Microblade Technology in Northern Sweden

Chronological and Cultural Implications

Anders Olofsson

This article 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. It is proposed that microblade production from handle cores was introduced perhaps as early as 7700/7500 BP in northern Sweden, but at least some time during the period 8000–7000 BP. It is possible that this type of core survives right up to ca. 5500 BP. The north Swedish handle core tradition is compared with its neighboring cultures. It is argued that microblade production from oblong handle cores was an innovation that spread from southern Scandinavia or southeastern Norway/western Sweden to northern Sweden during the Early Atlantic period. The Scandinavian handle core tradition as a whole is further compared with its counterparts in northeastern Asia and North America.

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Key words: microblade cores, microblades, keeled scrapers, Mesolithic, chronology

INTRODUCTION

This article is based on parts of a more thorough study on microblade technology in northern Sweden originally published in 1995 (Olofsson 1995), with an addition of the latest research on the subject.

The main focus is on artifacts, namely microblade cores, microblades and so-called keeled scrapers found in northernmost Sweden, that is Norrland, and the provinces of Dalarna and Värmland in upper middle Sweden (Fig. 1).

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).

The original study is a statistical analysis of 676 artifacts from Swedish museums and other collections with a detailed description of technology, raw material, geographical distribution, etc., much of which, however, for practical reasons must be omitted here.

The primary aim of this article is to shed light on the following issues:

- 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 here is on the handle core.

Dates are in most cases given in ordinary uncalibrated BP values. When BC is used and it is specified in the sources whether it is calibrated or not, this is stated. Some of the more important sites mentioned in the text are plotted in Figure 2a, b.

THE MICROBLADE TECHNOLOGY: A SHORT PRESENTATION

Microblades (see Fig. 4:4) are small blades that were generally used as blanks for the production of microliths. Microliths (Fig. 4:3) are – in this case – retouched microblades, which were used as arrowheads and inserts in bone points. They may also have functioned as cutting edges in fishing implements and tools for harvesting plant food or as knife-edges (Clarke 1976:452–457; Giddings 1964:202–206). Microliths and microblades have also occurred as inserts in bone daggers (Sw. *flinteggdolkar*, see Voss 1961:153–167). Frequently the microblades have been used just as they were without being retouched into microliths; this applies especially to their use as inserts.

The microblades were produced, most likely by pressure technique, from handle cores (Sw. *handtagskärnor*, see Fig. 4:1) and conical/cylindrical microblade cores (see Fig. 4:2 which is a conical core, the cylindrical core has two opposite striking platforms). Closely associated with the handle core is the so-called keeled scraper (see Fig. 4:5), which by some scholars is judged to be a preform for a handle core, and by others as an actual scraper.

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. The microblade complex has a circumpolar distribution. The handle cores, also called wedge-shaped cores, campus-type cores, Gobi cores and so on, are found not only in most of

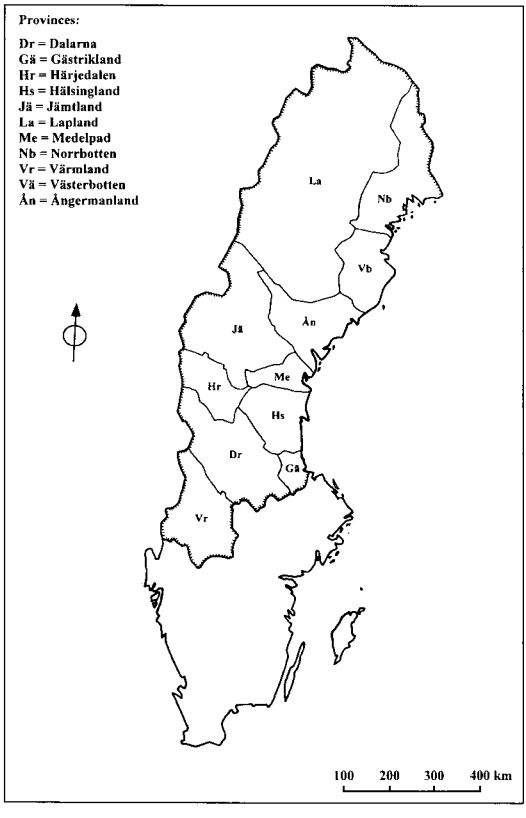
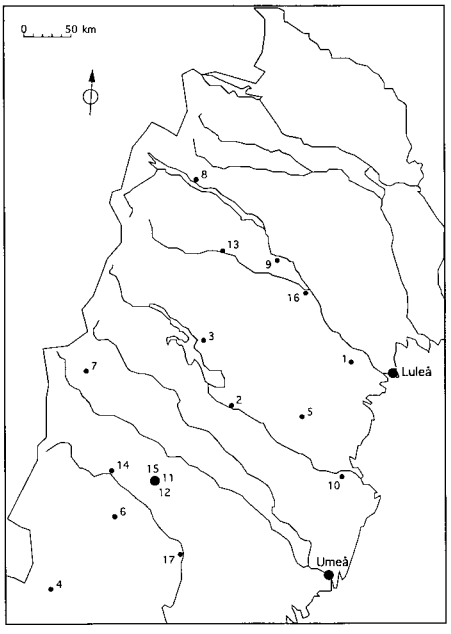
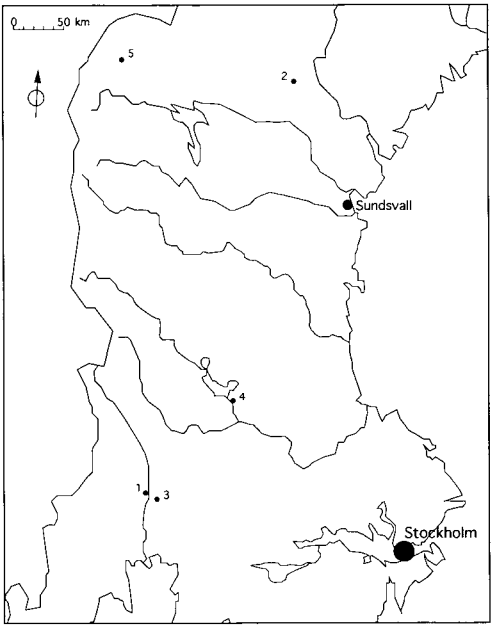


Fig. 1. Map showing the area of investigation and the provinces concerned.



