

LATE GLACIAL ENVIRONMENT AND LATE PALAEOLITHIC SETTLEMENT IN SOUTHERN SWEDEN

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ABSTRACT

Quaternary geological studies have resulted in a rather good view of the deglaciation of southern Sweden. Palaeontomological analyses have shown that the climatic changes during the Late Glacial were much more dramatic than was known earlier. Surveys intended to search for Late Palaeolithic settlement remains have provided several new finds, especially in the northern part of Scania. The subsistence of Late Palaeolithic man is discussed in relation to new result from the natural sciences.

Deglaciation

Detailed studies in the areas of quaternary geology and biology have been carried out over the last two decades in relation to the Late Glacial conditions in southern Sweden. The considerable number of examined sites throughout southern Sweden means that we now have a rather good idea of the deglaciation (Mörner 1969, Berglund 1976, 1979, Lagerlund et al 1983, Berglund & Rapp 1988, Björck et al 1988). This can be combined with a number of radiometric datings.

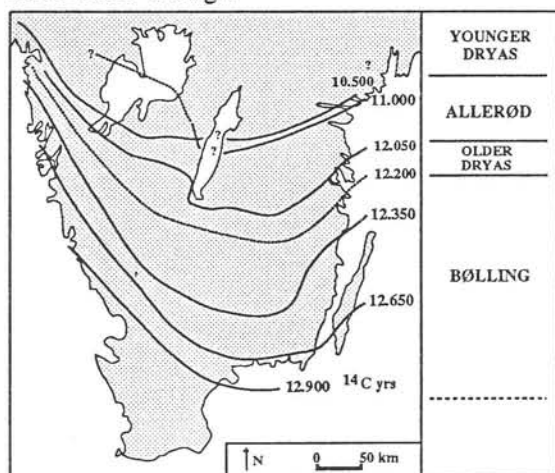


Fig 1. Deglaciation in southern Sweden. Based on Björck et al 1988 and Berglund & Rapp 1988

The province of Scania was the first part of southern Sweden from which the ice disappeared in about 13,500 BP. The deglaciation process can be well

monitored as far as Middle Sweden, where the melting of the ice ceased as the temperature fell during the Younger Dryas (fig 1). Deglaciation then continued again after this period. The Swedish West Coast becomes ice-free earlier than the eastern Baltic coast, but the melting of ice in the west was much slower than in the east. A certain delay in the melting of the ice occurred in the central area included in the South Swedish Highland. Very rapid melting occurred mainly during the Bølling, at a rate which is estimated at the most at about 50 km per century.

Flora and fauna

Pollen analyses of the oldest known layers in the south-west of Sweden point to an ice free Bølling period (Berglund & Rapp 1988, Björck et al 1988). Analyses of the insect fauna in the Late Glacial deposits in Scania indicate that southern Sweden was subject to a noticeable rise in temperature at the end of the Bølling and during the Older Dryas (fig 2) (Lemdahl 1988). There is evidence of a certain decrease in temperature during the Allerød period, and also of a noticeable increase in temperature during the transition to the Postglacial period.

As a result, the data which are actually available to us with regard to our interpretation of the palaeo-ecological conditions prevailing during the de-glaciation phase are disparate. The insect studies give a picture which differs noticeably from the pollen

