In the trail of the elks
Finds from the Preboreal in southern Sweden
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FORGOTTEN TIMES AND SPACES

New perspectives in paleoanthropological, paleoetnological and archeological studies

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Abstract
The Preboreal is a period that is still relatively poorly known as regards its archeological cultures. At the transition between the Pleistocene and the Holocene there are finds from Northern Germany indicating the presence of the Late Paleolithic Ahrensburg culture with a clear focus on reindeer hunting, but at the same time there are Danish finds reflecting an orientation to elk hunting, with an unclear cultural affiliation. Clear evidence of a material culture characteristic of the Maglemose culture does not appear until the middle part of the Preboreal. Dated finds suggest that reindeer existed throughout the chronozone, contemporary with other game such as horse and elk. Elk is observed through finds of deposits of parts of elk bodies which differ from later ways of treating game animals. These have been interpreted as being linked to ritual activities. A couple of finds of metapodials from Skåne may be a consequence of the same patterns of deposition. Finds of elk antler mattock heads and leister points have also been observed. The former in particular have a special position as characteristic of an early Maglemose culture. The leister points can be followed back to the Late Paleolithic, and it is still uncertain when elk antler mattock heads began to appear.

Keywords
Pleistocene – Holocene transition, Maglemose culture, elk, reindeer, chronozone, Sweden

Introduction
The Preboreal chronozone is a period about which little is known in comparison with other stages of the Mesolithic in Southern Scandinavia. The extreme rises in temperature that mark its introduction were followed by distinct fluctuations in
temperature (Björck et al. 1997; van der Plicht et al. 2004; Rasmussen et al. 2006; Kobashi et al. 2008). Rapid climate changes along with regional climate gradients cause difficulties in comparing radiometric datings (Blockley et al. 2007). An improved climate during the period meant that the tundra-like landscape from the Younger Dryas changed, at first to a light steppe landscape with grass and herbs. Clusters of birch, willow, sallow, and aspen occurred. An early stage of the chronozone led to the formation of forest-like stocks of juniper. A few centuries later birch too underwent a vigorous spread, and after a few more centuries there was also an invasion of pine into the bright birch forests. Towards the end of the period hazel appeared as well. On good soils it even formed pure hazel woods.

In some former studies the transition from the Late Paleolithic to the Early Mesolithic has been presented as a quite abrupt change from a society mainly based on reindeer hunting to hunting of a new boreal fauna (Benecke 2004). The question is whether this matches the information we have today about the period.

The transition from Late Pleistocene to Holocene is reasonably well dated to 9.5 ky cal BC. This transition has also been regarded as some kind of basis for the cultural transition between the Late Paleolithic and the Mesolithic. The first real questioning of the contemporaneity between the climatic and cultural changes was a result of the dates presented from the Northwestern German site of Stellmoor, viewed as the eponymous site for the Ahrensburg culture. The dates provided a value close to about 9,500 cal BC (Fischer and Tauber 1987). In contrast, the earliest well dated sites with a “typical” Mesolithic material culture are dated to about 9.0 ky cal BC (Dark 1998; Mellars 1998; Gramsch 2002). Other sites with artifacts attributed to the earliest Maglemose Culture give values of 9.0–8.0 ky cal BC (Fischer 1996; Brinch Petersen 2009).

Even if there are some problems with the calibration of the radiocarbon scale during the period in question (Baales et al. 2002; Cziesla and Petit 2003), this is probably not the only reason for the lacuna between the latest expression of a Late Paleolithic material culture and the earliest Maglemose Culture.

**The find situation of faunal remains**

We have to be aware that the faunal finds from the Late Pleistocene and Early Holocene may cause great problems concerning how representative they are in describing the cultural as well as environmental situation. From a number of radiocarbon dates of different mammal finds in Southern Scandinavia we have reasonably good information about some animals during the period in question (Liljegren and Ekström 1996; Larsson et al. 2002; Aaris-Sørensen et al. 2007; Aaris-Sørensen 2009). Skeletal parts of reindeer, especially antlers, have been found in a number of wetlands during drainage and peat cutting (Liljegren 1975). More than 40 finds from Southern Sweden have been dated (Liljegren and Ekström 1996).

