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Innehåll

The postglacial colonization of humans, fauna and plants in northern Sweden

Helena Knutsson & Kjel Knutsson

English summary

This paper contains a re-evaluation of the pioneer settlement of Scandinavia following the melting of the Weichselian ice sheet during the late Glacial/Preboreal. The preliminary results of the Swedish part of an inter-Nordic research project are presented, focusing on analyses of blade assemblages from Central Sweden that, previously, had only been tentatively discussed. A preliminary comparative analysis shows that the material has similarities to Middle Mesolithic blade assemblages from southern Norway and western Sweden and thus represents the first pioneers settling this area during the Preboreal and early Boreal. A suture zone between a southern immigration route, characterised by sites with the blade assemblage described, and a northern route, characterised by flaked quartz assemblages, is identified in northern Härjedalen. This zone coincides with the suture zone between a northern and a southern late glacial animal and plant migration route identified through DNA analyses. It is thus hypothesised that human migrants, meeting the same obstacles and opportunities as animals and plants, established themselves according to the same spatial and temporal logic. This suture zone can be identified through several millennia and seems to have controlled some of the human networks for long periods in the region. It is concluded that these age-old network patterns with persistent "suture zones" hold potential for archaeology to contribute to a general theory of culture, based on the unique qualities of the archaeological record, namely research into distant times.

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Introduction

The research presented in this paper is part of a larger research programme within the inter-Nordic research group, the Nordic Blade Technology Network (NBTN), aiming at a re-evaluation of the pioneer settlement of Scandinavia following the melting of the Weichselian ice sheet during the late Glacial/Preboreal. One focus pertinent to this paper is the reconstruction of the establishment of settlements through an

analysis of the intruding groups to a new natural and subsequently social environment. This human/nature and human/human ecology will, among other things, be discussed in terms of descent, expansion and adaptation as a result of this ecology. Complex cultural practices with a need for large amounts of knowhow transmitted between generations and thus of long periods of learning, is especially valuable within this research focus (Apel 2001). These cultural changes are sensitive to changes in raw material availability and the confrontation with "other" cultural traditions. The macroblade technology characteristic of the lithic assemblages related to the first settlers of northern and southern Scandinavia (Madsen 1986; 2006; Rankama & Kankaanpää 2008; 2007; Blankholm 2008; Larsson 1996; Knutsson H 2004), has these qualities and has thus been made the focus of the Nordic Blade Technology Network project.

In Finland the traces of these first settlers and their technology have been known for some time (Matiskainen 1989) but just recently the first substantial settlement material with the whole production process of macroblades (Rankama & Kankanpää 2008) has been excavated. The character of the earliest settlement of western Scandinavia, western Sweden (Kindgren 1996; Nordqvist 2000) and Norway (Larsson 1996) is well known since the early twentieth century, but in recent years large scale excavations relating to development projects in southern Norway (Jaksland 2008; Bjerck *et al.* 2008) have produced a series of well defined lithic assemblages from the Late Glacial/Preboreal transition period including blades and debitage from blade making. A recently excavated Preboreal site with evidence of the production of macroblades in Troms (Blankholm 2008), has given new substance to the northernmost context with early blade making. In southernmost Scandinavia the work of Bo Madsen and later Mikkel Sörensen has described in detail the blade making of the pioneers in that region (Madsen 1986; Sörensen 2006).

The melting of the Weichselian ice, however, opened up new land not only to humans but also to animals and plants (Engelmark & Buckland 2003). Although overly deterministic models of human human/nature relationships have been rightly criticised over the past decades, the human pioneers in this new landscape somehow had to relate to the colonization of plants and animals. It is therefore important for archaeologists to discuss the geography of this process. One avenue is

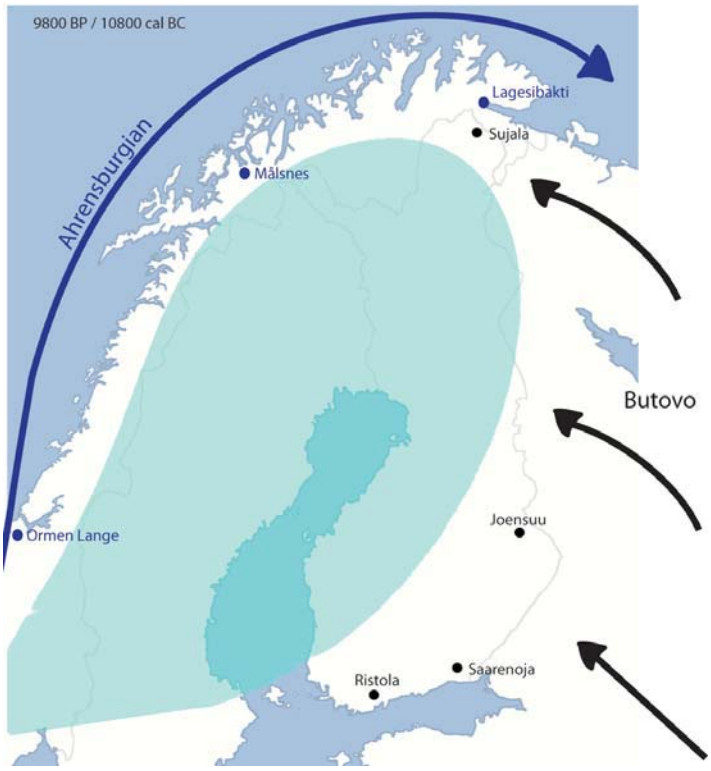

Fig. 1. Map with examples of excavated Stone Age sites belonging to the pioneer settlement of western and eastern Fennoscandia during the Preboreal period. Two migration routes are visible, a western belonging to the Post-Ahrensburg lithic tradition, an eastern belonging to the Butovo lithic tradition.