1. Alträsket, RAÄ no. 184, Överluleå parish, Norrbotten; 2. Bastuselforsen, River Skellefteälven, site 1608, Arvidsjaur parish, Lapland; 3. Döudden, Lulepotten, RAÄ no. 508, Arjeplog parish, Lapland; 4. Foskvattnet, RAÄ no. 79, Hotagen parish, Jämtland; 5. Garaselet, RAÄ no. 79, Jörn parish, Västerbotten; 6. Högland, Långseleån, RAÄ no. 181, Dorotea parish, Lapland; 7. Kungaudden, Forsavan, Sorsele parish, Lapland; 8. Kårtjejaure, site 1371, Gällivare parish, Lapland; 9. Ligga, site 1021, Jokkmokk parish, Lapland; 10. Lundfors, RAÄ no. 164, Skellefteå parish, Västerbotten; 11. Luspen, Brännåker 1:10, RAÄ no. 190, Vilhelmina parish, Lapland; 12. Nyluspen 1:10, RAÄ no. 553, Vilhelmina parish, Lapland; 13. Skalka, Smaller Lule River, site 1193, Jokkmokk parish, Lapland; 14. Stalon 1:1, RAÄ no. 636, Vilhelmina parish, Lapland; 15. Vojmsjön, RAÄ no. 180, Vilhelmina parish, Lapland; 16. Vuollerim, RAÄ no. 1292, Jokkmokk parish, Lapland; 17. Åseleforsen, RAÄ no. 125, Åsele parish, Lapland.



1. Kvarnåsen, RAÄ no. 32, Norra Råda parish, Värmland. 2. Lafssjön, RAÄ no. 128, Ramsele parish, Ångermanland. 3. Lidsbron, RAÄ no. 18, Sunnemo parish, Värmland. 4. Limsjön, Leksand parish, Dalarna. 5. Ytterängs udde, Juvuln, RAÄ no. 74 a, Kall parish, Jämtland.

Fig. 2. Map of the more important sites mentioned in the text.

Scandinavia but also in a wide area stretching from Mongolia, northeastern Russia, across Japan and into North America. The north Swedish handle-core tradition is compared with its counterparts in the rest of Scandinavia, but also with equivalents in the more remote areas mentioned above.

Another interesting aspect of the microblade technology in northern Sweden is that it has been associated with the first more substantial immigration into the area after the deglaciation of the Weichselian ice sheet. Also that aspect is touched upon.

CHRONOLOGICAL REFLECTIONS

Well into the 1960s many archaeologists were doubtful whether Norrland was populated during the Mesolithic, i.e. before 5000 BP (e.g. Janson 1966:22). However, in 1964 the C 14-dates from Döudden were published, and they were clearly Late Mesolithic – 6105±100 BP and 6115±100 BP (Forsberg 1985:4). The year 1969 marked the start of the excavation that probably has been most influential on the re-evaluation of the prehistory of Norrland, namely the excavation at Garaselet, Jörn parish, Västerbotten. Among the finds worth mentioning are handle cores, keeled scrapers, and microblades, artifacts that had been found earlier all over Norrland but were then assumed to be anachronistic products. Now the artifacts could be dated with three C 14-dates to ca. 8000 BP (Sundqvist 1978). After that nobody could doubt that Norrland was populated also in the Mesolithic.

During the last 25 years the north Swedish handle core tradition has been dated to ca. 8000 BP. This date is, however, based on only these three dates (8160±110 BP, 8040±100 BP, and 7885±300 BP) from the Garaselet site. Moreover, in recent years it has been questioned whether the artifacts concerned here, the handle cores/keeled scrapers and the microblades, can be tied to these dates from the oldest layer of the site, or if they should be linked to a younger phase dating from ca. 6000 BP (Knutsson 1993).

One of the primary aims of the investigation has been to bring more data into the discussion and, if possible, get a firmer grasp of the chronology regarding these artifacts. Therefore 17 sites (Tab. 1) have been analyzed from a chronological point of view. From 15 of them there are artifacts included in the statistical part of this investigation.

These 17 sites have been analyzed and discussed with respect to C 14-dates, find context, and similar factors of importance to the matter. Unfortunately, this is not the right place to give a detailed account of that, but the chronological position of the sites is summarized in Table 1. (Methodological questions related to dating of Norrlandic Stone Age sites are discussed in Olofsson 1995.) However, I will give a short presentation of the relevant material.

The oldest possible evidence of handle core technology in northern Sweden (the controversial Garaselet finds not included) is a find of two rejuvenation flakes (at least one of which stems from a handle core) accompanied by at least nine microblades from the excavation of a site at Högland, Dorotea parish, Lapland (Fig. 3). The rejuvenation flakes are made of light quartzite and the microblades of white, grey, or beige-rose quartzite. From a cooking pit covered with a thick sand layer there is a