The majority of dates are related to what should be regarded as the first half of the Preboreal. The situation is the same in Denmark (Aaris-Sørensen et al. 2007) and the east Baltic region (Ukkonen et al. 2006). However, this does not indicate unreservedly
that reindeer were more numerous during the early Preboreal than earlier. Drainage and especially peat cutting might not have included the lowermost layers of bogs. The vegetation around small lakes might have increased in the early Holocene and therefore attracted animals to the lakeshores for longer periods than before. The filling in of organic material started already in the early Preboreal. Therefore, more animals might have become stuck in the mud, died and been preserved.

The numerous finds of reindeer, mainly antlers and skulls, in bogs are in most cases due to the fact that these skeletal parts are easily recognized as exotic. One has to be aware that skulls with antlers have been easier to identify and retrieve than crania with shed antlers. Therefore winter bulls and early summer cows are probably underrepresented (Aaris-Sørensen et al. 2007, Figure 5).

The question is how long reindeer was a part of the fauna after the glaciation stage in Southern Scandinavia. In Southernmost Sweden there is a dating of an antler that gave the value $9,090 \pm 90$ BP, OxA-2793 (Hedges et al. 1995). This would mean that reindeer existed during significant parts of the Preboreal. Similar datings also occur from Denmark (Aaris-Sørensen et al. 2007; Aaris-Sørensen 2009). The existence of newborn as well as young calves testifies that Southern Scandinavia was a calving ground during the Preboreal (Aaris-Sørensen et al. 2007).

Figure 1: Scania, Southernmost Sweden, with the sites of finds mentioned in the text. Legend: open square: deposition of elk bones, filled square: elk antler mattock adzes, filled circle: leister points.
The horse has been dated to the Younger Dryas in Southernmost Sweden (Larsson et al. 2002) and to the Preboreal in Denmark (Aaris-Sørensen 2009). The reason the number of finds from wild horse is so small might be that the bones are not easy to identify. If, for example, skulls were found during peat digging, they would have been familiar to local rural people and might be regarded as horse carcasses recently buried because of natural death or due to diseases. So the finds of wild horse are no doubt be heavily underrepresented.

The museum stores of Southernmost Sweden contain a number of elk finds (Liljegren 1975). Unfortunately these finds have not been dated with the same intensity as the reindeer. In Southern Sweden elk appeared during a rather early part of the Allerød, and a small number of dates show their presence during the Younger Dryas and Preboreal (Liljegren and Ekström 1996; Larsson et al. 2002). It is uncertain whether the elk survived all through the Younger Dryas or reinvaded at the start of the Holocene.

Judging by their present behavior, reindeer as well as elk can be acclimatized to a range of different environments from forested regions to open tundra. Elk and reindeer are not viewed as direct competitors since they prefer different food (Bowyer et al. 2003). Elk move within the same region during a yearly cycle. Horse and elk are more stable resources than reindeer, which was probably an important but seasonal resource. Horse and elk should therefore be much more reliable for hunting, with an occasional surplus derived from mass killing of migrating herds of reindeer.

Elk bone depositions

Since the elk has a very limited pattern of movement during the year, besides which it moves in small flocks, hunting this quarry requires a different strategy from hunting more pronounced herd animals such as reindeer and horse.

From the Preboreal we have three Danish find sites revealing an interesting pattern of deposition of skeletal parts of elk. Significant parts of elk bodies were deposited together after the animals had been slaughtered. The finds near the shore of the kettle hole at Lundby on Zealand (Møller Hansen and Buck Pedersen 2006) from the Pleistocene/Holocene transition, or the remains from Skottemark dated to the Preboreal (Fischer 1996), might indicate that using small lakes or ponds as traps was of special importance for elk-hunting during the period in question. However, the small lakes usable for chasing and trapping large animals became overgrown during the early Holocene. That particular method of hunting thus disappeared.

