

ARCHAEOLOGY and ENVIRONMENT 16

PIONEER SETTLEMENT IN  
THE MESOLITHIC OF  
NORTHERN SWEDEN

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**Abstract**

The aim of the thesis is to cast light on the earliest settlement of northern Sweden. The starting point is lithic artifacts, which have been studied from a technological as well as a more conventional typological perspective (Papers I, II, and IV). Paper III deals primarily with geological and palaeoecological methods and my contribution is mainly confined to the lithic artifacts. The main research objectives are concerned with early postglacial colonization and cultural affiliation mirrored through technological traditions. Another "main thread" is a source-critical discussion regarding dating problems, and the chronological integrity of find contexts. The chronological position of artifact types in the North Swedish Mesolithic is another related problem being discussed.

The geographical area under investigation comprises northern Sweden *sensu largo*: Norrland plus the provinces of Värmland and Dalarna. The time period studied is the Mesolithic, with an emphasis on the earliest part, ca. 8500–7500 BP.

Paper I discusses the Mesolithic in the province of Värmland. There are traits indicating both an affiliation with the Lihult/Nøstvet sphere (for example, Lihult axes and saws/knives of sandstone) as well as other features more common in an eastern/northern context (quartz use, bipolar reduction, and, at least for the final Mesolithic and Neolithic, slate artifacts).

Paper II aims at elucidating microblade technology in northern Sweden as regards chronological position and cultural context. It was found that microblade production from handle cores (also called wedge-shaped cores) was introduced at about the same time in northern Sweden as in other areas of Scandinavia where these artifacts occur, ca. 8000–7500 BP. The handle core tradition continued until ca. 5500/5000 BP.

Paper III deals with lake-tilting caused by non-uniform glacio-isostatic uplift. This phenomenon has been used to identify potential areas of Mesolithic occupation in the Arjeplog area, Lapland. Surveys and excavations within the research project *Man, Fire, and Landscape*, have significantly increased the number of Mesolithic sites in the area. The investigations have resulted in the discovery of the oldest firmly dated archaeological site in northern Sweden, Dumpokjauratj, in Arjeplog parish, Lapland, with a maximum date of 8630 ± 85 BP.

Paper IV discusses the pioneering phase of occupation in northern Sweden, in the light of the above-mentioned site of Dumpokjauratj and a site at Garaset in northern Västerbotten. These are further compared with contemporary sites in surrounding areas of Fennoscandia. The majority of the assemblages are dominated by platform reduction, even if bipolar reduction also occurs at the earliest sites. Slate artifacts found at Dumpokjauratj suggest connections with the Finnish Mesolithic, which is the only cultural context in our region with documented slate use at this early point in time. But there are also traits that do not specifically point towards Finland, e.g. frequent use of fine-grained flint-like materials and porphyry, and (at Dumpokjauratj) a lanceolate microlith made of a microblade of this fine-grained igneous rock. The latter suggests associations with the Scandinavian Mesolithic in general.

In any event, the early dates from Dumpokjauratj show that interior Lapland was occupied soon after deglaciation, probably within a few hundred years.

Key words: Mesolithic, pioneer settlement, lithic technology, cultural context, chronology, glacio-isostatic uplift, lake-tilting.

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## PREFACE

The starting point for this thesis was a phone call from Ingela Bergman, at the Silver Museum in Arjeplog. The date was Friday, November 13, 1998. She was looking for a doctoral student for her research project *Man, Fire, and Landscape*, and she asked me if I was interested. I was astonished, to say the least, and a bit flattered too - and of course I accepted. From that day on 13 has been my lucky number. I was working as a museum curator at Värmland's Museum (the County Museum of Värmland) at that time, but my engagement there was going to end on December 31 the same year, so this came in handy. It not only saved my finances, it was a great challenge as well. Ingela made it clear from the very start that this was going to involve a lot of hard work. It sure did, but most of all it has given me many joyful moments, not least during the three seasons that I participated in fieldwork in the Arjeplog area. So before proceeding with all the other "thanks" which is customary in these situations, I would, first of all, like to express my sincere gratitude to two people: Ingela Bergman, the head of the project *Man, Fire, and Landscape* and Noel Broadbent, my supervisor at the Department of Archaeology and Sami Studies, Umeå University. They have, with great enthusiasm and immense patience, guided me "through the good times and the bad". They have both willingly shared their knowledge, and they have supported me in the best possible way, practically as well as academically. Noel has also revised my English. Another special thanks goes to Kjell Knutsson at the Department of Archaeology and Ancient History, Uppsala University. Kjell has, with his generosity and his extensive knowledge of lithic technology as well as the North Swedish Mesolithic, been of great importance to the realization of this work.

My doctoral studies, as well as the research project *Man, Fire, and Landscape*, have been financed by the Bank of Sweden Tercentenary Foundation, and I hereby acknowledge them for their support. The Silver Museum research programme is supported by the European Union's structural funds.

All doctoral studies have a "prehistory". My "Mesolithic journey" began in 1989 when I was encouraged by Lars Forsberg, University of Bergen, who at that time had a position at the Department of

Archaeology, Umeå University, to write a Master's thesis on microblade technology in northern Sweden. As this work became the basis for Paper II in the present thesis, I wish to once again thank Lars for introducing me to the Mesolithic of Norrland.

Through several seasons of fieldwork and other engagements, I ended up at Värmland's Museum in 1996. I was primarily working with digitalization of the archaeological collections at the museum. However, the employees were encouraged to do research and write articles, something I would like to acknowledge the museum direction for, particularly the Museum Manager at that time, Per-Olof Millberg. This sensible policy eventually resulted in Paper I of this volume, which was commenced during my engagement at the museum, and was finished and published during my first period as a doctoral student in Umeå. I would also like to thank my co-writer in Paper I, Hans Olsson, Värmland's Museum, for good cooperation. In connection herewith, I would also like to express my gratitude to Joel Boaz, then at Universitetets Oldsaksamling in Oslo, for help with translating the original manuscript of Paper I into English.

I would also like to thank my co-writers in Paper III, who were - besides my supervisor Ingela Bergman - Tore Pässe, Geological Survey of Sweden, Earth Sciences Centre in Göteborg, and Olle Zackrisson, Greger Hörnberg, Erik Hellberg, and Elisabeth Bohlin, the four latter based at the Department of Vegetation Ecology, Swedish University of Agricultural Sciences in Umeå. Greger Hörnberg has also read and commented sections of Paper IV.

I would like to acknowledge Elsevier for permission to reproduce Paper III.

I am also very grateful to Anna-Karin Lindqvist and Per H Ramqvist, HB Prehistorica for doing the layout work.

There are many more people without whose help and support this work would never have been accomplished: Sven Erik Grydeland and others at Tromsø Museum; Christina Lindgren, Department of Archaeology, Stockholm University (Sven Erik and Christina deserve an extra thank you for giving me access to their own un-

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Mickle G. Zhilin, Institute of Archaeology RAS, Moscow; Angela Deocampo-Hägg and Johan Hägg, Umeå; and Dan Kärrefors, Olarp. I am sure there are more, of whom I have forgotten, but thanks to you as well.

And, last but not least: Thank you Eva-Britt for putting up with me during this laborious time.

Flurkmark, July 31, 2003

Anders Olofsson

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## APPENDIX

This thesis is based on the following four papers, which will be referred to by their Roman numerals.