Site	Artifact types	Approximate date (source)
Dr., Leksand parish, Limsjön	hc, ks, con mb c?, mb	Middle Mesolithic, 7640±85 BP (Larsson 1994:248)
Jä., Kall parish, Ytterängs udde, Juvuln, RAÄ no. 74 a	ks	Middle Neolithic, 4520±130 BP (Forsberg 1979)
La., Arvidsjaur parish, Basuselforsen, site no. 1608	mb?	Comparatively late? (Neolithic/Bronze Age) (my estimate, see also Norrman 1968)
La., Dorotea parish, Högland, RAÄ no.181	mb, rejuv fl	Middle Mesolithic, 7715±115 BP (Melander 1981a)
La., Gällivare parish, Kårtjejaure, site no.1371	hc, ks	Late Mesolithic, 6330±80 BP (Forsberg 1985:248)
La., Jokkmokk parish, Ligga, site no.1021	ks	Early Neolithic/Middle Neolithic (Forsberg 1987:18)
La., Jokkmokk parish, Skalka, site 1193	mb?	Bronze Age? (my estimate, see also Forsberg 1985:206–208)
La., Jokkmokk parish, Vuollerim, RAÄ no. 1292 (J106A)	hc, ks, mb	Late Mesolithic, 5575±145 BP to 5025±180 BP (plus one date of 4390±300 BP) (Loeffler 1998:69, 95)
La., Sorsele parish, Kungaudden, Forsavan	hc	Bronze Age? (Christiansson 1969)
La., Vilhelmina parish, Luspen, Brännåker 1:10, RAÄ no. 190	con mb c	Middle Mesolithic, 7070±75 BP (Rydström 1980)
La., Vilhelmina parish, Nyluspen 1:10, RAÄ no. 553	hc, ks	Late Mesolithic, 5570±65 BP or Middle Mesolithic 7580±115 BP (Spång 1983)
La., Vilhelmina parish, Stalon, RAÄ no. 636	microlith	Late Mesolithic, 6555±95 BP (Melander 1980)
La., Åsele parish, Åseleforsen, RAÄ no. 125	mb?	Middle Neolithic, 4930±90 and 4810±90 BP or Early/Middle Mesolithic, 8360±230 to 7555±100 BP (Bergström 1993:56)
Nb., Överluleå parish, Alträsket, RAÄ no. 184	mb	Late Mesolithic, 5760 BP (mean value of four samples, Halén 1995:232)
Vb., Jörn parish, Garaselet, RAÄ no. 79	hc, ks, mb	Middle Mesolithic, ca. 8000 BP or Late Mesolithic, ca. 6000 BP (Knutsson 1993)
Vb., Skellefteå parish, Lundfors, RAÄ no. 164	hc?, ks, mb?	Late Mesolithic, 5355±65 BP (Broadbent 1979:47)
Ån., Ramsele parish, Lafssjön, RAÄ no. 128	hc	Middle Mesolithic, 7080±190 BP (Jennbert 1984:36)

con mb c = conical microblade core
hc = handle core
ks = keeled scraper
mb = microblade
rejuv fl = rejuvenation flake

Tab. 1. Summary of dates.

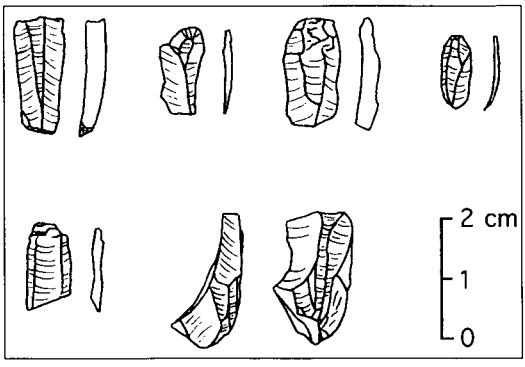


Fig. 3. Microblades and rejuvenation flake from a handle core from Högland, RAÄ no. 181, Dorotea parish, Lapland.

C 14-date of 7715±115 BP (the charcoal sample from the pit was taken at 0.6 m). This cooking pit was situated in area 3 (the site consists of three separate areas) in the square meters 244/582–244/583, and the above-mentioned finds were found in 244/582 and adjacent squares (Melander 1981a; 1981b).

Berit Andersson has, subsequent to my survey, treated the site of Högland in a Swedish licentiate dissertation (Andersson 1999). By refitting flakes from areas 2 and 3, Andersson has shown that they can be linked to each other (Andersson 1999:75). Within area 1 no typical Mesolithic artifacts have been found (Andersson 1999:75). The artifacts found in area 1 closely resemble the stone inventory that is usually found in Neolithic semi-subterranean house remains in the interior of Norrland (Andersson 1999:75 referring to Lundberg 1997). Furthermore, a slate knife of a type that is usually dated to the Neolithic was found in area 1 (Baudou 1978:17).

Andersson offers two different alternatives for interpretation. The first is that the differences between area 1 and area 2/3 should be interpreted in chronological or seasonal terms; the other is that the differences mirror a social division of a small group (Andersson 1999:95). If we take into consideration what has been said above concerning the different nature of the areas, what seems most likely to me is that the differences reflect chronological disparity. Thus, area 1 probably dates from the Neolithic and area 2/3 from the Mesolithic (i.e. Andersson's first hypothesis, p. 77).

The handle core fragment and three certain microblades (of which one is retouched) were found in the same square as the pit A 2 (244/582), and the other rejuvenation flake and the rest of the microblades were found in this and adjacent squares (244/580 and 244/581). The microblades in 244/580-581 were found in layers 0-0.20 and 0-0.10 m and the unspecified rejuvenation flake in 244/580 in layer 0-0.20 m, but there is no information about layer regarding the microblades and the handle core fragment from 244/582 (or any other flakes from that square). Melander mentions that "some flakes were also found in the pit" (Melander 1981a, my translation), but in the excavation report he does not separate the handle core fragment and the microblades in 244/582 from ordinary flakes in that square, and thus we are left in ignorance as to whether "our" artifacts were found in the pit itself or only in the same square meter but outside the pit.

The cooking pit was covered with sand, and Melander thinks that this is due to a deliberate covering of the pit for hygienic reasons. Andersson does not disagree with that, but she adds a further possibility: that the artifacts, while the sandy ground surface

was without vegetation due to heavy trampling, had been eroded from higher lying parts of the site down to the hollow where the pit was situated (Andersson 1999:77).

Finally, it can be concluded that in spite of some uncertainty – we cannot be sure of a 100% connection between the artifacts and the date – this is as close to a sealed find that one can get in these circumstances. For now, the most plausible hypothesis must be that there is a connection between the artifacts and the date of 7715±115 BP.

In the excavation of a site at Lake Limsjön, Leksand parish, Dalarna six keeled scrapers, two handle cores, four microblade cores, and as many as 263 microblades were found. Five of the keeled scrapers are of porphyry, while the sixth is made of reddish sandstone. The two handle cores are made of porphyry and tuff respectively. The artifacts are not contained in the statistical part of this investigation. Two of the C 14-dates from the site indicate the Stone Age: 7640±85 BP from hearth A 17 and 5000±100 BP from post-hole A 15. The remaining six C 14-dates from the site belong mainly to the Late Iron Age. The archaeological record unambiguously indicates the Mesolithic, while the hearths with Iron Age dates probably should be connected with clearance activities. To sum up, Larsson dates the site to ca. 8000/7500–7000 BP (Larsson 1994).

