediment core from the "Eastern fen" increase dramatically. The basin was filled with sediments and turned into a fen. A number of parameters indicating human activity at the site may be evidenced in the pollen diagram: finds of pollen from wheat and barley (*Hordeum*- and *Triticum*-types), an increasing amount of herb pollen, and high charcoal values. This may be interpreted as being indicative of clearing and grazing at the site. But what about cultivation? Wheat and barley pollen might have come from the harvest, but it might also be the result of threshing, possibly carried out at other places than in the fields. However, in the sediment core there are a number of parameters which indicate intensive erosion from the slope during this period. The sediments are low in organic carbon and in pollen concentrations, but high in the content of mineral particles, high in values of phytoliths and in aerophilus diatom taxa together with reworked "Ancyclus Lake" taxa. The same sediments could be traced in the archaeological investigation in the fen and these layers also contained archaeological finds of the same kind as in the above site, that is, pottery, quartz debitage and fire-cracked stones. The layers and erosion process could only be dated by correlation to the geological core. It is presumed to represent traces of erosion from a field directly adjacent to the fen.

Discussion

This first preliminary correlation of the archaeological and palaeo-environmental records was primarily carried out on a level of identifying the presence or absence of human activity on the site.

The correlation on presence was not possible for the Mesolithic and Neolithic periods, but only for the Early Iron Age. For the Early Neolithic, the absence of indications coincides in both the sources. For the Mesolithic and Middle Neolithic periods, however, the traces of human activities found in the archaeological record have no correspondence in the pollen diagram. It has been possible to correlate cultivation in both sources for the Early Iron Age, and also to establish the position of at least one cultivated field. Information yielded through pollen analysis is the occurrence, duration of and gradual changes in cultivation, while the charred seeds in the archaeological context provided information on taxa used.

Since the correlation of presence was not possible for long periods, there is then no way to evaluate the

periods of absence of anthropogenic indications that coincide in both sources. Why is it more difficult to trace human presence in the pollen records in some periods? Is it only possible to trace certain kinds of activities? Is that dependent upon how intensely humans affect the environment? Do simultaneous natural changes block the ones caused by humans? Might it be the result of the different ways the palaeo-environmental record changed over time, from a regional to a very local sampling site? Do the periods of absence indicate a hiatus in the stratigraphical sequence? How can we judge representativity when only relying on a pollen diagram?

The English has been examined by Phyllis Andersson

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