related to recent progress within genetic research. By analyzing the DNA profile of different taxa, microbiologists have been able to elucidate general trends of these taxa moving over Europe and Scandinavia at the end of the last glaciation (Taberlet *et al.* 1998). They have been able to describe the most likely colonization routes and above all, the identification of suture zones where taxa lineages met (Fig. 9). In this short paper we will discuss the preliminary results of our ongoing

investigation of the history of human colonization where new materials are introduced into the debate, and then attempt to illustrate how the human process can be analyzed in relation to the animal and plant colonization.

As it stands now, there seems to be a western and an eastern human route into Scandinavia relating to the Ahrensburg lithic tradition in the west and the Butovo type material in the east (Fig. 1), all dated to the Preboreal period (from *c.* 11 000 cal BP) when the last part of the ice still covered all of northern Sweden. It is in this area north of the river Dalälven, still covered by ice in the Preboreal, that the material discussed in this paper has been found. Our part of the work within the larger scope of the Nordic Blade Technology Network is to contribute to a discussion on the possible migrants into this area, the last one freed from ice during the course of the Pre-boreal and early Boreal period.

In the early 1990s the late Mesolithic handle core tradition was still seen as representing the pioneer settlers in Norrland, but contemporary work at that time by Lars Forsberg from Umeå University and Kjel Knutsson from Uppsala University could clearly show that there was a 1500-year long period of settlement before that, basically of an unknown character (Knutsson 1993; Forsberg 1996; Knutsson & Forsberg 1998).

The Late Mesolithic handle core tradition of Norrland is comparably well defined with dated sites belonging to the period 6500– 4200 cal BC, the sites being identified by debitage and cores of the handle core tradition (Knutsson 1993; Olofsson 1995; Forsberg 1996; Guinard & Groop 2007; Manninen & Knutsson 2010).This type of lithic tradition for the production of microblades is wide-spread in Scandinavia, covering an area from northern Germany to northern Swedish Lapland. Since the sites cover this vast area it has been of interest to understand if they represent a contemporaneous change of material culture within a hunter/gatherer network as suggested by Kjel Knutsson (2004). The chronological situation in southern Sweden is well defined; the dated sites north of the river Dalälven are few but fall well within the period as defined by radiocarbon dates further south (Olofsson 1995; Guinard & Groop 2007).

In 2005 the Department of Archaeology at Uppsala university launched a survey and excavation program (the fieldwork was part of the umbrella project: Archaeological Perspectives on Cultural Analysis –

Material Culture and the Transmission of Knowledge, now also part of the inter-Nordic research group Nordic Blade Technology Network), in order to get a grip on the chronology of the whole Mesolithic sequence in southern Norrland. The research area was restricted to southern Norrland and northern Svealand with a focused field research area around the municipality Torsåker in North-western Gästrikland (Fig. 8). The Torsåker area was selected because within a reasonably small area it covers a shoreline displacement process from the highest coastline at c. 200 m.a.s.l. down to middle Neolithic levels. Another important aspect is the fact that for a number of years the quaternary geologist Michael Berglund from Mitthögskolan has been working in the area constructing a modern and well-dated local shore line displacement curve (Berglund 2005; 2010). The collaboration with the local amateur archaeology group in Torsåker, Kråknäsjärnet, has also been important for our work. They have helped us with the surveys and logistics, as well as excavations.

To date we have identified several formerly shore-bound sites from c. 110 m.a.s.l. down to Neolithic levels. The project has, mainly through students' fieldwork training, excavated six sites covering the whole Late Mesolithic from 107 m.a.s.l. down to c. 60 m.a.s.l. (*c.* 8700 cal yrs BP – *c.* 6500 cal yrs BP). A PhD project launched in August 2010 by Michel Guinard at the Department of Archaeology at Uppsala University will use this material in an investigation of hunter/gatherer networks in Norrland during the Middle and Late Mesolithic. All the sites are dominated by a lithic assemblage characterized by a microblade industry based on handle cores in quartz or tuffite.

The project now concentrates its efforts on the higher elevations of the landscape in the western part of our research area, an archipelago in the former late Preboreal/Boreal Ancylus Lake. The surveys have just started but in October 2010 one of our local amateur archaeologists, Detlef Klamke, discovered a site in what must have been a sandy bay in the Ancylus Lake. Probing the site he found a blade core at *c.* 155 m.a.s.l. (Fig. 4). If the site was situated on the shore at that time, the blade core can be dated to the Preboreal period, approximately 10300 cal BP. As we will see, the preliminary dating of this blade core corresponds well with the general impression we have of the archaeological source material during our work on the few excavated sites in our research area in southern Norrland, and above all the huge stray find collection in Dalar-

Fig. 2. Map of excavated Stone Age sites with dates covering the last part of the Early Mesolithic and the Middle Mesolithic in Sweden north of river Dalälven. The sites thus represent the pioneer settlement of Norrland.

nas museum. This takes us over to a discussion of what possibly came before the handle core tradition in Norrland, the enigmatic pioneer period discovered by Lars Forsberg and Kjel Knutsson in the early 1990s.