I: Olofsson, Anders & Olsson, Hans 1999. The Mesolithic in Värmland: Research Status. In: Boaz, J. (ed.), *The Mesolithic of Central Scandinavia*. Universitetets Oldsaksamlings Skrifter, Ny rekke, Nr. 22, pp. 73-86. Oslo.

II: Olofsson, Anders 2002. Microblade Technology in Northern Sweden: Chronological and Cultural Implications. *Current Swedish Archaeology*, Vol. 10, pp. 73-94.

III: Bergman, Ingela; Påsse, Tore; Olofsson, Anders; Zachrisson, Olle; Hörnberg, Greger; Hellberg, Erik; Bohlin, Elisabeth 2003. Isostatic Land Uplift and Mesolithic Landscapes: lake-tilting, a key to the discovery of Mesolithic sites in the interior of Northern Sweden. *Journal of Archaeological Science*. In press. Reprinted from *Journal of Archaeological Science* (corrected proof via [www.sciencedirect.com](http://www.sciencedirect.com)), copyright 2003, with permission from Elsevier.

IV: Olofsson, Anders 2003. *Early Colonization of Northern Norrland: Technology, Chronology, and Culture*.

Papers I-III appear with kind permission of the publisher.





# 1 INTRODUCTION

The main purpose of the present study is to illuminate the earliest settlement of northern Sweden. The starting point has been lithic artifacts, which have been studied from a technological as well as a more conventional typological perspective (Papers I, II, and IV). Paper III deals primarily with geological and palaeoecological methods and my contribution is mainly confined to the lithic artifacts. The main research objectives concern early postglacial colonization and cultural affiliation. Another "main thread" are source-critical discussions regarding dating problems, and the chronological integrity of find contexts. The chronological position of artifact types in the North Swedish Mesolithic is another related problem being discussed.

Since the bulk of the study is made up of Paper IV, which deals with the earliest sites in Norrland, those having dates earlier than 8000 BP, it was felt legitimate to use the title "Pioneer Settlement in the Mesolithic of Northern Sweden" for the complete thesis. However, Papers I, II, and III have a broader chronological scope. They not only deal with the earlier part of the Mesolithic, the discussions extend into the Late Mesolithic as well.

The geographical area under investigation comprises northern Sweden *sensu largo* (Fig. 1). This, however, requires a clarification. Paper IV discusses the whole of northern Sweden (that is, Norrland) although from the starting point of two sites in northern Norrland (in the

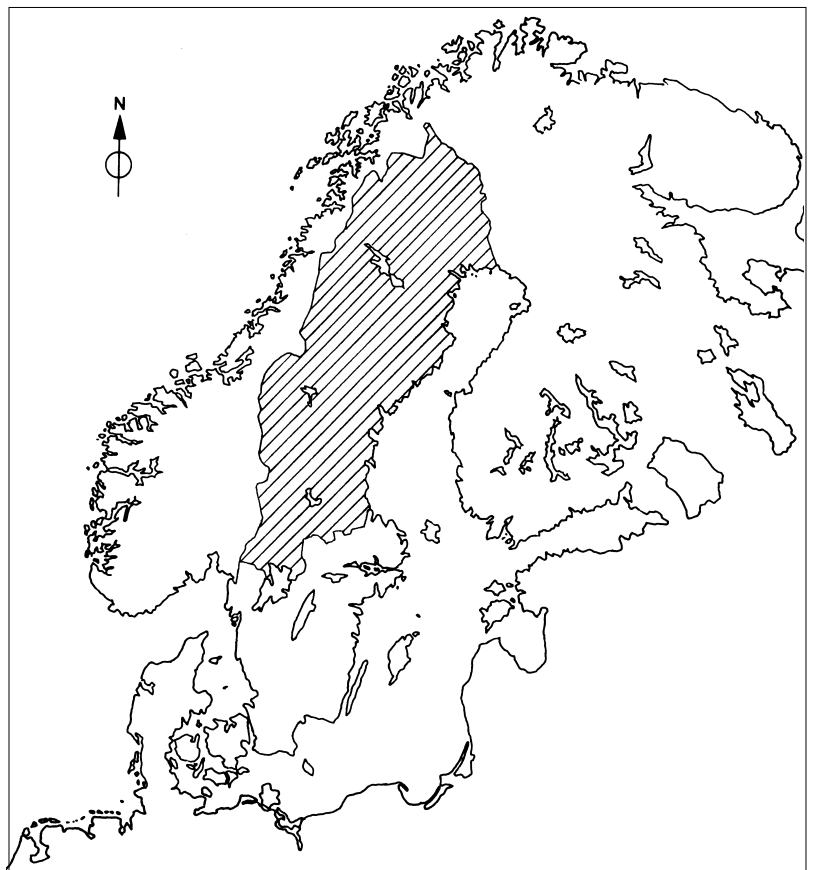


Fig. 1. Map of study area.

provinces of Lapland and Västerbotten respectively). Paper III primarily concerns the Arjeplog area in Lapland, although the phenomena discussed are valid for a wider area. Paper II concerns all of northern Sweden (Norrland) including Värmland and Dalarna. The latter two regions are usually regarded as provinces of Central Sweden. However, since parts of both Värmland and Dalarna (especially the northern parts of the provinces, north of *Limes Norrlandicus*) in a topographical as well as ecological sense belong to Norrland, they have been incorporated into the study. Paper I specifically deals with Värmland. Since Värmland (and Dalarna) can be considered as a border zone between southern Sweden and Norrland proper, this paper broadens the outlook by discussing contacts to the south and southwest.

## 2 THEORY AND METHOD

A theme common to a majority of the papers is a desire to place the finds in a cultural context. By culture and cultural context I mean an "archaeological culture", that is, assemblages recurring together at several sites (see e.g. Dark 1995:200; see also Shennan 1989 for a critical review of the concept of culture in archaeology). In this sense, I see the concept of culture applied to the Scandinavian Mesolithic first and foremost as an analytical tool. But, of course, any researcher dealing with these issues hopes, and also believes deep inside, that the "archaeological cultures" (which we more or less create subjectively) have at least some bearing on real people in prehistory, whether it be on a cultural, ethnic, or linguistic level.

I believe that the diffusion of ideas and innovations is, and always has been, a forceful agent in the process of cultural change (see e.g. Larsson 1997). In fact, in the case of paper IV, which discusses cultural context in a previously uninhabited (glaciated) area, we could even talk about a "migrationist" perspective. However, to my mind, this reasoning only applies to the earliest pioneering phase. As soon as a stable population in the area in question had evolved, we have to take other mechanisms into consideration (However, as the lover of law and order has probably noted already; coming into an unpopulated area does not involve cultural *change* and therefore this is not the same thing as a migrationist view in a proper sense.) Recognizing that diffusion of ideas is an active mechanism in the process of cultural change is

not the same thing as stating that it is the only mechanism working in this way. I do not consider myself a diffusionist of "the old school". Of course, independent development or adaptation may be just as important factors. The natural environment sets the extreme limits for what is impossible, but it also makes almost anything acceptable within the limits of what is possible (Olsen 1997:138 referring to Sahlins 1969:30). In my view, it would be wrong to deny that the diffusion of ideas as well as independent innovation are two separate mechanisms working side by side throughout the history of mankind. In some instances one or the other of the two is the obvious actor, but I suspect that in many cases these two mechanisms work in a complicated and intertwined way that is virtually impossible to unravel.

I am also of the opinion that science, in general, should strive towards making generalizations about the phenomena investigated, although I believe that it is practically impossible to come up with "laws" of absolute universal applicability in the humanities and social sciences. If such laws exist they tend to be rather trivial Micky Mouse Laws (Flannery 1973).