A site at Nyluspen 1:10, RAÄ no. 553 in Vilhelmina parish, Lapland has produced similar artifacts (Spång 1983). The site, which was excavated in 1977, has remains from several periods and the dates span from 8180 to 450 BP. Two handle cores were found within the squares 120/326 and 328. A charcoal sample, dated to 5570±65 BP, was taken at 120.9/327.8–328.1 in a cooking pit (?) with bones and fire-cracked stones, at a depth of 0.20 m (Spång 1983: charcoal sample list), and thus in proximity of the handle cores. However, the two handle cores, of white quartzite/brecciated quartz (Fig. 4:1) and flint or fine-grained igneous/volcanic rock (Sw. *hälleflinta*) respectively, were found at a depth of 0.05 m. Also a keeled scraper of quartzite was found at the site. One can, of course, also assume that the handle cores, instead of being tied to the date of 5570 BP, could be connected with a cooking pit, A 8, situated 20 m to the east. A 8 is dated to 7580±115 BP, and that would perhaps be in better accordance with the known age of these artifacts. But then we have to abandon the demand for absolute spatial connection between the find and the date.

These early dates are both few and more or less uncertain. The date from Högland (7715 BP) is afflicted with a rather high standard deviation of ±115 years. The date (7640 BP) from Limsjön is difficult to evaluate on the basis of the available information, even if it seems plausible for typological reasons (although I am quite aware of the risk of arguing in a circle here). Assigning the handle cores from Nyluspen to the 7580 BP date is admittedly speculative, since they were, in fact, found closer to the date of 5570 BP than the date of 7580 BP. But since it is not explicitly stated in the excavation report that both the handle cores and the dated charcoal came from a sealed context (and also the vertical position differed, see above), the most sensible conclusion must be that both dates are possible – especially if we consider the late dates of these artifacts from e.g. Vuollerim in Jokkmokk parish (see below).

There are dates from the later half of the period 8000–7000 BP as well. At a site

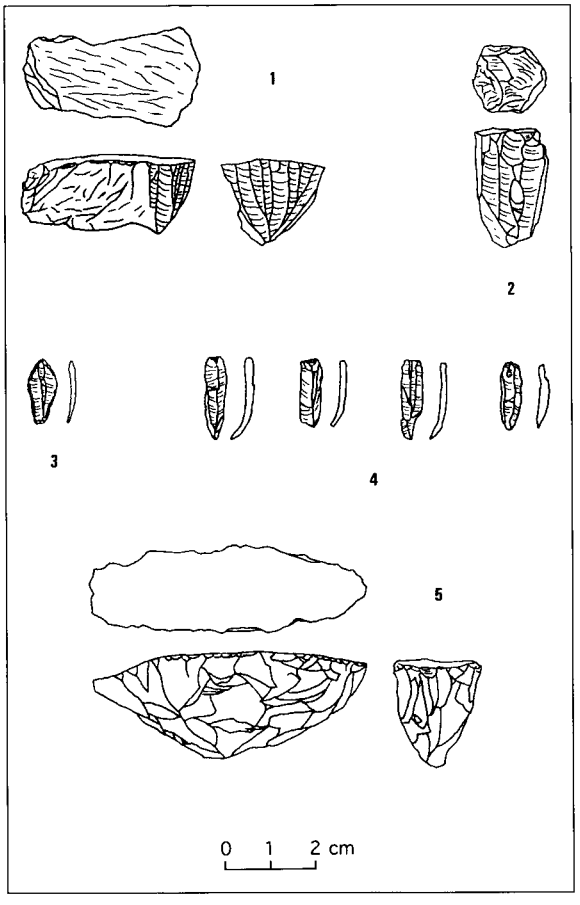


Fig. 4. Examples of artifact types treated in the article. 1. Handle core of quartzite/brecciated quartz from Nyluspen, RAÄ no. 553, Vilhelmina parish, Lapland. 2. Conical microblade core of jasper from Nedre Ransjön, Linsell parish, Härjedalen. 3. Microlith of flint from RAÄ no. 636, Stalon, Vilhelmina parish, Lapland. 4. Microblades of porphyry from Garaselet, RAÄ no. 79, Jörn parish, Västerbotten. 5. Keeled scraper of quartzite from Ormsjön, Braksjön, site LD 45, Dorotea parish, Lapland.

excavated by the National Heritage Board in 1980 at Lafssjön, Ramsele parish, Ångermanland three handle cores (not included in the statistical part of this investigation) were found close to a hearth pit which produced a date of 7080±190 BP. The hearth pit was situated in the squares 221–222/94–95 and the handle cores – two of quartzite and one of fine-grained, silica-rich igneous/volcanic rock (Sw. *hälleflinta*) – were found in squares 220/94, 222/95, and 220/96 (Jennbert 1984).

An excavation of a site (Luspen, RAÄ no. 190) at the southern part of Lake Vojmsjön in Vilhelmina parish, Lapland yielded among other things a handle core and a conical microblade core, both of grey quartzite. A cooking pit at the site gave a date of 7070±75 BP. The conical microblade core was found only ca. 1 m from this cooking pit and thus seems to have a spatial connection to the date. The handle core was found at another part of the site. However, it is not improbable that also the handle core is linked to the date of 7070 BP (Rydström 1980).

The duration of the handle core tradition is unclear. There are dates from the period 7000–6000 BP. At Lake Kårtjejaure, site 1371 in Gällivare parish, Lapland a certain handle core and three "keeled scrapers" (the handle core and two of the keeled scrapers are included in this investigation) were found during excavation which possibly can be linked to a C 14-date of 6330±80 BP (Forsberg 1985:55–58, 243–248).

One of very few Norrlandic sites with a stratigraphic sequence, Döudden in Arjeplog parish, Lapland, has yielded finds of two handle cores/keeled scrapers of dark quartzite and fine-grained, silica-rich igneous/volcanic rock (Sw. *hälleflinta*) respectively in the oldest layer, which is C 14-dated to ca. 5200–3800 cal BC (Bergman 1995:95, 195).