Today the earliest prehistory of Sweden north of the river Dalälven is still represented by scanty material and thus, compared to most other areas of Scandinavia, little known. This can be explained by the few excavations carried out in the region due to sparse present-day settlement and therefore lack of large-scale development projects. Excavations in connection with the construction of hydroelectric power plants in the period 1940s–1980s (Baudou 1995; Biörnstad 2006), however, resulted in the discovery and excavation of hundreds of Stone Age sites along the major rivers in the northernmost part of Sweden. Here the settlement history has been reasonably well covered (Christiansson 1974; Baudou 1977; 1995; Forsberg 1996; Knutsson *et al.* 2003), but in recent years research projects (Bergman *et al.* 2003; 2004; Olofsson 2003) and surveys in connection with different development projects (Östlund 2007; Hedman 2009) has resulted in new finds that have changed the picture considerably. The first settlers in the north seem to have followed close to the melting ice margin in a southerly movement from the north (Olofsson 2003, Hedman 2009). The sites are ephemeral but most of them contain a refuse fauna dominated by reindeer. The lithic technology related to these early sites is seemingly very simple, mainly characterized by flaked quartz.

We thus have evidence for pioneers north of the ice as early as in the Preboreal period. To the south of the melting Weichselian ice only one excavated site dated to this earliest pioneering period has been discovered and partly excavated, and this as late as 2009 (Lindberg 2010). From the Orsandbaden site situated at 177 m.a.s.l. close to the large inland lake Siljan in Dalarna, a burnt bone gave the date 9089±207 BP, placing the site in the late Preboreal when the Weichselian ice front stood only 200 km to the north. This site from the pioneering phase has only been test excavated but fragments of a macroblade industry in the assemblage is of special interest to us in our project because of the above-mentioned blade core found in Torsåker.

Early, or possibly early, macroblade industries have actually been found on a few other excavated sites in the region (Fig. 2) (Apel *et al.* 1996; Björck *et al.* 2001; Melander 1981; Östberg 1972): On the Gårdsjösundet site in Hälsingland, southern Norrland, macroblades in tuff were related to several ^{14}C-dated hazelnut shells and a piece of tar (8060±65 BP; 7850±90 BP; 7760±75 BP; 7705±90 BP; 7685±90 BP

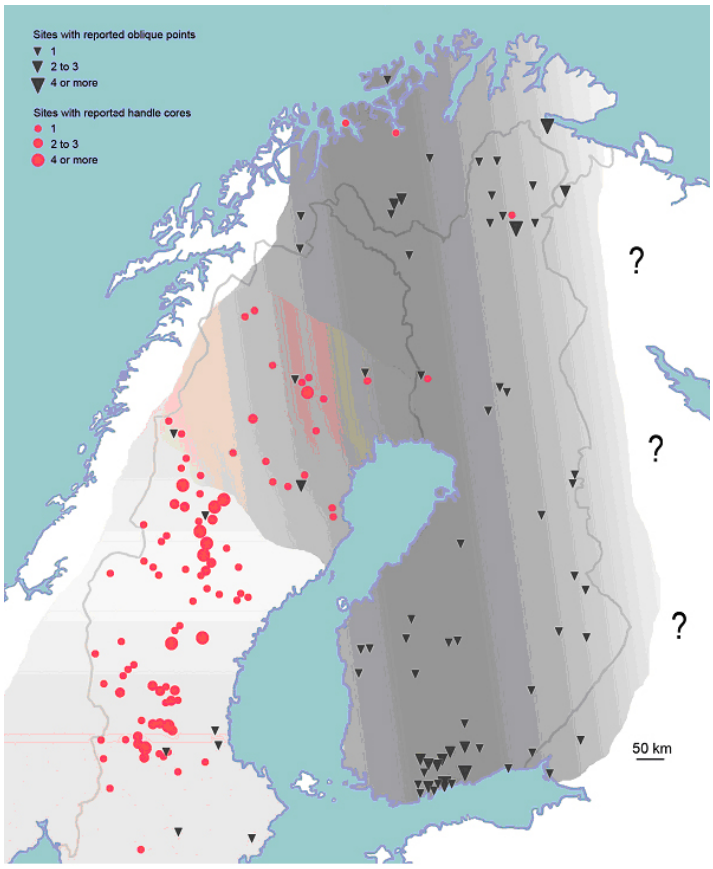

Fig. 3. Map of Stone Age sites belonging to the Late Mesolithic handle core tradition in Sweden north of the River Dalälven. On the same map the distribution is shown of a contemporaneous industry in Northern Norway, Finland and western Russia, the oblique point tradition (after Manninen & Knutsson 2010, fig 11).

and 7660±80 BP). At Högland in Dorotea parish in central Norrland, a possible quartzite blade industry close to a cooking pit was dated by charcoal from the pit to 7715±115 BP. Other macroblade material in quartzite that has not been dated has been found at Övre Särvsjön in Hede parish in Härjedalen. At Limsjön, excavated in 1982, where a few

Fig. 4. A blade core made of quartz found by Detlef Klamke 155 m.a.s.l. in our research area in Torsåker, NV Gästrikland, autumn 2010. The core indicates a possible settlement site formerly located in a small sandy bay on a larger island in an archipelago of the Ancylus lake in the late Preboreal.

macroblades were found in an environment with a microblade industry, a charcoal sample could be dated to 7660±85 BP. On the Laforsen site in northern Hälsingland a burnt elk bone, among other things related to macroblades in porphyry, was dated to 7200 cal BP. The Valhalla site in Gästrikland (Apel *et al.* 1996) and three sites at Lake Tisjön in Dalarna, have not been dated so far. This scanty evidence points to a possible middle Mesolithic industry in this region characterized by a macroblade industry. A blade core close to the Tisjön material dated to *c.* 7900 cal BP at Ålbusetra (Gustafson 1986) can be discussed in this connection, but we will return to the Norwegian materials when we have made a first comparison with the surrounding industries.