I also take an essentially empirical position rather than a deductive one, at least within certain limits (see e.g. Dark 1995:20-22). Of course, all researchers have at least some idea of what he or she will find. Thus, we are all biased in one way or another, and I have no problem with that; we have to ask questions of our source material, otherwise we end up with pure description. But if we become totally absorbed by the testing of hypotheses, we will only find what we are looking for, and nothing else - and by doing so we are "closing the door" to new ideas that could lead to unexpected finds and different results.

I do believe, however, that it is possible to gain real insights into pre-historic matters - at least to a certain degree. I therefore reject the extreme relativist approach advocated by some post-processual archaeologists (e.g. Shanks & Tilley 1987; see also Dark 1995:39-40).

As regards methods, Papers II and IV are essentially made up of analyses of lithic artifacts. Paper II focuses entirely on microblades and microblade cores/keeled scrapers from Norrland, Värmland, and Dalarna. Paper IV focuses primarily on the flakes from the sites of Dumpokjauratj in Arjeplog parish, Lapland, and Garaselet in Jörn parish, Västerbotten, although cores and formal tools are also brought into the discussion in order to give a better understanding of the assemblages in their entirety. My contributions in Papers I and III are

based on artifact studies, although not with the same detail as in Papers II and IV. In other respects Paper III is founded on a mathematical model of non-uniform glacio-isostatic uplift and lake-tilting (Påsse 1998; 2001).

In Papers II and IV attribute analyses of quantitative and qualitative features of the lithics have been implemented. The data have subsequently undergone statistical analyses, primarily in order to facilitate a description of the assemblages for further discussions and comparisons with contemporaneous assemblages from other parts of Fennoscandia.

Otherwise, published literature, excavation reports, museum catalogues etc. have been used. And, last but not least, some personal experience in lithic knapping have been helpful for understanding at least some of the mysteries of lithic reduction.

### 3 SUMMARIES OF THE PAPERS

#### PAPER I

A. Olofsson & H. Olsson 1999. The Mesolithic in Värmland: Research Status. In: Boaz, J. (ed.), *The Mesolithic of Central Scandinavia*. Universitetets Oldsaksamlings Skrifter, Ny rekke, Nr. 22, pp. 73-86. Oslo.

Värmland has often been considered to be a boundary area between north and the south, as well as between east and west. Recent research has added a great deal to our understanding of this area as well as introduced new questions. This paper summarizes the history of Mesolithic research in Värmland and discusses recent surveys and excavations. These data are used to discuss chronology as well as the role of Värmland in the landscape of the Mesolithic.

The study of the Mesolithic in Värmland is, however, still in its early stages. In some respects there has been little change in the understanding of this period over the past 75 years. Much of the present knowledge is built on the distribution of various types of stray finds, particularly axes.

However, from the 1950s onwards there has been an increase in research activity, beginning with salvage excavations undertaken by the National Heritage Board of i.a. the River Klarälven, followed, from the 1980s on-

wards, by excavations undertaken by Värmland's Museum, as well as a survey of sites for the national register of ancient sites and monuments by The Central Board of National Antiquities. The teaching of archaeology also started at the University of Karlstad during this time period.

Värmland is thought to have been deglaciated in the period 10,000-9000 BP (cf. Andersson 1987:47; Fredén 1988:4). In the earliest Holocene, Lake Vänern was an ocean bay with several long fjords reaching far into the interior. Southernmost Värmland was submerged by a broad sound that connected the Yoldia Sea to the east and Kattegat-Skagerrak to the west. At ca. 9000 BP Lake Vänern was isolated from the sea (Fredén 1988:4).

There are no unambiguous archaeological finds from the earliest Mesolithic in Värmland, although the environmental prerequisites for such an occupation appear to have been established shortly after the retreat of the ice. This is shown by the presence of faunal remains of great seal (*Erignatus barbatus*), dated to 10,105 ± 180 BP (Knarrström 1992:8). In nearby Bohuslän and Østfold there are sites belonging to the Hensbacka and Fosna cultures belonging to the period ca. 10,000 BP and onwards. In Dalsland there are also a number of stray finds of Early Mesolithic artifact types, and in Västergötland there are sites of Hensbacka character (Rex Svensson 1988; Andersson 1987:10; Kindgren 1991:42). This implies that it is not unlikely that Värmland was occupied seasonally for hunting/fishing and gathering expeditions during this early phase.

From the subsequent Middle Mesolithic, referred to as Sandarna culture on the Swedish West coast, typical pickaxes with biconical shaftholes (Knarrström 1992:17; Nilsson 1992:15) as well as conical microblade cores have been found.

The most typical artifacts from the Late Mesolithic are so-called Lihult axes. Over 90 of them have been found, primarily in the southern part of the county (Andersson 1987:13 and Fig. 9). These axes indicate connections with the Lihult/Nøstvet culture (ca. 7200-5000 BP) of the Swedish west coast and southeast Norway.

In the late 1950s and early 1960s a few sites in Norra Finnskoga (Pousette 1961) and Södra Finnskoga (Hvarfner 1957) parishes in northern Värmland were excavated by the National Heritage Board. These sites yielded, among other things, handle cores, keeled scrapers, and microblades. They also showed a varied raw material use, including flint, quartz, quartzite,

porphyry etc. In 1973 an excavation of the site of Labacka in Rudskoga parish, southern Värmland undertaken by Värmlands Museum (Olsson 1976), produced i.a. artifacts of Cambrian flint, a raw material that can be traced to chalk deposits in Kinnekulle in Västergötland. This is a raw material used by Sandarna and, particularly, Lihult groups in western Sweden (Kindgren 1991:47) and it is also found in other sites in Värmland. It shows that there were contacts over a wide area during the Middle/Late Mesolithic in western and central Sweden.

In 1993 and 1994 national register surveys produced many new sites in central Värmland as well as in the westernmost areas of the county. In this connection, Värmland's hitherto richest site was found. The site, Kvarnåsen, RAÄ no. 32 Norra Råda parish in central Värmland, has produced roughly 2000 artifacts of flint (including Cambrian flint and *hällflinta*), quartz, quartzite, porphyry, greenstone, slate etc. Among the finds, microblades and microblade cores of ordinary flint as well as Cambrian flint, a segmented knife/backed knife of flint, a sandstone saw/knife, and an axe fragment of stone, deserve mention. Both the sandstone saw/knife and the segmented knife/backed knife of flint have obvious counterparts in the Lihult/Nøstvet complex (see e.g. Cullberg 1975:37; Kindgren 1991:60-61; Mikkelson 1975b:73). On the other hand, a relatively high proportion of quartz, ca. 40 %, and use of bipolar reduction is reminiscent of eastern Central Sweden and northern Sweden. This further confirms the impression of Värmland as a border area between different traditions.

The site of Kvarnåsen has not been excavated and consequently there are no radiocarbon dates, however a rough estimation can be obtained by shore level dating. The site is located on a sandy plateau on the western shore of River Klarälven, ca. 115-120 m a.s.l. From ca. 9000 BP Lake Storvänern had long bays including the Klarälven valley. According to a tentative curve (Nilsson 1996:13, 32; Fredén 1988:38) Kvarnåsen would first have risen from the water as an islet at ca 125 m a.s.l., and at ca. 115-120 m a.s.l., or ca. 7800-7600 BP, the location for the first time became inhabitable, thus setting the *terminus post quem* for human occupation of the site.