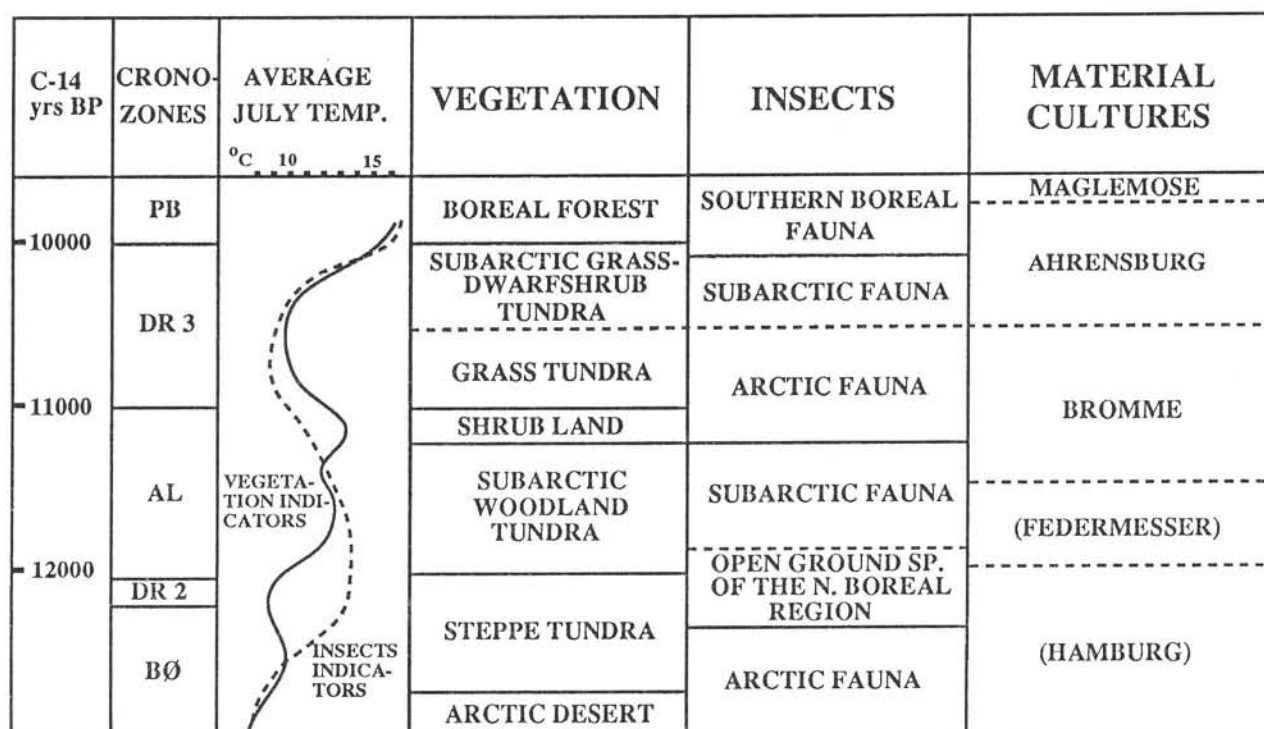


Fig 2. Average July temperatures for the time span c 13,000 to c 10,000 BP, based upon palaeoecological and palaeontomological studies, and the vegetation of the Late Glacial Period in south-west Sweden, based on analyses of pollen, macrofossils and insect finds (Lem Dahl 1988, with additions).

analysis as far as the oldest chronozones are concerned. A compilation of the available data produces the following information about the Late Glacial period:

Bølling, later part: Major differences between summer and winter temperatures. Presumably the climate was relatively dry, too. Areas of inland ice may have remained, covered by layers of moraine.

Allerød: Smaller changes between summer and winter temperature. The climate becomes more humid. A humus layer is formed. Thawing of remaining land ice. A colder climate towards the end of the period.

Younger Dryas: Rapid change to a reduction in temperature. Low summer and winter temperatures. Precipitation is higher than in the preceding period. Severe wind and water erosion. Ice wedges are formed. A rapid increase in temperature at the end. A new protective humus layer is formed.

Transition from Younger Dryas to Preboreal: A climate with temperatures higher than today. The precipitation is low.

Of particular interest to our understanding of the

Late Glacial fauna are the finds of sub-fossils of, inter alia, the mammoth and the reindeer. Of the former, one find from Lockarp in south-west Scania has given ^{14}C -values in the range $13,360 \pm 95$ to $13,090 \pm 120\text{BP}$ (Berglund et al 1976). This indicates that the mammoth was living in Sweden during the deglaciation. The find on its own might be of less interest, but together with other North-European finds of the same age, it proves the presence of a flora with a productivity high enough to support this large and herd-living animal. This environment is often referred to as the mammoth-steppe.

A considerable number of reindeer finds has been made in small lakes, most of them dead ice holes, in south-west Scania (Clark 1975; fig 5, Liljegren 1975). Most are pieces of reindeer antler. Whole skeletons and skeletal parts have been recovered in some cases. A proportion of the antlers had been shed, indicating that reindeer had lived in the area throughout the year. Pollen analyses of the sediments adjacent to the find positions of a number of antlers have revealed that several of these belong to the Younger Dryas (Welinder 1971). Two ^{14}C -datings of reindeer antlers produced the values $11,170 \pm 110$ and $9,810 \pm 95\text{BP}$ (Ekström et al 1989), ie the latter belongs to the Preboreal period. Danish datings also show that reindeer were still living on

the island of Bornholm up to the Preboreal period (Aaris-Sørensen 1988:108f).