There is evidence, although it is scanty, of an early settlement in the northern part of Norrland characterized by a simple quartz industry and a refuse fauna dominated by reindeer bones. This seems to persist until *c.* 7000 cal BC when the microblade technology based on handle cores discussed earlier was introduced in the whole area.

In the southern part of our area of investigation, our hypothesis, although still weakly supported at this stage, is that people with a macroblade industry settled as soon as the ice retreated in the late Preboreal. Investigation within our project at Torsåker in Gästrikland shows that this early tradition is replaced by the handle core tradition around 7200 cal BC (Knutsson *et al.* 2010; Guinard 2007). The fossil

fauna of this early settlement in the south is scanty and gives no clues as to the human/nature relationship at that time (Liljegren & Lagerås 1993).

Our ongoing investigation of a huge stray find collection, "The Lannerbro collection", from three main river systems in the southern part of our area of investigation – actually covering a large part of the assumed early macro blade area – shows that the early macroblade sites are hidden in the palimpsest of material from the sites. This material thus contains a large variety of debitage, cores and tools of different raw materials, among them traces of a macroblade industry. Leaving aside the bifacial material as well as all the polished slate tools that surely belong to the later prehistory of this area (Baudou 1995), we will continue this paper with a short presentation of the blade and blade core assemblage that we think may have relevance to the focus of our larger project, and more specifically to this paper, the pioneering settlement of this part of Scandinavia and its possible relation to the introduction of animal and plant species. Our idea is that the opportunities and obstacles important for the establishment of plants and animals during colonization of this huge area as the ice withdrew, must have been basically the same for human populations entering the area.

It must be noted here that similar bladelike pieces have been discovered north of the surveyed area covered by Lannerbro as far up as to southern Lapland (Knutsson *et al.* 2003). A reanalysis of this material within this project during 2009/2010 has, however, shown that all of this material is an occasional by-product from bifacial flaking of Bronze Age character. The blade traditions we are discussing in this paper thus seem to be restricted to a southern part of our research area with its northern limit in southern Härjedalen. The enigmatic pioneer settlement predicted by Knutsson and Forsberg in the early nineties thus seems to be represented by two very different material traditions and networks of cultural transmission.

General description of the macro blade material

The analysis of 40 000 pieces of flakes, cores and different artefacts in the material from the Lannerbro collection show a bewildering variety of debitage. As they are the most easily identified, bifacial points and

Fig. 5. Examples of blade cores in variable materials identified in the Lannerbro collection in the Dalarnas museum. These types of cores with prepared platforms are most likely of Preboreal/Boreal Age.

flakes made by bifacial reduction seem to dominate the material. This is, however, typical for Stone Age sites in Northern Sweden in general since this type of tool production results in large amounts of debitage (see Callahan 1979; Forsberg 1986; Apel 2001) and thus has strong visibility. But in the material we have also discovered something that concerns us in the pioneer project: three, possibly four, different types of blade cores and debitage related to them.

One type of macro blade core is characterized by prepared platforms and blade removals ideally covering ¾ of the core circumference (Fig. 5).

Fig. 6. A typical blade core with a flat platform, several which are fund in the Lannerbro collection. The dating of this type of technology is not known at present. From Myckelsjön, Mora parish, raä 385. Dalarnas Museum 18607:3030.

These cores always have a ”backside” without signs of blade removals and may thus be called ”one-sided”. In the material there are both preforms and possibly exhausted cores of this type. A second type of core, or perhaps a variety of the former, is present as three or four blade cores with prepared platforms but with extremely regular blade removals indicating a pressure technique (Fig. 5, upper row, second core from the right). The third type of core resembles the two first mentioned cores but is ”smaller” and has signs of very regular but narrow blade removals, most probably released by a pressure technique as well (Fig. 5, lower row). The latter type actually relates to similar microblade cores and in the literature is defined as a conical microblade core. We will discuss these relationships further on in the text.

A fourth type of blade core is characterized by a flat platform and traces of broad and irregular blade removals all around the circumference probably released by direct percussion. In the material we have examples of cores in an early stage of reduction as well as totally exhausted pieces

Fig. 7. A sample of blades and blade fragments from one of the sites in the Lannerbro collection in the Dalarnas museum.

with a large bump on the apex, created as fractures of blade removals stopped half way down the core front (Fig. 6).