The concluding section of the paper discusses Mesolithic Värmland and the question of cultural context. There are traits indicating both an affiliation to the Lihult/Nøstvet sphere (for example Lihult axes and saws/knives of sandstone) as well as other features more common in an eastern/northern context (quartz use, bipolar

reduction, and, at least for the final Mesolithic and Neolithic, slate artifacts) (see Nilsson 1992 and Nylin 1994 for further discussions of cultural boundaries in the Stone Age of Värmland).

As regards the Early Mesolithic there are stray finds from Värmland indicating occupation during Sandarna times. The earliest population seems to have come primarily from the west and south. Furthermore, it is possible that the southwestern part of the area was utilized seasonally by groups that spent parts of the year on the Norwegian coast (Østfold) and other parts of the year in Värmland (Andersen 1995). Finally, it is likely that there also was some influx from nearby Dalsland and Västergötland.

## PAPER II

A. Olofsson 2002. Microblade Technology in Northern Sweden: Chronological and Cultural Implications. *Current Swedish Archaeology* 10, pp. 73-94.

This paper deals with Mesolithic microblade technology in northern Sweden. The artifacts in question are keeled scrapers, microblade cores, i.e. handle cores (also called wedge-shaped cores) and conical/cylindrical microblade cores, and microblades from Norrland and the provinces of Dalarna and Värmland.

These artifact types have been recovered from practically the whole of Scandinavia down to Denmark and northern Germany. They are frequently found together and form the so-called microblade complex, which in Scandinavia is usually dated to the Mesolithic (the Boreal and Atlantic chronozones).

Microblades are small blades that could be retouched into microliths or used as they were, without further reworking. They frequently functioned as inserts in bone points, but other fields of application have also been observed (Clarke 1976:452-457; Giddings 1964:202-206; Voss 1961:153-167). The microblades were produced, most likely by pressure technique, from handle cores (Sw. *handtagskärnor*) and conical/cylindrical microblade cores. Closely associated with the handle core is the so-called keeled scraper, which by some scholars is judged to be a preform of a handle core, and by others as an actual scraper.

The principal questions are:

- How old are these artifacts in northern Sweden?
- What is the cultural context: from which cultural area did the microblade technology spread to northern Sweden?

The main focus is on the handle core since this type of core has been involved in much speculation about the diffusion of ideas and the cultural affiliation among the Stone Age cultures of the northern Boreal/Arctic zone.

In the years 1969-1975 the site of Garaselet in Jörn parish, Västerbotten, was excavated. Among the finds were handle cores, keeled scrapers, and microblades. The site was radiocarbon dated with three dates to ca. 8200-7800 BP (Sundqvist 1978), thereby making it the oldest known archaeological site in Norrland at that time. Consequently, these artifact types were associated with the first immigration to the area after the deglaciation of the Weichselian ice sheet. It has subsequently been shown, however, that the handle cores on the site most probably belong to a later occupational phase, dated to ca. 6000 BP (Knutsson 1993).

Since much of the discussions about the chronological position of these artifacts in Norrland was based on only these three early dates, it was felt necessary to bring in more data in order to get a firmer grasp of the chronology regarding these artifacts. Therefore, 17 sites with finds of the artifact types in question were analyzed with respect to <sup>14</sup>C-dates, find contexts, and similar factors of importance to the matter.

The oldest possible evidence of handle core technology in northern Sweden (the controversial Gara-selet finds not included) is a find of two rejuvenation flakes (at least one of which stems from a handle core) accompanied by microblades from the excavation of a site at Högländ, Dorotea parish, Lapland. These artifacts were found in association with a cooking pit dated to 7715 ± 115 BP (Melander 1981a; 1981b; Andersson 1999). The rest of the 17 analyzed sites showed a chronological span for the handle core technology from ca. 7600 BP (Limsjön, Leksand parish, Dalarna, see Larsson 1994) to ca. 5500/5000 BP (e.g. Vuollerim, Jokkmokk parish, Lapland, see Loeffler & Westfal 1985:433-434; Loeffler 1998:71).

The Norrlandic handle core tradition was further compared with its counterparts in other parts of Scandinavia as well as other areas of the northern hemisphere. The handle core technology is thought to have been introduced ca. 8000 BP in southern Scandinavia. It constitutes a characteristic feature of the younger

Maglemose culture, 8300/8000-7500 BP, and the Kongemose culture, ca. 7500-6500 BP (Becker 1952: 143-144; Bille Henriksen 1976; Larsson 1978; Vang Petersen 1984). In fact, it seems to be relatively frequent in most of Scandinavia during the Middle and Late Mesolithic, with the possible exceptions of Finland and northernmost Norway. In western Norway handle cores also seem to be comparatively rare (see Olofsson 1995 for further details).

Handle cores (also called wedge-shaped cores, campus-type cores, Gobi cores, etc.) constitute a characteristic element in the Late Palaeolithic and Mesolithic cultures of eastern Siberia, Mongolia, northern China and Japan. The distribution stretches eastwards over the Bering Straits and into North America. The wedge-shaped cores are common in e.g. the so-called American Paleo-Arctic tradition, and similar artifacts occur in the Arctic Small Tool tradition in arctic America and Greenland (see Olofsson 1995 for a review).

It was found that handle cores/wedge shaped cores do not constitute a very frequent artifact category in northernmost Norway or in Finland and western Russia. This, taken together with the early dates of these artifacts in southern Scandinavia and the continuous distribution northwards through Sweden, led to the conclusion that the handle core tradition during the Early Atlantic period was spread by the diffusion of ideas and/or actual migration from southern Scandinavia and/or the Swedish west coast/eastern Norway and then northwards through Norrland.

### PAPER III

I. Bergman, T. Pässe, A. Olofsson, O. Zackrisson, G. Hörnberg, E. Hellberg, and E. Bohlin 2003. Isostatic Land Uplift and Mesolithic Landscapes: lake-tilting, a key to the discovery of Mesolithic sites in the interior of northern Sweden. *Journal of Archaeological Science*. In press (available online as corrected proof as from 22 May 2003 at [www.sciencedirect.com](http://www.sciencedirect.com)).

This paper presents a model of non-uniform glacio-isostatic uplift and lake-tilting used to identify potential areas of Mesolithic occupation in the interior of northern Norrland. By reconstructing shoreline displacement of ancient lakes, archaeological, palaeoecological, and geological studies have resulted in the discovery of a significant number of Mesolithic sites.

Until recently relatively few Mesolithic sites were known in the interior of northern Sweden. Less than 40 sites could be attributed to the Mesolithic on the basis of radiocarbon dates and less than ten were older than 7500 BP (Forsberg 1996). This lack of Mesolithic sites is disturbing, given the large amount of sites from later time periods found in Norrland. Many of these were found in connection with surveys and excavations undertaken in the 1950s and 1960s due to hydroelectric development of the major rivers in northern Sweden. Another related problem is that many of the sites were heavily mixed, containing material from different time periods.

In Fennoscandia discussions about early postglacial colonization and pioneer settlements are closely connected to the deglaciation of the Weichselian ice sheet. According to prevalent models of deglaciation, the Weichselian ice sheet still covered parts of the interior of northern Sweden in 8500 BP and deglaciation was not completed until ca. 8000 BP (cf. Karlén 1979; Lundqvist 1998b; Stewart *et al.* 2000; Fjeldskaar *et al.* 2000). When northern Sweden finally became colonized, surrounding areas of Fennoscandia had for long been subject to human occupation (Thommessen 1996; Arponen & Hintikainen 1995; Matiszkainen 1996).