That these small lakes were being filled in with organic litter during an early stage of the Holocene made them extremely dangerous for animals to cross, which might also have been a factor making these wetlands especially attractive to human hunters. Moreover, it ought to have been easier to hunt elk in this kind of environment since it prefers vegetation in water.

The finds at Lundby contain five concentrations of bones representing one to three individuals that are dated to the early Preboreal (Møller Hansen and Buck
Pedersen 2006; Leduc 2014) (Table 1). The bones at Skottemark include six individuals and the finds at Favbro two elks. The animals at the latter two sites were killed in the winter half of the year (Møhl 1978). At the site in Skottemark there were also finds of flint tools and several leister points, while just a few flakes were discovered at one of the concentrations in Lundby (Fischer 1996; Møller Hansen and Buck Pedersen 2006).

We do not know whether these kinds of elk depositions were a common phenomenon or not. The three finds indicate that they might be rather frequent. Recent digging by farmers might easily neglect this kind of find locations, as they look like “another heap of bones”. They might be destroyed by deep ploughing of former wetlands and totally disintegrated even by a small reduction of the water table.

The absence of metapodials is particularly stressed in the case of Skottemark, and they are under-represented in the finds from Lundby (Møhl 1978; Leduc 2014). It is suggested that they were removed to be used as raw material for tool manufacture. In this connection, a couple of finds from Southernmost Sweden are of interest. A somewhat similar type of deposition is indicated at the Ringsjöholm site in the bog Rönneholms Mosse, central Scania (Sjöström 1998) (Figure 1 and 2). A spit of sand partly parallel to the former lakeshore formed the basis for a Late Boreal–Early Atlantic settlement. The spit turned out to cover a layer of calcareous gyttja that was formed during the Preboreal. An assemblage of three metatarsal bones of elk in close proximity was found in this layer. All the bones were cut at the proximal end in order to remove the marrow. One bone shows clear evidence of cut marks. Two of the bones probably originate from the same full-grown bull and the third from a cow (personal information from Dr. Ola Magnell). That they belong to a late part of the Preboreal is proved by the radiocarbon dates from two bones (Table 1). In the same layer a small number of artifacts were found, including a flint core axe (Sjöström 1998).

A second find comes from Östra Grevie in Southwestern Scania (Wilhelmsson 2008) (Figure 1). The bones were noticed during digging to lay cables at the edge of a kettle hole. There were four extremity bones, probably from a young individual. Cut marks were noticed on one bone. A radiocarbon dating has given a value in the
late Preboreal (Table 1). A worked flint was registered near the find. Here we have two finds of precisely the bones that are absent from the Danish finds. In both cases there are slaughtering marks but no traces of any continued use of these bones.

As for the finds from Lundby, Skottemark and Favbro, different suggestions have been put forward to explain these accumulations of bones. Møhl is clear in his perception of these as the result of activities with a ritual element, an interpretation that is not supported by all who have examined the finds from Lundby (Møhl 1978; Møller Hansen et al. 2004).

The best way to preserve raw material such as metapodials for future use would have been to place them in water so that they would not dry out and crack. This would support a purely rational reason for depositing these finds for future use. Corresponding accumulations of metapodials also occur later in the Mesolithic (Larsson 1983). It should be borne in mind, however, that there need not always be a distinction between function and ritual in hunter-gatherer societies (Ingold 2000). Depictions of elks from this time show that this quarry had a special position in people’s conceptions (Kabacinski et al. 2011). Deposits of metapodials are in themselves a consequence of the more widespread deposits of elk bones. As we see from the radiometric datings, deposits of elk bones occur throughout the Preboreal.

Table 1. Dates of elk bone deposits.