In the Lannerbro collection a large number of whole and fragmented blades in variable raw materials have been located as well (Fig. 7). Blades are notoriously difficult to define; you always stand the risk of being trapped by the formal (metric) qualities traditionally used to define them (*i.e.* Malmer 1962). As was discussed shortly above, the blade assemblages (defined on formal criteria) from an area north of southern Härjedalen previously thought be part of the general blade making tradition in southern part of our research area (Knutsson *et al.* 2003) could be shown by a renewed analysis in the framework of this project to be occasional by-products from bifacial flaking. At the moment we are still working on the detailed analysis of well over 200 blades and blade fragments in the collection, but our preliminary observations indicate the presence of several blade-making strategies well in line with the observed blade cores. There is evidence of blades with both flat and prepared platforms, blades showing a geometry indicating that they were produced with different techniques such as direct, indirect and pressure.

The conclusion at this point is that blades from different core treatment practices are present in our research area. This will help in

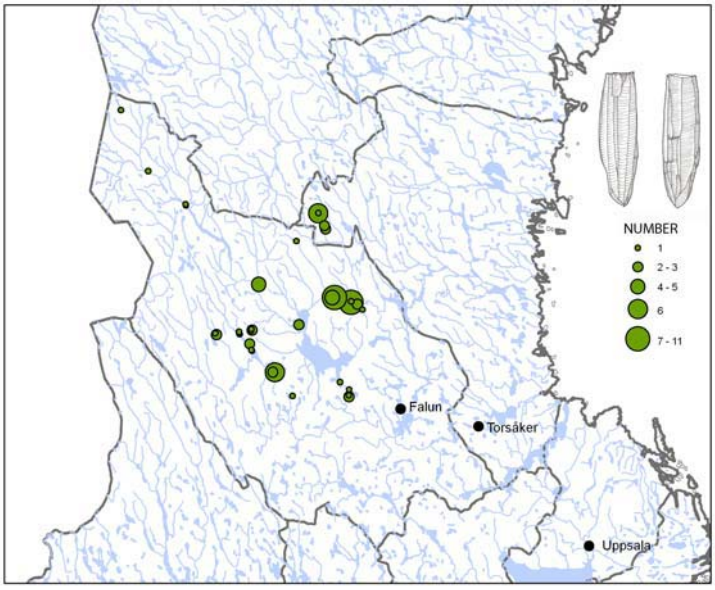

Fig. 8a. Map showing the distribution of sites with macroblade cores of a possibly Middle Mesolithic macroblade technology in the Lannerbro collection, Dalarna county museum.

separating between sites of different types and perhaps date. At the moment we do not know if the differences between core treatment practices are of cultural, functional or chronological significance. No doubt more detailed blade stigmata related to variations in method and technique will help us to be more specific. Since this is one of our future research topics in connection with planned experiments within our research network (NBTN), at this stage we will only comment shortly on this question at the end of our paper.

The important result of our analysis for this paper is, besides the details of the production process, that the spatial distribution of sites with blade cores, blades and core tablets (Fig. 8 a-b) covers an area from central Sweden north of the river Dalälven up to southernmost Härjedalen in southern Norrland. It thus falls well within the last stages of ice front retreat in the early Holocene, and the assumed territory of the macroblade group based on the few known excavated sites discussed

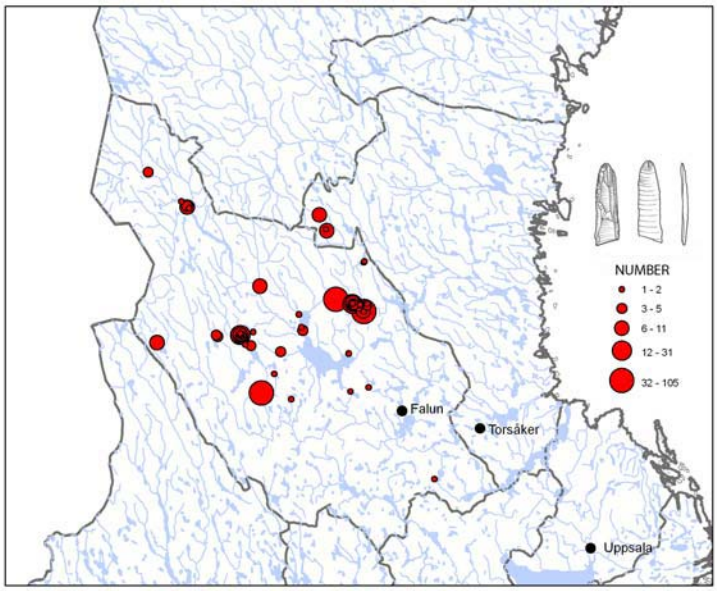

Fig. 8b. Map showing the distribution of sites with macroblades of a possibly Middle Mesolithic macroblade technology in the Lannerbro collection, Dalarna county museum.

earlier in this paper. Even though the data is scanty, a preliminary hypothesis of postglacial settlement in Norrland can be presented.

As the ice withdrew human groups entered the successively opened landscape. Hunter/gatherer groups in the north moved south; at least during the early stages of settlement they hunted reindeer. In the southern part of Norrland, the land freed from ice, was settled from the south. The two groups acted within totally different networks for the transmission of cultural knowledge, characterized by very different technological practices. A zone where the two groups must have met can be identified somewhere in south/central present-day Härjedalen (Fig. 4). Without going deeper into the details of cultural dynamics along a border zone between social groups at this stage, this discovery has some importance for the discussion of the relationship between humans, animals and plants. Biologists speak of suture-zones, where taxa lineages meet and create opportunities for hybridization. Cultural

reproduction can of course not be compared to the sexual reproduction of biological systems, but at this pioneering stage of settlement the comparison in distribution of these two systems may be valid. But before we end our paper comparing human, animal and plant colonization of the area, a short discussion of the possible origins of the two identified cultural networks may be appropriate.