Since 1999 the interdisciplinary research project *Man, Fire, and Landscape* has been carried out in co-operation between archaeologists, ecologists, and geologists. The aim has been to elucidate the conditions for and the establishment of early settlements in the interior of northern Sweden. The causes and course of colonization, the ecological conditions of subsistence, and the interaction between pioneer settlers and their environment are central themes of research.

Undoubtedly, lakes and watercourses were important in prehistory for communication as well as subsistence, hence constituting a decisive factor in the localization of settlements (Forsberg 1985; Bergman 1995; Lundberg 1997). In general, survey for prehistoric sites has focused on present shorelines. However, if we take into consideration that the tilting effect has displaced the shorelines since early postglacial times, the sites that once were located close to the shores now will be found either at a distance from present shores, or they will be submerged. This may very well explain the low number of Mesolithic sites found in the interior of northern Sweden.

This study aims at analyzing whether models of postglacial lake-tilting can be useful in identifying Early

Mesolithic settlements in landscapes under the influence of strong, non-uniform isostatic uplift. The investigation area comprises the Arjeplog region in Lapland.

The study focuses on lake tilting due to non-uniform glacio-isostatic uplift. If the lake outlet is situated in the area with the greatest rate of uplift, then remote parts of the lake will be continuously transgressed. Under opposite conditions, the lake will be continuously regressed in the remote parts. The lakes in the interior of northern Sweden are, generally speaking, elongated with an east-westerly extension, approximately in the tilting direction. Lake systems sometimes form coherent watercourses extending more than 150 km. Hence, they are highly exposed to the tilting effect, with an upheaval in the eastern parts and a corresponding submersion of the western shorelines.

A model of the lake-tilting (Pässe 1998, 2001) has been used to calculate the actual changes of the landscape. On the basis of shoreline displacement curves, the prehistoric landscape of several sub areas were reconstructed for different points in time. Previous to our investigations only one Mesolithic site, dating  $6250 \pm 225$  BP and  $6170 \pm 100$  BP, was known in the Arjeplog area from excavations carried out in the late 1950s and early 1960s in connection with hydroelectric development (Bergman 1995). In the present study more than 60 sites were registered within the study area, most of which were identified by concentrations of fire-cracked stones, sometimes in addition to artifacts and fragments of burned bones. The sites show a distributional pattern quite similar to that of later periods, i.e. settlements were predominantly located on archipelagos of islets, inlets, and points, and by outflows of lakes and inflows of watercourses into lakes. Fifteen sites were excavated, ten of which proved to be Mesolithic, with radiocarbon dates ranging from  $8630 \pm 85$  BP to  $5390 \pm 70$  BP. The remaining five belong to the Neolithic and, in one case, to the Early Bronze Age.

The lake-tilting model has, together with archaeological and palaeoecological studies, resulted in the discovery of a previously unknown Mesolithic landscape. The model proved to be instrumental in the identification of Mesolithic sites and a significant number were found, thus filling a blank in the archaeological record. The investigations have also led to the discovery of the oldest firmly dated site in Northern Sweden - Dum-pokjauratj, with 16 AMS radiocarbon dates within the time period  $8630 \pm 85$  BP to  $7465 \pm 75$  BP.

## PAPER IV

A. Olofsson 2003. *Early Colonization of Northern Norrland: Technology, Chronology, and Culture.*

The article is an attempt to identify and define the earliest north Swedish lithic inventories. The overarching purpose is to place the earliest Norrlandic finds, which are from the Late Boreal chronozone, in a cultural context. This is done by example of the sites Dumpokjauratj 1986:42 in Arjeplog parish, Lapland and Garaselet, RAÄ no. 79 in Jörn parish, Västerbotten. The main part of the study is made up of analyses of lithic artifacts, waste as well as formal tools.

Dumpokjauratj is the oldest firmly dated site in northern Sweden; the oldest date from the site being  $8630 \pm 85$  BP. The earliest phase at Garaselet is also dated to the time period ca. 8000 BP ( $8160 \pm 110$  BP to  $7885 \pm 300$  BP). Hence the chronological scope of the study is the time period ca. 8000 BP (approx. 8500-7500 BP).

The main effort has been spent on an attribute analysis of the lithics from the site of Dumpokjauratj. This dwelling site is well-dated and it is, considering its geographical setting and chronological position, unusually rich in finds. Consequently, it gives us a unique opportunity to gain insights into the earliest phase of the north Swedish Stone Age - a time period that we previously only had a faint notion of through a few radiocarbon dates from more or less uncertain and mixed contexts. The other site dealt with, Garaselet, is a multi-period site, where the find contexts are not as clear-cut as in Dumpokjauratj. However, building upon the work of Kjell Knutsson (1993), I have analyzed the finds from the oldest area of the site. Furthermore, in order to bring comparative assemblages into the discussion, four sites in northern Norway and northern Finland have been studied first hand. In addition, literature, excavation reports etc. have been consulted.

With the starting point in the lithic artifacts from the sites, questions related to lithic technology have been discussed, e.g. "What sort of lithic reduction had taken place at the site?", "What kinds of tools were made?" or "Are there any culturally specific idiosyncracies or normative strategies with respect to tool types or their production, that reveal anything about cultural affinity?" It should be pointed out that the central focus of this study has been at an overarching level, questions concerning colonization processes and cultural contacts.

Relevant questions are e.g. "Were did these pioneer groups come from?" and/or "Which region/regions had they contact and exchange with?"

Furthermore, questions concerning deglaciation of the area, climate, flora and fauna etc. have been touched upon since they have been considered to be of importance in the discussion of the earliest human colonization of the area. Finally, chronology and source critical discussions concerning find contexts and dating problems run through the article.

The site of Dumpokjauratj, which is situated at Lake Dumpokjauratj, ca. 20 km east of Arjeplog, was identified during archaeological surveys in 1986 (Bergman 1993). The first excavation of the Dumpokjauratj site was undertaken in 1994 (Liedgren 1995). In 2000-2002 the site was excavated (Bergman 2001) within the inter-disciplinary research project *Man, Fire, and Landscape* (a co-operation between the Silver Museum of Arjeplog, the Department of Archaeology and Sami Studies at Umeå University, and the Department of Vegetation Ecology, Swedish University of Agricultural Sciences in Umeå). The site has yielded 19 AMS radiocarbon dates ranging from  $8630 \pm 85$  BP to  $5070 \pm 70$  BP. Out of these, 16 dates within the time period  $8630 \pm 85$  BP to  $7465 \pm 75$  BP, produced from charcoal samples taken from reliable contexts in cooking pits and other features, are considered to indicate the chronological position of the site.

The excavations at Dumpokjauratj 1994-2001 have yielded a total of 3709 lithic artifacts. Out of these, 915 artifacts from three features with nine radiocarbon dates spanning from  $8630 \pm 85$  BP to  $7870 \pm 80$  BP were selected for analysis.

As regards the raw materials, the analyzed assemblage from Dumpokjauratj (915 cores, formal tools, and flakes) consists of 48.6 % quartz, 23.1 % igneous rock, and 22.8 % quartzite. The remaining 5.5 % is made up of quartz/quartzite, slate, and unidentified rock.