Remains of settlement

As far as traces of settlements are concerned, the position is still that only one single undisturbed site has been excavated - Segebro in south-west Scania (Salomonsson 1964). The artefact material and the distribution of the finds agree very closely with the numerous sites in Denmark which belong to the Bromme culture (Mathiassen 1946, Andersen 1973, 1988, Fischer 1976, Fischer & Mortensen 1978). The remains which have been found correspond to the features appropriate to a group of the size of a family. On the basis of new analyses of the eponymous site Bromme, on Zealand (Fischer & Sonne Nielsen 1987), the Segebro site probably belongs to an older part of the Bromme culture.

A new excavation was carried out at Segebro in 1976 (Larsson 1982). A remarkable collection of wastes, probably from a production site, was found at a point 10 metres from the area which had previously been identified as the boundary area of the site (Larsson 1982; fig 77).

New investigations

A start has been made during recent years on a new inventory, with a view to collecting data in respect of Late Palaeolithic finds. This included visiting the previously known sites of finds of tanged points, for the purpose of establishing whether these are nothing more than the locations of individual finds, or whether the finds mark the position of Late Palaeolithic sites. New studies of museum collections has also resulted in the identification of a number of Bromme points (Larsson 1984, 1986).

Contacts with amateur archaeologists have also led to several finds being made. Three tanged points were found at each of two locations (Larsson 1986). Only a very limited number of worked flints was found at each site. The new finds of tanged points have contributed to a major extension (fig 3) of the distribution of finds of Bromme points, which were previously known only within south-west Scania (Salomonsson 1961). One find was made as far north as on the south side of the South Swedish Highland (Westergren 1979:34 f). Further finds in northern Scania have confirmed that this find was not an extreme northerly marker of remains associated with humans (Carlie & Götz 1983). What is particularly interesting is the occurrence of some

Bromme points close to lake Finjasjön in northern Scania (fig 3).

These new finds also provide an interesting picture of the topography of the find sites. Certain points were found adjacent to the inlets into and the outlets from lakes - a site location which is highly typical of Danish finds (Fischer 1976). Others were found at the edge of tunnel valleys, on islands or on a raised area in undulating countryside.



Fig 3. The relations of ice, land and water during the Younger Dryas (above) and the distribution of finds from the Late Palaeolithic of southernmost Sweden (below). Legend; 1: single finds of tanged point of the Bromme type, 2: sites with at least three finds of tanged points of the Bromme type, 3: excavated Late Palaeolithic sites, 4: single finds of tanged point of the Ahrensburg type and 5: single finds of implement made of reindeer antler

Most of the sites, except for Segebro, seem to represent short stays as they contain only a small number of tools, while wastes from flint knapping are few in number. The same situation has also been

noted in northern part of Jutland (Madsen 1983, Nilsson 1989). On the other hand, sites with a large amount of debitage have been found in eastern Denmark (Andersen 1973, Fischer 1990). Waste is found in areas with an abundance of raw material suitable for knapping. The flint-knappers seem to have used a very wasteful technology resulting in a large amount of debitage in relation to the tools. The differences in the number of tools might, on the other hand, be related to different settlement types (Grønnow 1987; 159f). Despite wide variations in the number of objects, each site appears to represent a single camp. It is common to find several camp sites in close proximity. However, the composition of finds, as for example at Bromme, suggests that they are of different ages (Fischer & Sonne Nielsen 1987) and therefore did not function as units in a larger social group.

A small number of finds from southernmost Sweden mark or indicate settlements belonging to the Ahrensburg culture (fig 3). Only in a few cases was a tanged point of the Ahrensburg type found in association with the site remains. In the site Öbacken in the south of Scania, the artefacts were found in a layer which can be dated to the Preboreal, which in this case should be designated as a *terminus ante quem* dating (Welinder 1971; 7 f). Indications of the Ahrensburg culture consist of a small number of finds of striking implements of the Lyngby type (Althin et al 1950) and coarse-barbed harpoons (Larsson 1978; 62f). In one particular case a striking implement of the Lyngby type was found in such a position that it could only be dated to the Younger Dryas (Larsson 1976).

The end of the Late Palaeolithic

Just as we are uncertain when human activity commenced during the Late Glacial Period, so we are uncertain of where precisely to place the boundary between the Palaeolithic and the Mesolithic. A rapid change in vegetation can be identified at the transition between the Younger Dryas and the Preboreal. Most of the Late Glacial animal species appear to have survived for a time, concurrently with which species such as bison, wild horses and the aurochs migrated into the region. The impression gained is that this period was an unusually favourable one for humans, although one remarkable feature is the almost total absence of finds dating from the Early Preboreal.