A preliminary comparison with surrounding blade industries

As discussed above, our present understanding of the process of the settling of Fennoscandia at the end of the Pleistocene points to two large movements of groups of hunter/gatherers in this area at this time. One western route of assumed Ahrensburgian origins settled the western and northern part of mainly the coastal areas of Fennoscandia, and one eastern route of Butovo type origin moved into present day Finland from the east in the Preboreal period (Fig. 1). The present understanding further says that these two historically separated groups met at one stage in the northernmost part of the area, also a kind of suture zone (Riede 2007 Fig. V. 10). As this happened, the ice still covered most of Sweden from the river Dalälven to northern Lapland. It is the last process of settling in land freed from ice that we have taken as our special research topic.

There have been previous attempts that already started in the late 19th century to understand the early Mesolithic in this area as a process of an early migration (Forsberg 2008:87ff; Ojala 2009), and possible connections to surrounding areas have been sketched (Falkenström 1996; Lindberg 1998; Knutsson *et al.* 2003; Forsberg 2008; Falkenström & Lindberg in press). No attempt has been made so far, however, to relate the material to an eastern tradition, *i.e.* the north Finnish Butovo type material (Rankama & Kankanpää 2008). So far most information in our assemblage points in a western direction, even though some of the core types in Dalarna are almost identical to the newly discovered Finnish types.

Without going into any greater detail at this stage, we will refer to three studies (the northeastern connection left as it stands now with the hypothesis by Olofsson (2003) that the groups moving from the north belong to the early Suomusjärvi tradition) of blade technologies in

Norway and western Sweden (Ballin 1999; Bjerck 1986; Nordquist 2000).

The presence of "conical narrow blade cores" is established in the Sandarna sequence on the Swedish west coast (Nordqvist 2000:164) and dated between 9000–7600 BP. These cores are unifacial according to Nordqvist: "detachments have only been removed from one face". It is not stated whether they have prepared platforms, but from illustrations (Nordqvist 2000: Figs. 152-153), the platforms are not faceted but are constructed by several flakes. It is not stated that there are specialized microblade cores in this period, and thus whether or not there are only "narrow blade cores". The illustrations seem to indicate, however, that the "blade cores" are down to a 30 mm flaking front and width of blade detachments well below 10 mm.

In western Norway Hein Bjerck's discussion of blade production in the Mesolithic defines the early microblade tradition represented in this research area by sites submerged by the Tapes transgression between 9000–7000 BP. Here: "multifacial blade cores with extremely even blades" are typical. They have circular to semi-circular striking edges (assumable platform edges) and with flaking angles close to 90 degrees (Bjerck 1986: 109f). He further states that: "Unifacial macroblade cores and abundant; extremely even macroblades appear to be exclusive for the Early Microblade Tradition" (Bjerck 1986:110). According to the tables in Figure 4, the sites of the Early Microblade Tradition also contain microblades and microblade cores of the multifacial type. It is not stated explicitly but the changes in core treatment practices in the Early Microblade Tradition involve the introduction of faceting of the core platform.

Ballin's (1999a-b) treatment of the south Norwegian Mesolithic chronology also contains descriptions of blade and microblade core treatment practices (Ballin 1999b:274 ff). According his analysis of sites in southern and western Norway with surrounding areas in Denmark and Sweden, the Middle Mesolithic, corresponding to the Sandarna period in western Sweden and the Early Microblade Tradition in central Norway, there are both blade and microblade cores. They are of the conical type and the presence of ridged blades, platform preparation flakes and core preparation flakes in the studied assemblages (Ballin 1999b: 274) shows that the cores had faceted platforms and a prepared core technology in general. There is a general tendency over time of

blades getting smaller and at the same time a change in flaking angle mean from 77 degrees in MM A to 82 degrees in MM B (Ballin 1999b: 276). Ballin also evaluates blade regularity and sees, as did Bjerck, that the blades became more regular and smaller over time. A characteristic of the blade production in this period is platform preparation through trimming and grinding.

Although the analyses and descriptions of blade traditions and core treatment practices by the three selected publications differ slightly from each other, there are considerable similarities between the Sandarna, Early Mesolithic and Middle Mesolithic epochs. The cores, blades and general core treatment practices are, if not identical, very similar. The regular blades, the flaking angles, prepared platforms, one-sided organisation of blade detachments and control of core geometry speak a similar language. The variation in blade regularity that has meaning in terms of a process from coarser to more regular blades throughout the Middle Mesolithic, may thus very well represent a timeline in our mixed material from Dalarna.

The spatial distribution and archaeological content of the earliest sites in Sweden north of the river Dalälven discussed in the first part of our paper, indicate a territorial structure formed by the speed and spatial distribution of the melting ice (Knutsson 2004). We now have stronger evidence for our initial hypothesis, that pioneers coming from the north (quartz assemblages, reindeer and later elk bones) and pioneers from the south, met somewhere in present day Härjedalen. The northern extension of the blade complex representing the northern limit of the southern expansion of groups, most probably was related to the movement of Early Middle Mesolithic groups in South-eastern or western present day Norway (*cf. F*orsberg 1996). So far everything speaks in favour of this: the blade assemblages in central Sweden date from the early Middle Mesolithic age and are the traces of the first settlers in this area.