There are signs indicating that this kind of artifacts could have existed until ca. 5500/5000 BP, e.g. a handle core and several microblades from the house remains at Vuollerim, Jokkmokk parish, Lapland (Loeffler & Westfal 1985:433–434; Loeffler 1998:71). In this context we can also remind ourselves of the specimens from RAÄ no. 553, Vilhelmina parish, mentioned above – if we choose the late alternative, 5570 BP. A true outlier is a specimen from Kungaudden, Sorsele parish, Lapland since this site is typologically dated to the Bronze Age (Christiansson 1969). This handle core must be either a mysterious rarity in the Bronze Age or else the site also contains older material.

The so-called keeled scrapers seem to be more or less synchronous with the handle cores. However, it seems that keel-shaped scrapers (but with a less marked keel and perhaps also lower, shorter, and wider than the Mesolithic ones) were present in the Neolithic as well. Many of them are made of quartz, and it is possible that some of them are, in fact, flake cores instead of scrapers (cf. Broadbent 1979:69–71; Halén 1994:101, Fig. 106 and pp. 126–127 regarding platform cores of quartz). In spite of this, many of them are true scrapers. It remains, however, uncertain whether there is any closer cultural or functional relationship between these scrapers and the "classical" keeled scrapers.

Little is known about the age of the conical microblade cores in northern Sweden. There is only one fairly certain date for this artifact category in the investigated material – the above-mentioned 7070 BP from Luspen, RAÄ no. 190 in Vilhelmina parish, Lapland (Rydström 1980). It has often been claimed that the conical microblade core was introduced somewhat earlier than the handle core (Welinder 1971:118; Bille Henriksen 1976:121; Larsson 1978:149). In Denmark it is dated by Brinch Petersen (1973:126) to 8300–7600 BP, and in that case it has a relatively short time span. The change from conical microblade cores to handle cores seems to have occurred around 7000 BP in southeastern Norway, judging from excavated sites in the Oslofjord area (Ballin 1998:123).

It appears as if blades and microblades are a more timeless kind of artifact that was manufactured from different types of cores throughout time, and it is possible that the production of small blades occurred also during the Neolithic/Bronze Age (Bastuselforsen, Arvidsjaur parish; Skalka, Jokkmokk parish; and Åseleforsen, Åsele parish; see Tab. 1). However, it is likely that most of the microblades from these late sites were fortuitously produced, since "microblades" can result from other kinds of stone knapping, e.g. pressure retouching of bifacially worked points, manufacturing of burins, retouching of scrapers, etc. (Cook 1968:123, 125; Nygaard 1974:26; Callahan 1987:41–42), without being connected with the so-called microblade tradition, neither functionally nor culturally. Despite that, microblades are so strongly associated with the Mesolithic microblade tradition that for excellent reasons it can be assumed that the majority of these artifacts belong to this specific cultural context. Early dates of microblade finds but without microblade cores have been obtained from Foskvattnet, Hotagen parish, Jämtland (7805 BP, see Sundström 1989:32–33); Stalon, Vilhelmina parish, Lapland (6555 BP, microlith, see Fig. 4:3 and Melander 1980); and Alträsket,

Överluleå parish, Norrbotten (5760 BP, mean value of four dates, see Halén 1995:232).

At the Lidsbron site, Sunnemo parish, Värmland, a pit (rubbish pit?) with charred hazelnut shells was excavated in 1998. The hazelnuts were dated to 6965±80 BP. This feature also included lithics, among other things microblades. In addition, several other microblades and a few microblade cores, at least one of which can be classified as a handle core, were found at the site, however without any clear association with a dated feature. There are also dates ranging from 7920±70 BP to 7765±80 BP from the site, and it is at present unclear whether the microblades and the microblade cores should be attributed to these dates or to the date of 6965 BP mentioned above. (Olsson 2000:17–18). Another site in Värmland with microblades and microblade cores is Kvarnåsen in Norra Råda parish, which with typological and geological methods can be dated to roughly 7000 BP (Olofsson & Olsson 1999).

COMPARATIVE STUDIES

In the following a comparison is made between northern Sweden and surrounding cultures regarding the relevant artifact types; the main focus is, however, on the handle core. The areas concerned are southern Scandinavia, western Sweden, southern and middle Norway, northern Norway, eastern middle Sweden, Finland, and the southern coast of the Baltic. Furthermore, a brief overview is given of more remotely situated microblade cultures in northeastern Asia and North America.

The handle core is considered to appear ca. 8000 BP in southern Scandinavia (Denmark and Scania). Together with the other artifact categories in this investigation, 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; Vang Petersen 1984). The Norrlandic specimens show strong similarities with the south Scandinavian ones. However, there seem to be some differences. For readers not familiar with Scandinavian archaeology, it can be noted that one such difference is that most specimens (as well as many other artifact categories) are made of flint in the southern parts of Scandinavia, while in the northern parts the raw material is more mixed – here a variety of other fine grained materials as volcanic/igneous rocks, quartzite, jasper, and to some extent quartz were used instead (although specimens of flint do exist in northern Sweden). This is due to the fact that, in Scandinavia, flint suitable for tool making is found almost entirely in the southernmost areas (Denmark and Scania), in chalk deposits in the bedrock. Flint occurs also along the Swedish west coast and the Norwegian coast, transported there by drifting ice as well as in moraine deposits (see e.g. Berg-Hansen 1999:255–266). Judging from the literature the south Scandinavian handle cores seem to be somewhat larger than their Norrlandic counterparts (comparisons made with data in Andersen 1985:21; Callahan 1985:34). Furthermore, it is possible that a platform angle over 90 degrees is more common in southern Scandinavia than in Norrland (comparisons made with data in Callahan 1985:25; see also Callahan 1984 and illustrations in Andersen 1985:28 and Brøndsted 1966:65, 70). Another interesting fact is that microliths, which are so intimately associated with the microblade tradition in southern Scandinavia, are extremely rare in northern Sweden.

As far as triangular (scalene) microliths are concerned, they are to my knowledge non-existent in Norrland.

Handle cores occur also further north in southern Sweden, for example in Småland (Lidén 1936:155–213) and in Västergötland (Fredsjö 1953:156; Kindgren 1991). At the site of Högby in Östergötland (near Lake Vättern) finds of handle cores are correlated to an occupation phase that is C14-dated to ca. 7600–6000 BP (Carlsson *et al.* 1999:56–57).