<table>
<thead>
<tr>
<th>site</th>
<th>lab. no.</th>
<th>date</th>
</tr>
</thead>
<tbody>
<tr>
<td>Lundby 2</td>
<td>AAR-5469</td>
<td>9,950 ± 75</td>
</tr>
<tr>
<td>Lundby 1</td>
<td>AAR-5470</td>
<td>9,930 ± 70</td>
</tr>
<tr>
<td>Lundby 3</td>
<td>AAR-5471</td>
<td>9,860 ± 70</td>
</tr>
<tr>
<td>Skottemark</td>
<td>K-2075</td>
<td>9,400 ± 140</td>
</tr>
<tr>
<td>Ringsjöholm</td>
<td>LuS 10784</td>
<td>9,145 ± 40</td>
</tr>
<tr>
<td>Ringsjöholm</td>
<td>LuS 10785</td>
<td>9,110 ± 35</td>
</tr>
<tr>
<td>Ostra Grevie</td>
<td>LuS 7733</td>
<td>9,035 ± 55</td>
</tr>
</tbody>
</table>

Elk antler mattock head adzes

There is considerable uncertainty about the form taken by Southern Scandinavian settlements in the early Preboreal. With the exception of Lundby, there is no find location dated to this period. Based on typology, some find sites with artifacts belonging to the Ahrensburg culture have been interpreted as belonging to the Preboreal (Johansen and Stapert 1999). The Årup site in Northeastern Scania (Nilsson and Hanlon 2006), with flint material including indications of opposed-platform single-faced cores as well as early Mesolithic types of microliths, has been regarded, for the same reason, as belonging to a stage of the epi-Ahrensburgian (Brinch Petersen 2009).

The suggestion that Lundby belonged to the Maglemose culture is based on the fact that the elk antler mattock head adze found in Lundby later occurs in distinct
complexes dated to the Maglemose culture (Møller Hansen and Buck Pedersen 2006). But this argument can hardly be considered certain.

The finds from Lundby really challenge the definition of the Maglemose culture (Møller Hansen et al. 2004; Møller Hansen and Buck Pedersen 2006). The elk antler mattock head adze is well known from early Mesolithic sites such as Star Carr (Clark 1954) and Friesack (Pratsch 1995). In Scandinavia it is known from a number of stray finds (Andersen 1976, 1977). In Friesack the type appears in the middle and late Preboreal layers (Pratsch 1995).

That the Preboreal is the time of existence of this axe type in Southern Sweden is indicated by the dates of three examples from Southernmost Sweden. They are all bog finds. Two are found in adjacent parishes, Västra Nöbbelöv (Mossby) and Sjörup (Salomonsson 1962) (Figure 3). They are dated to the Preboreal (Table 2). That the axe type existed throughout a longer time is indicated by a date from a find in Harlösa, in central Scania, Southern Sweden. This find has been dated by pollen analysis to an early part of the Preboreal (Tillander 1962). In the close vicinity of the find, flint artifacts similar to those from the Bromme culture were found (Salomonsson 1962). However, a sample from the mattock head adze provided Preboreal date (Table 2). It may be added that this form of adze also occurs in other parts of Continental Europe. A find from Paderborn-Sande, Germany, has been dated to the Preboreal/Boreal transition (Stapel et al. 2012) (Table 2).

The relationship between sea and land in the Preboreal was significantly different from that of today. Considerable parts of the Southern Baltic consisted of land, which must have facilitated close contacts for both humans and fauna with northern Continental Europe. This also means that the coastal settlements are now at the bottom of the sea. Settlement must have been intensive, as we see from the many settlement site finds from the west coast of Sweden, where eustatic uplift raised them high above the present shoreline (Kindgren 1996). Two of the dated mattock head adzes, from Mossby and Sjörup, were found close to the present coast, which probably means that they were used by people who lived in the coastal zone as it was then.

Even if the type appears in an early Mesolithic context, it could very well have been invented in an otherwise Late Paleolithic assemblage. As long as the organic material from the Preboreal is very scanty we do not really know what is typical of a Late Paleolithic origin or a new Early Mesolithic innovation.