The finds from the Ahrensburg culture at the Stellmoor site are ^{14}C -dated between $10,140 \pm 105\text{BP}$

and $9,810 \pm 100\text{BP}$ (Fischer & Tauber 1986); these values are very close to the geological dating of the transition from Late Glacial to Postglacial times 10,000 BP, and the dating of the reindeer to the Preboreal period, indicates that Late Palaeolithic forms of society might have existed during an early part of the Preboreal (Fischer 1978, 1982).

Two alternative processes of change may be postulated. One starts with the Late Glacial material culture, which underwent changes over a rather long period. Another possible process involves more rapid change with a clear break in continuity, based instead on influence by or direct influx from continental societies which had already adapted to the new conditions (Fischer 1978).

At the Bonderup site in central Zealand we find conditions that might support the thesis of a slow transition from a Late Palaeolithic tradition to a Mesolithic one (Fischer 1982). The artefacts were found in a mud layer dated by pollen analysis to the Preboreal (Fredskild 1982). The finds included a point of the Ahrensburg type, bipolar cores typical of the Ahrensburg culture, and a triangular micro-lith. Another find was a large flint tool, which was interpreted as a prototype of an axe blade.

The newly published account of the so-called Barmose group from south Zealand provides us with a much-wanted opportunity to study the oldest phase of the Maglemose culture (Degn Johansson 1990). Unfortunately no reliable radiometrical datings are available. Through a process of comparison with north German settlements, this phase has been dated to the period 9,700-9,500 BP. There are grounds to express reservations at this point, however. The comparison of south Scandinavian with north German conditions during the Preboreal is thus beset with considerable uncertainty.

^{14}C datings from the oldest layers of the Friesack site west of Berlin yield values close to the Younger Dryas/Preboreal (Gramsch 1987). These finds from Friesack are wholly Mesolithic in character, with no Late Palaeolithic features. Moreover, the osteological material from this site contains no bones of subarctic fauna. This may suggest that, at an early stage in the Preboreal, the area immediately to the south of Scandinavia underwent a rapid change, not just in material culture, but also in fauna. The former indicates powerful influence from the south, which totally changed the material culture in the course of a couple of centuries.

As in the case of the evidence from the Younger Dryas, it is not clear whether the paucity of finds during the Preboreal actually reflects a sparse population, or is due to the difficulty in identifying sites from the Ahrensburg Culture. It should be pointed out, however, that some artefact types, such as blades (Hartz 1987) and rhomboid points, are very similar to those from the Mesolithic Kongemose culture (Larsson 1980, 1990).

Several studies of lakes and bogs have revealed a significantly low water level in the Preboreal (Digerfeldt 1975, Gaillard 1984). Since people sought locations by open water, they settled in areas which were submerged when the water level rose and thus became covered with organic sediment. In addition, the shoreline zone in the Preboreal was located so near the present edge of the bog, with its thin layers of peat, as to make it not so attractive to peat cutting in recent time. This might be one of the reasons for the lack of sites dating from the transition between the Late Glacial and the Early Postglacial periods.

As can be appreciated from figure 1, the topographical conditions would have supported early settlement along the Swedish West Coast. Distinct land elevation has occurred in this area since deglaciation, interrupted by occasional transgressions during the Atlantic period (Mörner 1969, Persson 1973). A Late Palaeolithic coastal settlement could have existed, therefore, along the Swedish West Coast, and could have continued into southern Norway. A small number of finds of large tanged points, which exhibit certain similarities with the Bromme points, has been made in this area (Fredsjö 1953, Bang-Andersen 1988). In one particular case, Tosskär in the province of Bohuslän (Fredsjö 1953: 60 ff), an arrowhead of this kind occurs in a site context together with so-called single-edged arrowheads. This type of arrowhead exhibits major similarities with the Ahrensburg points, and is a direct development of these, which is proved by the finds from the site D at the lake Store Myrvatnet in south-west Norway, dated to the middle part of the Preboreal (Bang-Andersen 1990). The oldest known finds from the Hensbacka culture reflect an implement composition which is indicative of a strong Late Palaeolithic tradition, but with distinct regional characteristics.

"Reindeer hunters"

In previous accounts of the first settlement of south Scandinavia by humans, the expression "reindeer

hunters" has often been applied. Parallels have quite frequently been drawn, without much forethought, between these immigrant communities and the indigenous population in Arctic regions. A number of reservations should nevertheless be expressed at this point.

Irrespective of whether pollen analysis or palaeo-entomological analysis is preferred, the Late Glacial Period emerges as a period of climatologically and ecologically extremely important variations, from Arctic deserts which change into sub-Arctic forests and which in turn become grassy tundra. The amounts of precipitation also appear to have fluctuated noticeably. A number of different factors must be taken into account, therefore, such as the loss by evaporation, the rate of migration of both flora and fauna and the change in the relationship between land and water, in order to arrive at a reliable overall picture of the conditions facing human beings in the Late Palaeolithic period.