Within the Lihult/Nøstvet complex (7400/7000–5000 BP), the relevant artifacts are frequently found. Handle cores are regarded as being introduced sometime after ca. 7200/7000 BP on the Swedish west coast (cf. Kindgren 1991:42; Nordqvist 1998:170), while it is possible that they can have come into use around 8000 BP in southeastern Norway (Mikkelsen 1975b:24, 28–31), i.e. about the same time as in southern Scandinavia. However, in the latest literature on the subject there are indications that the latter assumptions may have to be re-evaluated. The notion of an early handle core phase in southeastern Norway is largely based upon the site of Tørkop in Østfold, where an uncertain handle core was found in a cultural layer dated to 8180±170 BP (Mikkelsen 1975b:29; Ballin 1999:208). Torben Bjarke Ballin has re-examined the assemblage from Tørkop, and he states that there are no handle cores from the site and that the supposed handle core might instead be a rough-out for a conical core (Ballin 1999:208). It has long been an established archaeological "truth" that the handle core was introduced on the Swedish west coast ca. 7000 BP, or after the maximum post-glacial transgression. However, in an excavation of a site called Dammen in Bro parish, Bohuslän, with dates ranging from roughly 8000 to 7500 BP, a handle core was recovered (Kindgren & Schaller Åhrberg 1999:225, 231). Furthermore, microblades "which most likely have been struck from a handle core" have been found at a site dated to 8200 BP at Munkeröd in southern Bohuslän (Kindgren & Schaller Åhrberg 1999:231). Taken together, this indicates that the appearance of the handle core on the Swedish west coast may have taken place somewhat earlier than previously thought. The west Swedish (e.g. Alin 1955:66, Fig. 20; 111, Fig. 37; 112, Fig. 38), and perhaps even more so, the east Norwegian material (Mikkelsen 1975a; Mikkelsen & Nybruget 1975; Gustafson 1987) show strong similarity to the north Swedish finds.

In the west Norwegian Fosna culture handle cores seem to be comparatively rare. In this area conical and cylindrical cores were most frequently used. A cylindrical microblade core from Linsell parish, Härjedalen bears a strong resemblance to a core from Åmot in Hedmark fylke, eastern Norway (Mikkelsen & Nybruget 1975:101, Fig. 9). It is possible that we have a connection here, since this type of core (at least in this particular context) is believed to be a west Norwegian innovation in the Late Mesolithic that diffused south and eastwards (Indrelid 1973:79; Nygaard 1974:25–29).

In the Komsa culture in northern Norway there is, to all appearances, an early (ca. 9000–7500/7000 BP) microblade production from conical and cylindrical cores (Woodman 1993:72–75; Olsen 1994:31–35). It is, however, uncertain whether typical handle cores of south Scandinavian and north Swedish type exist here. Keeled scrapers do, however, seem to occur (see Olofsson 1995:116–118 for a more comprehensive

discussion concerning northern Norway; see also Siiriäinen 1982:8).

Also regarding Finland it is uncertain whether any true microblade production from handle cores, in the sense we are implying here, has taken place. The only convincing case that I know of is a specimen from Lake Inari, Finnish Lapland, made of fine-grained, probably non-local, rock (Siiriäinen 1982). It should be noted that there are finds of quartz from the Askola/Suomusjärvi culture (9200–6200 BP) that have been classified as handle cores (Luho 1956, 1967; Schulz 1990), but these have been questioned by several researchers (cf. Knutsson 1993:11–12; Siiriäinen 1982:8; Edgren 1993:28). It deserves mention that Siiriäinen, regarding the specimen from Inari, believes that the core or the technotradition behind it could have come from northern Norway or Sweden into Finland. He does not consider it likely that it could have reached the area from the Finnish or East Carelian region, "as the technique in question does not seem to have had a uniform occurence in these areas" (Siiriäinen 1982:8). Siiriäinen mentions a few east European finds, but he thinks that they " are not typical because they are not related definitely to blade striking" (Siiriäinen 1982:8).

In central and eastern middle Sweden handle cores occur (Welinder 1977; Larsson 1994:247), and regular handle cores of quartz (not anvil technique) have been found in middle Sweden (Knutsson 1993:12). In the latest part of the Mesolithic there seem to have been influences from eastern middle Sweden northwards into the eastern parts of Norrland. This can be seen from the typical round-butted axes (Sw. *trindyxor*) that are so frequent in eastern middle Sweden and Dalarna and also occur in the eastern parts of southern and middle Norrland. Our artifacts, however, cluster mainly in the western parts. It is possible that here there are cultural and/or chronological differences (see also Baudou 1992:57; Lindholm & Runeson 1990:12–14, Fig. 3 and Fig. 42). Nevertheless, in a recent article by Knutsson *et al.* (1999:99, 96, Fig. 4) there is mention of a site with early dates of handle cores also in the southeastern part of Norrland – Gårdsjösund in Hälsingland, C 14-dated to 8000–7500 BP.

Also south of the Baltic handle cores are found. The cultural groups with handle cores in northern Germany and Poland (primarily the Oldesloe culture 7400–5200 BP, the roughly synchronous Jünsdorf group, and the Pomeranian group, see Gramsch 1973; Schwantes 1939; Schwabedissen 1944) are considered to belong to the Maglemosian technocomplex, and most probably these artifacts can be associated with Maglemose/Kongemose in southern Scandinavia.

In the east Baltic cultures of interest in this context, namely the Kunda culture (primarily Estonia and Latvia, ca. 9500–5000 BP, see Kozlowski 1988) and the Neman culture (primarily Latvia and Byelorussia, ca. 7000–5000 BP, see Kozlowski 1988), handle cores do not seem to occur (e.g. Indreko 1964:55–56).

However, it seems that this type of artifact does occur in Lithuania. A specimen from Maximonis in southern Lithuania must be considered as a true handle core (Kolcov 1989: Plate 29:26) and it is assigned to the Janislawice culture (present in Poland, Lithuania, Byelorussia, and Ukraine ca. 7500–5000 BP, see Kozlowski 1988:426, 433–437).