Out of these 915 artifacts, the flakes, 869 pieces (95.2 % out of the total), were subjected to attribute analysis. Of these 869 flakes, 41.9 % could be determined as to reduction strategy. Among them (364 flakes) the largest category, 44 %, turned out to be certain platform flakes. But also certain bipolar reduction (23.6 %) and certain platform-on-anvil reduction (2.2 %) are represented. Although both bipolar and platform reduction are present in all three main categories of raw materials (quartz, quartzite, and igneous rock), bipolar reduction is most

common in quartz, and platform reduction is most common in igneous rock. Also in the case of quartzite, platform reduction predominates over bipolar reduction.

It is likely that both hard and soft hammer percussion took place at Dumpokjauratj. Much of the debitage is rather small in size ( $m = 10.8$  for max. dim. for 869 flakes) and it is probable that much of this debitage derives from scraper production and retouching.

As regards the cores and formal tools, it is to be noted that there are almost equal quantities of platform and bipolar cores. There are eight platform and seven bipolar cores in the analyzed assemblage. Most cores are of quartz and quartzite. Only one core is made of igneous rock, a bipolar core. That may come as a surprise since most of the certain platform flakes are of igneous rock. This may, however, be a sign of an economizing raw material use; the scanty igneous rock (which in the case of Dumpokjauratj is very fine-grained, almost flint like and thus optimal for flaking) was exhausted completely in this way.

The majority of the pieces that have secondary working can be characterized as retouched flakes. Nine out of 16 retouched flakes are of quartzite. Among these 16 pieces, four can be labeled microliths. Similar pieces occur in the Finnish Mesolithic; Hans-Peter Schulz (1990) describes a trapezoid/backed piece horizon, ca. 8900-8000 BP, which in time correlates with leaf-shaped slate points. Similar pieces have been found at Finnish sites dated to the same period as Dumpokjauratj, e.g. Hyrynsalmi Koppeloniemi dated to ca. 8200 BP and Inari kk 13 dated to ca. 8700-8300 BP. They also occur in northernmost Norway, in Finnmark. Woodman (1993) terms them backed pieces (with various sub categories). I suspect (although I cannot prove it) that similar pieces are rather common in many areas of northern Fennoscandia (possibly also in an even wider geographical area) during the time period in question, but that they have been ignored (Woodman 1993:64 referring to Freundt 1948), or not recognized due to difficulties in detecting retouch in quartz in particular. One of the microliths of quartzite may be labeled an oblique/single-edged point (cf. Garaselet below).

Five pieces were classified as microblades (three of igneous rock and two of quartzite). However no unambiguous microblade core was found, possibly indicating that the microblades are more or less fortuitous products resulting from other kinds of stone tool production. On the other hand, there is also a "classic"

lanceolate microlith made of a microblade of igneous rock. It tells us that the people at Dumpokjauratj were part of a wider Scandinavian community. This relatively simple type of microlith (retouched microblade) occurs in Early/Middle Mesolithic contexts from the Maglemose complex in southern Scandinavia all the way up to northern Norway (see e.g. Vang Petersen 1993:82-88; Woodman 1993:63). It cannot be maintained, however, that blade/microblade production is a characteristic feature of the Dumpokjauratj site. It is possible that the site in question belongs to a phase preceding the microblade tradition proper in Norrland - at least the microblade tradition comprising microblade production from specific handle cores/wedge-shaped cores (cf. Knutsson 1993; Forsberg 1996).

Another conspicuous artifact is a slate knife found in area C near feature A5 (with an earliest date of  $8630 \pm 85$  BP). There is also a small medial fragment of a slate point that was found in the same area. The slate knife (or possibly a spear point?) is double edged. It is not possible to fix the medial fragment as to point type. During the excavations in 2002 more pieces of ground slate were found, now in the area immediately south of A5. In addition, a whetstone of slate (or possibly of fine-grained sandstone) with two opposite scores for a hanging device was found in area C as well. These are remarkable finds in such an early context. The conventional idea is that slate was introduced as a raw material for tools in Norrland at the Mesolithic-Neolithic transition, ca. 4500-4000 BC (Baudou 1978:17; 1992:62; Broadbent 1979:122-123; 1982:84; Forsberg 1989:59-60; Lundberg 1997:161), contemporaneous with other new expressions of material culture as e.g. semi-subterranean houses (Lundberg 1997). According to Baudou (1978:12, 17), the oldest slate forms in Norrland are the leaf-shaped points similar to Finnish Suomusjärvi types, dating to around 4000 BC. As regards northern Norway the consensus seems to be that the use of slate starts around 5000 BC (Sommerseth 1997:63-64, 103).

Of course we can never with 100 % certainty dismiss the possibility of a later occupation (or occupations?) of the Dumpokjauratj site; there are two late dates, of  $5115 \pm 80$  BP and  $5070 \pm 70$  BP respectively, from A4, and a date of  $6475 \pm 55$  BP from A2. However, all three dates are questionable since they come from mixed and uncertain contexts; the charcoal in these cases cannot with certainty be connected with human activities. Furthermore, all three dates come from the lower terrace



of the site, whereas the slate artifacts were recovered on the hilltop, the latter area having dates ranging from 8630  $\pm$  85 BP to 7980  $\pm$  80 BP. Under the condition that the slate artifacts can be tied to the dates of ca 8000 BP, they either - in my opinion - represent incidental use of slate or a hitherto unknown early slate industry in interior Norrland - or they can be associated with the Finnish Mesolithic. This is the only cultural context in the region in which we have documented slate use at this early point in time (e.g. Matiskainen 1989; Nunez 1998).

Garaselet is a site with remains from several time periods, from the Mesolithic up to the 1700s AD. The lithics from Garaselet amounts to a total of 4140 individual artifacts. Out of these, the lithics from the deepest layers from the area of the site with the oldest features (8160  $\pm$  110 BP to 6890  $\pm$  90 BP) were selected for analysis.

The analyzed assemblage from Garaselet consists of 71 pieces (67 flakes and 4 formal tools). As regards the flakes the single most common raw material is porphyry with 68.7 %, followed by quartz with 16.4 %. The rest is made up of a few pieces of quartzite, greenstone, flint, and tuffite. It may be worthy of attention that a large piece of greenstone was found in the oldest feature at Garaselet, a cooking pit dated to 8160  $\pm$  110 BP, indicating early use of greenstone in the area.

Regarding reduction strategy, this was not possible to determine in 70.1 % of the cases, but among the remaining 29.9 % (20 flakes), certain platform flakes constitute the single largest category (75 %). Only one certain bipolar flake, of quartz, is present in the analyzed assemblage.

Four formal tools are present among the analyzed artifacts. Both porphyry and quartzite are represented. To be mentioned is a retouched piece that is most appropriately described as an oblique/single-edged point of white quartzite and a knife of gray quartzite. No cores are present in the analyzed assemblage.

The single-edged/oblique point found at Garaselet (possibly also one example at Dumpokjauratj) is impossible to pinpoint as regards chronological as well as cultural context. It has been shown that similar pieces occur during the Early as well as Late Mesolithic in western Scandinavia (Knutsson 1993:24), and in Finland they show up ca. 7800/7700 BP (Matiskainen 1989:389; Schulz 1990:13).