The next necessary step is now to analyze in more detail the original materials from Norway and western Sweden and to carry out experimental simulations of the core treatment practices discussed. We will then stand a good chance of a detailed and efficient analysis of the process whereby the last European pioneers established themselves in present day northern Europe and more specifically, for our project, in

northern Sweden, and thus set the stage for a discussion of the consequences of this large scale socio/cultural structure. But already at this stage we can present a hypothesis on human/nature relationships with some substance. We will therefore now turn to the testimony of genetics, more specifically the variety in present-day animal and plant populations possibly related to the pioneer colonization phase.

Discussion

As we still are searching for the details of the pioneer period in Norrland, the following discussion will necessarily be preliminary. We mentioned at the outset that through the investigations of the DNA profile of different present day animal and plant taxa, microbiologists have elucidated the general trends of these taxa moving over Europe and Scandinavia at the end of the last glaciation (Taberlet *et al.* 1998). They have been able to describe the most likely places of origin and thus the colonization routes, and above all the identification of suture zones where different taxa lineages met (Fig. 9). The suture zones are identified as "a band, whether narrow or broad, of geographical overlap between major biotic assemblages, including some pairs of species or semi species which hybridize in the zone" (Remington 1968). According to Taberelet *et al.* (1998:461), the important point is that these hybrid zones are concentrated within limited areas and can be extended to the intra-specific level to characterize areas where different populations met after the postglacial expansion.

In Europe, four major suture zones have been identified by researchers up to 1998. One of those "suture zones" "is located in Scandinavia (Fig. 9), and indicates that this area may have been colonized from both the north and the south by different animal and plant populations originating from different Glacial refugia in southern Europe. By 1998 DNA from four mammalian species had been shown to support this suture zone: shrew mouse (Sw. *näbbmus*), *Sorex araneus* (Fredga & Nawrin 1977), forest vole (Sw. *skogssork*), *Clethrionomys glareolus* (Tegelström 1987), field mouse (Sw. åkersork), *Microtus agrestis* (Jaarola & Tegelström 1995), and brown bear (Sw. brunbjörn), *Ursus arctos* (Taberlet *et al.* 1995). Although not exactly representing species hunted by the human groups entering the area in the Late Glacial, the localization of the suture zone tells us something of the direction, speed and extension

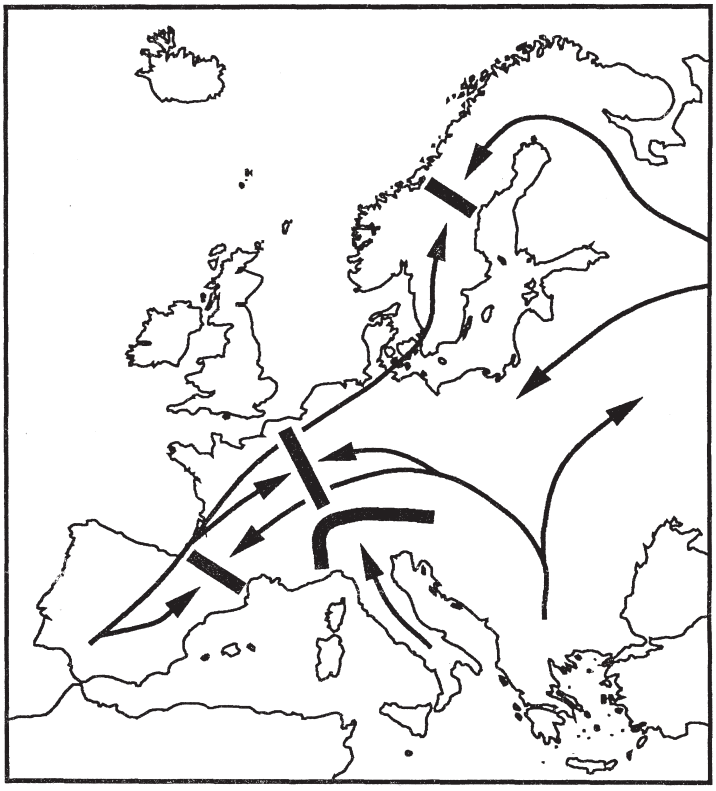

Fig. 9. Map illustrating the main movement of faunal and plant taxa in Europe during the Late Glacial period. The thick, black bands in the map represent suture zones where taxa hybridization has been identified. One of these zones is situated in Härjedalen in southern Norrland (After Taberlet *et al.* 1998, figure 6).

of animal population movements in that time period and may act as a proxy for other species as well, possibly including humans.

If humans followed the melting ice in accord with animal and plant species, the localization of the biologically determined suture zone should coincide with the archaeologically determined suture zone. Comparison of the two maps (Fig. 2 and 9) indicates that this is actually the case. This preliminary analysis seems to indicate that, on a

general scale, in time human groups actually followed the animal (and probably) plant species as they entered the land freed from ice.