The often excellent west and central Russian blade industries usually made use of

conical and cylindrical blade and microblade cores (see e.g. Gurina 1987:37 and Sumkin 1990:8 regarding the Kola peninsula; Kolcov 1989:211–293 regarding the whole area). However, it has recently come to my attention that handle cores (or wedge-like cores) do occur in the forest zone of Russia, though they are not the main type in this area. Handle cores emerge e.g. on Upper Volga in the very beginning of the Mesolithic and survive into the early Neolithic. Such cores exist in the Butovo, Ienevo, and Veretye cultures. Small handle cores were widely used for the production of microblades in the Volga-Oka basin, especially in regions where only small flint pebbles were available (personal communication with Dr. Mickle Zhilin, RAS, Moscow). Osibkina, in her account of the Mesolithic in the area east of Lake Onega (Osibkina 1983: artifact no. 2 in illustration on p. 55), depicts an artifact similar to a handle core/keeled scraper from the site of Kolupaevskaia on the Sukhona River, ca. 450 km E.S.E. of Lake Onega (Osibkina 1983: map on p. 10).

Handle cores (also called wedge-shaped cores, campus-type cores, Gobi cores, etc.) constitute a characteristic element in the Late Palaeolithic cultures of eastern Siberia (e.g. Chard 1974:27–38; Smith 1974:351–352; Fiedel 1992:35–38), but the artifact type seems to have survived into the Neolithic (Derevianko 1969; Chard 1974:90, Fig. 2.32.). In addition to Siberia, these artifacts are found in Mongolia (Nelson 1935:356; 1937:267–272), northern China (Hayashi 1968:166–169; Chen & Olsen 1990; Chang 1986:60), and Japan (Hayashi 1968; Kobayashi 1970). This Northeast Asian-Northwest American Microblade tradition, NANAMT (Smith 1974), seems to have been established in the Angara and Aldan area some time after 18,000 BP (this area, together with Mongolia and northern China, is usually seen as the core area of this particular technotradition). From there it spread through far-eastern Siberia, Mongolia, and northern China to Japan where it existed at least 15,000 BP (Smith 1974:351–352).

The distribution stretches eastwards over Bering Strait and into North America. The wedge-shaped cores are common in e.g. the so-called American Paleo-Arctic tradition (ca. 9000–6000 BC, see e.g. Fiedel 1992; Anderson 1970:2, 4–5), and similar artifacts occur in the Arctic Small Tool tradition in arctic America and Greenland (the Denbigh Flint complex and subsequent stages, ca. 2000 BC–1000/1200 AD, see e.g. Fiedel 1992: 149–159; Schledermann 1990:22–23, 321–322).

THEORIES OF MIGRATION AND CULTURAL CONTACTS

During the last decades there have been mainly two opposing views on the earliest colonization of Norrland. Since the handle cores, at least since the above-mentioned Garselet specimens were recovered in the early 1970s, have been so closely associated with this earliest phase, these two schools of thought have been applied to the handle core tradition as well.

The one school of thought claims a migration/diffusion of ideas from the south, southwest, or west into Norrland. It could here be fruitful to take a look at some of the research connected with it. Evert Baudou has treated this issue in his "The Prehistory of Norrland" (*Norrlands forntid*) published in 1992. Baudou emphasizes the similarities

between artifacts of the Fosna culture in middle Norway (primarily Trøndelag) and the Norrlandic ones (Baudou 1992:54–56).

Kjel Knutsson (1993) separates the earliest phase from the handle core phase. He illustrates that with the Garaselet site, which in his opinion has one early phase ca. 8000 BP and one later phase with handle cores, dated to around 6000 BP (although he is not willing to apply the date of ca. 6000 BP as the date of *introduction* of the handle core in Norrland). Knutsson states that there is a consensus among archaeologists that the handle core tradition originated and developed in southern Scandinavia during the Late Boreal–Atlantic chronozones. Furthermore, Knutsson hints at the possibility that the supposed earliest phase consists of hunting parties from the Norwegian Fosna culture visiting the area in the Late Boreal.

Also Lars Forsberg (1996) sees an early period before the handle core. By means of statistical analysis of 33 Norrlandic sites dating from the Mesolithic, he obtains three main groups: 1) Sites with exotic raw materials, borers, grey color, and a dating from the early period (8600–7400 BP). 2) Microblade technology (microblades, handle cores/ keeled scrapers) quartzite dominance, heterogeneous petrography, and a predominantly dark color of the raw material (7400–5800 BP). 3) Quartz technology, white color, beaver and elk bones, and a dating from the late period (5800–5400 BP). Forsberg points to the fact that the oldest sites occur in a zone in central Norrland (northern Jämtland, southern Lapland, and Västerbotten). This is not far from the Trøndelag area in Norway, with old dates like Ålbusetra (8800 BP). In this area there seems to be an expansion of the Fosna groups from the coast inland. There seems to be a gradual transition from the typical grey flint of the coastal sites to more local raw materials such as quartzite. This tallies with the earliest material from the Norrlandic sites, which contains local raw materials but also a few instances of exotic raw materials, amongst others grey flint. Thus, Forsberg suggests (as does Baudou, above) that the earliest migration into Norrland may have come from the Trøndelag area. He also suggests a movement from the southwest 6–700 years later, which brought the handle core technology into the area. Forsberg also hints at the possibility of an early migration from northern Finland and the northern part of Russian Carelia into northeastern Norrland (Forsberg 1996:248–249).

Mats P. Malmer (1992) equates the microblade inventory from northern Sweden with that from southern Scandinavia, and brings up the notion of an all-embracing Maglemose culture in the whole of Scandinavia.

The other school of thought emphasizes the easterly connections, and opens the door for a diffusion from the east and northeast. Lars Larsson (1978:176) calls attention to the fact that the handle core has a circumpolar distribution. He also brings up the notion that, since the specimens from Norrland (e.g. Garaselet) seem to be of the same age as the south Scandinavian ones and the specimens from Siberia and Alaska even older, we could here be dealing with a distribution from north to south. Also other researchers have touched upon the idea of a connection to the northeast Asian–northwest American wedge-shaped core technology (e.g. Broadbent 1982:27–28; Andersen 1985:45; Schulz 1990:22).