We have seen traits that point to a connection with the Finnish Mesolithic (the Suomusjärvi culture). I am

here referring to the slate artifacts from Dumpokjauratj, under the provision that they can be tied to the 8000 BP dates, and that they are not the result of independent innovation. It should be noted that there are other finds of Suomusjärvi artifacts (leaf-shaped points, coniform-holed globular mace-heads, and triangular whetstones) in northern Sweden that point in the same direction (see e.g. Falk 1995, 1997a, 1997b). However, there are also other traits that do not point specifically eastwards, e.g. the frequent use of fine-grained flint-like materials and porphyry, and a lanceolate microlith of this fine-grained igneous rock. Of course, it is impossible to exactly pinpoint the direction of the earliest colonization. Interior Lapland was the last area to be deglaciated and consequently the area was open for colonization from every direction. What can be said with some degree of certainty is, however, that the site of Dumpokjauratj provides evidence of rapid colonization of the area following deglaciation. According to prevalent deglaciation models, the final disappearance of the Weichselian ice-sheet in the interior of Norrbotten can be set to slightly after 8500 BP (Lundqvist 2000:414, see also Lundqvist 1998a and 1998b regarding ice-recession in Sweden). As the majority of the radiocarbon dates from Dumpokjauratj belong to the period ca. 8600-8000 BP, this shows that the site was occupied soon after deglaciation, probably within a few hundred years.

## 4 DISCUSSION AND CONCLUSIONS

There seems to have been suitable ecological preconditions for the colonization of Värmland (Paper I) in the Early Mesolithic (Knarrström 1992:8). There are possible stray finds belonging to this early phase in the province, as well as a number of Fosna/Hensbacka sites in the southwest and west of the region (see Paper I for a review). Nevertheless, the earliest securely documented finds from Värmland belong to the Middle Mesolithic (Sandarna times). Stray finds of pickaxes with biconical shaftholes and conical microblade cores indicate connections with the South Scandinavian Maglemose culture (see Brinch Petersen 1973:126 regarding conical microblade cores) as well as with the Sandarna culture on the Swedish West Coast (Nordqvist 1998:169-170) and Mikkelsens phase II/Early Microblade Tradition in

southern Norway (Mikkelsen 1975a; Bjerck 1986). During the Late Mesolithic there was a clear connection with the West Swedish/Southeast Norwegian Lihult/Nøstvet culture in the form of Lihult axes found in the central and, in particular, the southern parts of the province. Sites with Cambrian flint, a lithic raw material deriving from Kinnekulle in Västergötland (Kindgren 1991), point in the same direction. Also saws/knives of sandstone found at several sites (see also Olsson 2000:14-15) indicate an affiliation with the Lihult/ Nøstvet culture. Thus it seems legitimate to speak of Värmland - at least the southern parts of the province - as an offshoot of the Lihult/Nøstvet complex. However there are also raw materials and artifact types that are more typical of northern Sweden and eastern Central Sweden, e.g. slate points and extensive use of quartz, quartzite, and various igneous rocks on many sites. Finds of artifacts of red slate may point to direct contacts with northern Sweden, since red slate does not occur in the bedrock of Värmland, but of Norrland (Nylin 1994:21; Lundberg 1997:161-163). Sites with a preponderance of quartz generally have a more northerly distribution than the flint-dominated sites and sites with Lihult/Nøstvet axes; however the picture is somewhat blurred and more research is needed on this point before making any certain statements (cf. Nylin 1994; Svensson 1998:45-46).

Finds of conical microblade cores, handle cores, and microblades from Värmland show that the area was a part of a wider Scandinavian microblade tradition, which brings us to Paper II. There is, in fact, a continuous distribution of these finds from northern Germany and southern Scandinavia all the way up to Lapland. The chronological period is the Middle and Late Mesolithic. As has been shown in Paper II, the microblade tradition embraces much of Scandinavia; but the microblades, microblade cores, and accompanying slotted bone points have a much wider, circumpolar distribution throughout the northern hemisphere. In particular, the specialized wedge-shaped cores, termed handle cores in Scandinavia (Sw. *handtagskärnor*), are conspicuous. It is uncertain whether their widespread distribution is due to a diffusion of ideas/migration of people or if they can be ascribed to independent innovations in different regions.

In the case of the North German/Scandinavian handle core tradition it seems likely, however, that the rapid spread of this technology from northern Germany to northern Lapland (possibly in less than 500 years) could be explained in terms of diffusion, essentially from south and southwest into Norrland; the handle core technology

appeared at ca. 8000 BP in southern Scandinavia (Becker 1952:143-144; Bille Henriksen 1976; Larsson 1978) and the earliest date of a (fragment of a) handle core in northern Sweden is the find from Högländ, southern Lapland, dated to  $7715 \pm 115$  BP (Melander 1981a; 1981b; Olofsson 1995; Andersson 1999).

Kjel Knutsson, Per Falkenström, and Karl-Fredrik Lindberg have recently discussed these issues in the article: *Appropriation of the Past. Neolithisation in the Northern Scandinavian Perspective* (2003). The authors argue that the handle core tradition was spread from south to north through people moving in exchange networks. It is proposed that the handle core tradition carried values important for the reproduction of these societies. Around 5500/5000 BP, contemporary with the neolithization in southern Sweden, these traditions disappeared in favor of new material symbols (slate artifacts, semi-subterranean houses, etc.) symbolizing a new identity. This new material culture, clearly different from the Early Neolithic of southern Scandinavia, contrasts sharply with the preceding handle core tradition common to much of Scandinavia in the Middle and Late Neolithic. It is proposed that this was a reaction by the North Swedish hunter-gatherer groups to the changes taking place in the south (Knutsson *et al.* 2003:414, 428 and referred literature).

The authors (Knutsson *et al.* 2003:423 and referred literature) furthermore propose that the handle core tradition was somehow linked to the female sex. They assume virilocality of post-marital settlement and exogamy for the society in question. The explanation for the wide distribution of the handle core tradition may thus be that it was "spread by the hands of those who moved on marriage, the women" (*ibid.* 423). The fact that slotted bone points and a handle core have been found in southern Scandinavian Late Mesolithic graves attributed to the female sex (Knutsson *et al.* 2003:424; Strassburg 2000:155-156) also points in the same direction.

These are quite interesting perspectives on the handle core tradition, and we may in this connection remind ourselves that microblade technology has figured in gender-related discussions elsewhere. Berit Andersson states that microblades in European research are attributed to the male domain (Andersson 1999:96 referring to Grøn 1995), whereas in the North American Arctic they are supposed to have been used for cutting hides, and thereby become female (Andersson 1999:96 referring to McGhee

1979:55).

In any case, during the early 1990s the "old truth" (at least since the 1970s) that the handle core tradition represented the earliest settlement of Norrland became increasingly questioned (see e.g. Knutsson 1993; Forsberg 1993; 1996). In an article in *Tor* in 1993, Knutsson presented a reevaluation of the Garaselet site and the handle cores found there. It was shown that instead of being connected with the earliest dates of ca. 8000 BP, they clustered in the same area as younger features, from ca. 6000 BP. In the same article Knutsson also came up with the idea that single-edged/oblique points, from e.g. Rastklippan, Tärna parish, Lapland, could represent the earliest colonization into the area since this artifact type has a long chronological span in Norway where they can be found in Early as well as Late Mesolithic contexts (Knutsson 1993). The finds from Rastklippan were subsequently radiocarbon dated to ca. 6500 BP (Knutsson, personal communication), and belong to the late tradition of oblique points (however, cf. Paper IV for similar pieces from Dumpokjauratj and Garaselet that possibly can be dated to ca. 8000 BP). As early as the late 1970s and early 1980s excavations undertaken by the National Heritage Board and Västerbotten's County Museum in Åsele and Vilhelmina parishes of southern Lapland yielded unexpectedly early dates, prior to 8000 BP or the Late Boreal chronozone. But all of these were multi-period sites, and none had produced any handle cores that could be securely connected to the earliest features (Paper IV).