If the transmissions of biological inheritance follow the rules of sexual reproduction in hybridization, the rules dictating the hybridization of the "cultural suture zone" have been different. Ethnogenetic processes rather than phylogenetic processes (Collard & Tehrani 2005) acted on the groups meeting in southern Norrland sometime in the early part of the Boreal period. The analyses of these complex processes (compare Riede 2007: Table VII:1) lie in the future within our research project, but we have recently surveyed the structure of the visible change in material culture that followed by focussing on the north and north eastern part of our research area (Manninen & Knutsson in press) (Fig. 3).

It is always problematic to discuss human sociality in terms of spatial structures in archaeology based on the dissemination of tool types apprehended as some sort of cultural markers. For example, this problem was the reason why Ian Hodder launched his ethnoarchaeological work in Africa in the late 1970s. In the research agenda for our project, the *Chane Opératoire* concept has been seen as a possible way of discussing these patterns in relation to spatially delimited areas where a certain type of production and consumption process was transmitted vertically between generations. A complex production sequence such as the blade industry characterizing the pioneers discussed earlier, needs both knowledge of the actual recipes for production and the embodied know-how to execute the production process. Such a network of reproduced lithic tradition horizontally in space, and vertically between generations, is the embodiment of an intra-specific technology and thus a social group.

The next discernible "phase" in the Norrland Mesolithic was the above-mentioned handle core tradition (Knutsson 1993; Olofsson 1995: Forsberg 1996). It covers the period *c.* 6500–4200 cal BC and extends as a practice up to northern Swedish Lapland (Fig. 3). It has a contemporaneous but different network of technological transmission to the north and east, the oblique point tradition. Over a period of several years Kjel Knutsson has attempted to explain this lithic industry in northern Norrland exemplified by the Rastklippan site in the Tärna Mountains (Knutsson 1993; 2004). Today we know that this tradition is dated to the same period as the handle core tradition (Manninen &

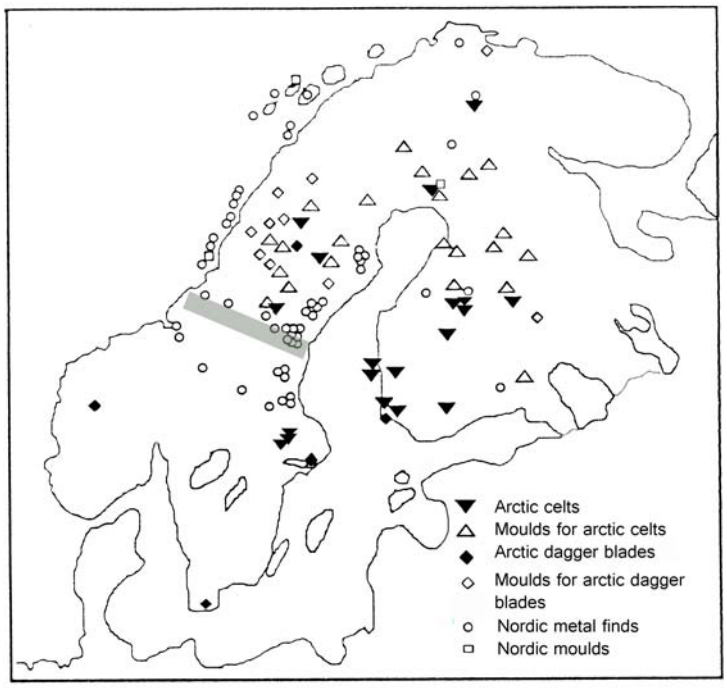

Fig. 10. Map illustrating the spread of Nordic and Arctic Bronze metalwork in Fennoscandia. Note the proposed historically constituted "suture" zone established as the result of the character of the pioneer settlement several thousand years earlier (after Bakka 1976, pl 16).

Knutsson (in press) and that as a specific technological practice it covers most of the North Calotte, Finland and western Russia. In Finland this tradition has been named the Litorina Mesolithic (Matiskainen 1985) or the Late Suomusjärvi culture. So what does this tell us about cultural transmission within the suture zone in Härjedalen hypothesized above?

In a suture zone the different cultural traditions can relate to each other very differently and the concept hybridity is perhaps wrong since it assumes some sort of spatially delimited interaction and thus the

inheritance of cultural traits between groups normally reproducing its cultural traits vertically and phylogenetically. We do not have the full information on the dating of the handle core tradition but assuming that it spread over its area of distribution within a short time through different ethnogenethic processes between groups, that is to say individuals copying each others' practices, exchanging ideas and objects, and marrying one another, the presence of the handle core tradition both north and south of the identified suture zone must be understood, as how microblades should be made beyond the originally established territories of the pioneer groups.

Although we will not now address the future research within the NBTN group, these types of interaction networks represented by indications of knowledge and knowhow transmitted between groups, seem, however, to respect old network boundaries over several millennia. For example, the Bronze Age metalwork showing evidence of two networks within Arctic and Nordic bronzes respectively (Fig. 10)(Bakka 1976: pl 16), have a suture zone seemingly identical to the one hypothesised for the pioneer phase discussed earlier. Although observed and discussed previously by Evert Baudou (1995: 104 ff), this Bronze Age zone is given additional meaning as it can be shown to reproduce the place for a dichotomy between north and south, established several millennia earlier.

These shadows of age-old network patterns with persistent "suture zones" holds a potential for archaeology to contribute to a general theory of culture based on the unique qualities of the archaeological record, its research into the depths of time. By means of two PhD projects and post-doc research the continuation of the NBTN project will look closer into this through a focus on cultural transmission, population dynamics and the history of structures.

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