The data are extremely limited with regard to the actual material directly associated with human settlement. Elk, reindeer, beavers, wolverines, swans and pike have been identified at the eponymous settlement at Bromme. Particular account should be taken of the fact that the number of find units of elk exceeds those of reindeer. In actual fact the reindeer finds consist of two pieces of antler, which can not be taken to provide direct evidence of reindeer hunting in the area. The presence of red deer has also been confirmed from the Trollesgave settlement (Fischer & Mortensen 1978).

The finds from north German settlements such as Meiendorf and Stellmoor point to the extremely clear dominance of reindeer, although a detailed analysis of the composition of parts of the skeleton has revealed that hunting took place in entirely different ways. The finds from the Hamburg culture have been interpreted as traces of selective hunting, in which full use was made of every individual animal (Grønnow 1987). The traces left by the Ahrensburg culture at the Stellmoor settlement point to mass slaughter associated with noticeable selection of the meat collected in this way. Both find sites can be described as being indicative of reindeer hunters, although the forms of hunting that they reflect exhibit significant differences. It is not clear whether this can be explained by hunting during different seasons or in different ecological environments.

The major climatic changes during the Late Palaeolithic period must have had a great effect on the

composition of the fauna and consequently on the living conditions for humans. Late Glacial humans were forced to adapt to a number of rapid changes. Not least, this concerned the forms of hunting. In view of the considerable fluctuations which can be traced in the size of recent reindeer populations (Grønnow & Meldgaard & Berglund Nielsen 1983; fig 9), the economy in the societies of the Late Palaeolithic period was presumably very much more varied than indicated by the limited species composition at just a few sites in north Germany and in Denmark (Rust 1937, 1943, Mathiassen 1946).

The reindeer is a herd animal which normally makes seasonal migrations over large areas. Any attempt to construct a model of these migrations during the Late Glacial period in northern Europe will be extremely unreliable. Low temperatures during the winter are not a major problem for reindeer; their main problem is the extent of the precipitation during the same period. A thick covering of snow is the greatest obstacle to the survival of the reindeer. Because of the indications of major variations in the level of precipitation, considerable shifts must be assumed to have taken place in the migratory cycle of the reindeer. It may even be necessary to take into account a total change in the north-south direction of the reindeers' migrations from one chronozone to another. Although the reindeer usually move over large areas, this need not have been the case at all times during the Late Glacial period. The composition of the vegetation may have been such that the migrations were minimized to a significant degree at certain times.

Certain parallels can be drawn here with the pattern of hunting for reindeer amongst the tundra Eskimos and the forest Indians in the north of North America (Jochim 1982, Riches 1982, Gordan 1990). The Eskimos practice collective hunting, whereas some Indians hunt individually. This has an influence not only on the form of reindeer hunting, but also on the whole pattern of society. If we also take into account other animal prey which might be more important than reindeer hunting during certain periods, then we will find ourselves on a more unreliable basis. For instance, no explanation has been offered as to the importance of the elk as prey during the Allerød. Its limited migration pattern and its smaller groups may have contributed to the need for Late Glacial man to adapt his pattern of living to a flexible organization of society. Furthermore, the position of sites next to the inlets into or the outlets from lakes indicates that fishing, for example for salmon, may have been a major activity.

Like the factual situation concerning Early Mesolithic settlement, our knowledge relates almost exclusively to inland settlement, whereas the finds from the coastal region of the time are extremely few in number. Finds of terrestrial fauna remains (Aaris Sørensen 1988;108) and, to a certain extent, flint objects (Larsson 1983) from the bottom of the strait Öresund indicate that the coastal areas were of significance for both animals and humans, just as they were in later periods. We have only a very scant knowledge of the exploitation of marine resources. Scattered finds of ringed seal and several species of whale give us some insight into the marine fauna (Aaris-Sørensen 1988;101 ff). Marine hunting and fishing were probably the basis of the economy during parts of the Late Palaeolithic. It might well be that the sites found inland represent nothing more than seasonal hunting of minor importance to the subsistence of the community. But even if coastal exploitation was of major importance, the climatic changes must have resulted in fundamental changes of marine animal resources during parts of the Late Glacial.

It will accordingly be necessary, in any future research, to consider Late Glacial man not as an exclusive hunter of reindeer, but rather as a highly flexible being which very successfully overcame major changes in its environment.

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