It was as a consequence of my studies of microblade technology in northern Sweden (Olofsson 1995 and Paper II this volume) that my interest turned to the time period that preceded the microblade tradition proper in northern Sweden (Paper IV). Thanks to my engagement in the research project *Man, Fire, and, Landscape* (Paper III), I was given the opportunity to work with this earliest phase of Norrlandic prehistory. We were also lucky enough to find the site that subsequently, through a number of radiocarbon dates, was to become the oldest firmly dated site in northern Sweden. The site, Dumpokjauratj 1986:42, near Svannäs, east of Arjeplog municipality, was discovered in 1986 by the head of the research project, Ingela Bergman, the Silver Museum of Arjeplog. At that time, another, adjacent location (1986:43) was found and the sites were identified through finds of a greenstone adze, quartz flakes, burned bones, and fire-cracked rocks (Bergman 1995:41). The sites were

judged to be connected to ancient, higher lying shorelines, and this was to become the prelude to the above-mentioned project (Bergman 1993; Bergman 1995:14-17; Liedgren 1995:2).

Paper III presents the inter-disciplinary research project *Man, Fire, and Landscape*, particularly focusing on the questions concerning non-uniform glacio-isostatic uplift and lake-tilting, and how this phenomenon can be used as a tool for identifying Early Holocene sites in the interior of northern Norrland. In spite of frequent surveys and excavations during the post-war period, relatively few Mesolithic sites have been identified in Norrland. This applies especially to the earliest time period, before 7500 BP (Forsberg 1996). The main efforts have been spent on surveying areas around the lakes and water-courses of today. The present project has focused on ancient shorelines affected by the tilting effect (see Paper III for an explanation), thereby significantly increasing the number of sites. Another benefit is that sites in areas affected by the tilting-effect seem to be chronologically discrete, seemingly representing short periods of occupation. This is probably due to the fact that shoreline displacement made the locations unattractive fast enough to ensure a reasonable degree of "contextual contemporaneity" in an archaeological sense. As was said above, the investigations led to the discovery of the oldest firmly dated site in Norrland and this is the key-site in the last article, Paper IV.

The Dumpokjauratj site (Paper IV) gives us for the first time reliable find contexts from the Late Boreal period in Norrland in the form of three cooking pits and one refuse pit yielding 12 radiocarbon dates ranging from  $8630 \pm 85$  BP to  $7870 \pm 80$  BP. All of the features have produced numerous lithic artifacts - flakes, cores, and formal tools, distributed from the turf layer down to the bottoms of the pits. As has been shown in the comparative section of Paper IV, this is a very unusual situation as regards Early Holocene sites in northern Scandinavia, and it gives us a much more secure starting point for discussions than before, since all previously known find contexts from the earliest pioneering phase in Norrland are more or less uncertain (mixed) in a chronological sense. As regards the finds from the surfaces around the dated features, we can never be 100 % certain of a chronological connection with the features, but that is a problem that all archaeologists working with this type of sites (without any stratigraphical layers being discernible) have to cope with. However, I think it is

reasonable to believe that the majority of the finds belong to the Early/Middle Mesolithic. We have to remember that as many as 16 out of a total of 19 dates from the site fall within the period  $8630 \pm 85$  BP to  $7465 \pm 75$  BP (the arithmetic mean and median for these 16 dates are 8066 and 8015 respectively).

An issue that was not really discussed in Paper IV, although it was touched upon, is the question of occupation events; are we speaking about one single occupation or several? If we choose to believe in the first alternative, the long chronological span - more than 1000 years - must be explained in terms of  $^{14}\text{C}$ -errors of some kind, which might be possible. There have been discussions in Norrlandic archaeology concerning e.g. samples becoming older than they should be due to the use of old tree-stumps for fire-wood, primarily pine roots and logs rich in tar, that could have been lying on the ground for quite a long time before decomposing (cf. Sundlin 1986:134). But this should not have affected the dates of ca. 8600-8100 BP from the oldest features at Dumpokjauratj, A5 and A6, since they all contained wood of deciduous tree. The other alternative is that there were several occupations taking place over a longer period of time. To me the latter alternative - several visits over a somewhat longer period of time (possibly a 1000 years) - seems more likely.

At Garaselet the chronological situation is far more complicated (in spite of the fact that the site has stratigraphy), since this site has occupation deposits from ca. 8000 BP up to the 1700s AD. The lithics from the lowermost layers in the area around the oldest features were selected for analysis.

At Dumpokjauratj several lithic raw materials were used for tool production, mainly quartz, quartzite, and a fine-grained igneous rock. At Garaselet an igneous rock, porphyry, predominates (68.7 % of the total), but also quartz, quartzite, greenstone, flint, and tuffite occur in the oldest context.

We have seen that both platform and bipolar reduction occur at both sites, although platform reduction prevails, the latter particularly at Garaselet. This pattern can also be seen in the other assemblages from Fennoscandia used as comparative material. Judging from the debitage as well as formal tools it seems likely that most lithic reduction aimed at production of flake blanks for further modification into scrapers. It is also possible that many flakes were used without further modification (see Hauglid 1993, Gero 1991), as indicated by use-wear visible to the naked eye

on some of the flakes from both sites.

We have also seen examples of microliths/backed pieces of quartz and quartzite (some of them resembling single-edged/oblique points). At Dumpokjauratj there are also signs of an emerging blade/microblade industry in Northern Sweden, even though it cannot be entirely ruled out that the evidence, a few microblades and an indistinct microblade core, were fortuitously produced. However, there is a lanceolate microlith made of a microblade of fine-grained igneous rock from Dumpokjauratj. In any event, microblade production does not constitute any characteristic feature of the site. It seems that both the oldest finds from Garaselet and the Dumpokjauratj assemblage belong to a time period before the handle core tradition proper in northern Sweden.

There were also artifacts of slate at Dumpokjauratj indicating early slate use in Norrland. Under the provision that the slate technology in this instance was not an independent innovation, or that the slate artifacts belong to a later occupation of the site (Late Mesolithic or Neolithic?), this suggests contacts with the Finnish Mesolithic. Finland is the only area in the region with documented slate use at this early point in time (e.g. Matiskainen 1989; Nunez 1998). As we have seen, there are other traits that possibly, but not exclusively, point in the same direction, e.g. the single-edged/oblique points. And, as has been shown by Falk (1995, 1997a, 1997b), other Suomusjärvi artifacts have been found in northern Sweden, which strengthens the idea of an early influx from the east/northeast. As Finnish Lapland was ice-free around 9000 BP (Hyvärinen 1997; Hicks & Hyvärinen 1997) there does not seem to have been any substantial environmental barriers to movements from the east and northeast.

The Dumpokjauratj site displays artifact types that indicate an easterly connection. However, Dumpokjauratj is just one example (although the most reliable) of sites from the earliest phase in the region. It would therefore be unwise to let this site speak on behalf of a whole "phase" of North Swedish prehistory. In fact, interior Lapland was the last region to be deglaciated and consequently open for colonization from every direction, and this was probably what happened. We have to remember that there are also traits that do not specifically point towards Finland, e.g. frequent use of fine-grained flint-like materials and porphyry, and a lanceolate microlith made of a microblade of this fine-grained igneous rock. The latter suggests associations with the Scandinavian Mesolithic

in general. This mixture of traits is perhaps exactly what one should expect in a newly colonized region surrounded by already established settlement.

Whatever the cultural background of the people who camped at Dumpokjauratj, the site bears witness to early human colonization of the region, probably within a few hundred years following the recession of the Weichselian ice sheet.

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