Elk mattock heads adzes seem to disappear in Southern Scandinavia at the transition to the Boreal chronozone. It is highly likely, however, that the form continued to be used in other parts of Scandinavia. Some support for this assumption comes from finds in Norway and the Swedish part of Southern Norrland where this form of adze is documented (Mikkelsen and Høeg 1977). A find from Singsån in Jämtland has been dated to 6,720 ± 85 BP (5,756–5,484 cal BC) (LuA 5693). This indicates that it was a form of tool that belonged to the Late Mesolithic material culture in this area. An explanation for the lack of finds during significant spans of time may be that the majority of Mesolithic settlement sites in Central and Northern Sweden have no organic material preserved. On the other hand, similar adze forms of elk antler also occur in the Neolithic in Central Sweden (Salomonsson 1962).
Leister points

Metapodials of elk were good raw material for making leister points. For several years archeological surveys have been conducted during peat cutting in Rönneholms Mosse in central Scania, Southernmost Sweden. Apart from settlement site remains (Larsson and Sjöström 2011), a considerable number of leister prongs have been found.
Figure 4: The calibrated radiocarbon dates.
found. When people used leisters the points stuck in the mud at the bottom, and the entire leister or the points broke off and stayed there. Through a large dating effort it has been shown that a couple of these belong to the Preboreal. Yet another stray find at Slabälta from the adjacent bog of Ageröds Mosse has been dated to the same period (Table 3). These leister prongs have small barbs cut into them or have one edge denticulated (Figure 5). They are very similar to two leister points from Skottemark and yet another Danish find also dated to the Preboreal (Fischer 1996, Figure 3, 2011, Figure 3b) (Table 3). They correspond well in form to finds in northern Continental Europe (Cziesla 2004; Gramsch 2011). This form, which has been viewed as a typical tool from the Maglemose Culture, can be traced far back into late glacial times (Cziesla 2004).

The find circumstances indicate that leister prongs were used for fishing.

Final comments

The elk antler mattock head from Lundby really challenges the definition of the Maglemose. Even if the type appears in an early Holocene context, it could very well have been invented in an otherwise Late Paleolithic assemblage. As long as the organic material from the Preboreal is very scanty we do not really know what is typical Late Paleolithic or Early Mesolithic.

Due to influences from the south, new inventions in lithic technology were introduced. The so-called epi-Ahrensburgian sites and the long-blade tradition in the continental south are examples of this change that started during an early but not the earliest part of the Preboreal (Johansen and Stapert 2000; Sørensen and Sternke 2004; Terberger 2004). In the middle part of the Preboreal the change shaped a lithic material culture as well as a mixture of bone and antler tools that we regard as typical Maglemose culture. During the early Preboreal hunting included the main herding animals such as reindeer and horse, with the addition of more localized species such as elk. We do not have to expect a radical change of new groups but more of an input of new ideas based upon a flow of contacts.

Résumé

Le Préboréal est une période qui est encore relativement mal connue du point de vue de ses cultures archéologiques. A la transition entre Pléistocène et Holocène, il existe des découvertes du nord de l’Allemagne qui indiquent la présence d’une culture du Paléolithique final (Ahrensbourgien) clairement orientée sur la chasse du Renne. Cependant, durant la même phase, il existe des découvertes danoises, d’attribution culturelle incertaine, qui indiquent l’existence de groupes dont la chasse est orientée sur l’Elan. Les premières traces claires de la culture maglemoisienne n’apparaissent pas avant le milieu du Préboréal. Les découvertes datées suggèrent que le Renne a toujours existé dans cette chronozone et fut contemporain d’autres gibiers comme le Cheval ou l’Elan. Les restes d’Elan identifiés se présentent sous la forme des dépôts de parties anatomiques du corps de l’animal ce qui diffère des manières plus tardives de traiter le gibier. Cela fut interprété comme de possibles activités rituelles. La découverte de deux métapodes à
Skåne correspond peut-être au même genre de dépôt. La présence de pointes barbelées (Leister points) et de têtes de pioche en bois d’Elan a également été observée. Ces dernières sont particulièrement caractéristiques du Maglemoisien ancien. Les pointes barbelées (Leister points) remontent, elles, au Paléolithique final tandis que la période d’apparition des têtes de pioche en bois d’Elan est encore incertaine.

Zusammenfassung


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