Already in 1968 Helge Larsen, in a paper presented at the eighth International Congress of Anthropological and Ethnological Sciences, pointed to the common components of the circumpolar microblade tradition: the bone and antler shafts (points) with microblade inserts, burins to make the groove for the inserts in the points, and the specialized microblade core. Larsen also noticed the vast distribution of the slotted bone point, from Trans Baikal in the east to Belgium in the west, roughly in a belt between the parallels 50 and 60 N, and that wedge-shaped cores occur "in Mongolia, at Verkholenskaya Gora and in the Maglemose culture" (Larsen 1968:338–340).

E. James Dixon, building upon Larsen 1968, pays attention to the fact that these points are actual composite tools, and that they represent a quite different conceptual approach to making a projectile compared with the method of producing a point by means of reducing a blank to the desired shape (Dixon 1985:59).

Both Loeffler & Westfal (1985:432–434) and Halén (1994:105–122), in their presentation of the Vuollerim and Lillberget sites respectively (both sites situated in Norrbotten, the latter a comb ceramic site and thus Neolithic), assume that the flint from the localities could be of Russian origin. Halén also thinks that the flint from the Mesolithic site of Alträsket, Norrbotten, closely resembles the Russian flint (Halén 1994:43).

Lennart Falk (1997b) focuses on early sites on the Bothnian coast from the Stockholm area in middle Sweden and northwards along the coast of Norrland. If the sites were related to the ancient beach, they should be dated to ca. 6500–5000 BC (some possibly even earlier). These sites are characterized by quartz inventory and bipolar reduction technique. Falk interprets this as indicating eastern influences (from the Finnish Suomusjärvi culture) that are just as early as the western ones, bringing unifacial platform technology with handle cores/keeled scrapers of fine cryptocrystalline materials (see also Falk 1997a).

CONCLUSION

Before I sum up, it is important to look at the possibility of an indigenous development of a handle core industry in northern Sweden. It is theoretically possible that this could have happened during the period between the deglaciation and the appearance of the handle core. However, this lacuna does not seem to have been a very long one. The available data suggest that most of Norrland was ice-free around 8100 BP (Forsberg 1996:242 and literature cited there). Furthermore, southern Scandinavia had a cultural background of several millennia before the handle core showed up there ca. 8000 BP. This, taken together with the early dates of these artifacts in southern Scandinavia and the continuous distribution northwards through Sweden, has prevented archaeologists from taking the idea of an indigenous development seriously (cf. Knutsson 1993:11).

As previously mentioned, there are a couple of Norrlandic sites with dates from the Boreal period, e.g. RAÄ no. 180, Vilhelmina parish, Lapland (8830±110 BP), Garaselet, Jörn parish, Västerbotten (8160±110 BP–7885±300 BP), RAÄ no. 553, Vilhelmina parish, Lapland (8180±80 BP), and RAÄ no. 125, Åsele parish, Lapland (8360±230 BP). No handle cores can safely be connected with these dates, and it is possible that

these finds belong to a period before the handle core tradition (cf. Sundlin 1986; Knutsson 1993:37; Forsberg 1993; Forsberg 1996).

We must also consider the microblade production from conical cores, which, at least in the northernmost areas, might be connected with the Komsa culture. For the time being we can only speculate about that, however.

What can be said with some degree of certainty is that in the eastern parts of southern and central Norway, on the Swedish west coast, in southern Scandinavia including eastern Denmark, and in northern Germany-Poland, microblade technology with handle cores and keeled scrapers becomes a characteristic tool-kit during the period 8000–7000 BP. As regards northern Norway and Finland, there are doubts about whether unambiguous handle cores exist (except for a few isolated finds). From middle Sweden there does not seem to have been any substantial influence until the Late Mesolithic. The conclusion must be 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 northwards through western Norrland.

As we have seen, there is a microblade tradition including wedge-shaped cores in northeastern Asia and in North America. It should, however, be mentioned that in spite of a striking resemblance there are some differences in the way the cores were shaped. In Scandinavia it seems as if the reduction in most cases started with the making of a striking platform. Then the rest of the core was shaped (Knutsson 1980:86, Fig. 1; Andersen 1985:23–24, Fig. 5, see also Olofsson 1995). In northeastern Asia and in North America it was customary to reduce the blank into a bifacially worked, "almond shaped" preform, and after that, as the second step, the platform was produced, but even in these areas different variants of the type where the platform blow precedes the core shaping occur (Kobayashi 1970; Smith 1974). It is, however, possible that there is a closer connection between the Asian-American microblade tradition and its Scandinavian counterpart. In such case, southern Scandinavia could be looked upon as a "melting pot" where easterly strains like an elaborated microblade technology on handle cores, in which the microblades are used as they are without being retouched into microliths, meet the European microlith tradition with narrow triangular microliths (Sauvetterian) and broad microliths (Castelnovian/Tardenoisian).

There is one additional phenomenon that could be of interest in the matter. As I have hinted at earlier, artifacts resembling handle cores/keeled scrapers occur in some Upper Palaeolithic cultures in western and central Europe, e.g. the Aurignacian complex, ca. 36–21,000 BP (Westerby 1927:56–62; Müller-Karpe 1966:307 and Tafel 205, 207; Champion *et al.* 1984:48–54; Gamble 1986:245). It seems to be unclear whether these artifacts should be regarded as core-scrapers or as cores for bladelets (*lamelles Dufour*), or if both functions are represented in the assemblages. Furthermore, there is a steadily increasing microlithization including a bladelet component among the European Upper Palaeolithic cultures, especially from ca. 20,000 BP onwards (Gamble 1986:136, 183, 199, 220). The relationship between the Mesolithic handle core tradition in Scandinavia

and both the Asian-American wedge-shaped core tradition and the small-blades of the European Upper Palaeolithic needs further investigation before we can definitely declare anything on this point.

Finally we have to consider the possibility of an autonomous development in southern Scandinavia during the Late Boreal.

POSTSCRIPT

It involves considerable risks to compare like this "in all directions" through both time and space. Formal and even technological similarities do not necessarily indicate cultural affinity. Is it possible that the idea of an oblong microblade core with invariable working face radius could have arisen at different occasions and at different places independent of each other? And even if these similar, although technically somewhat different (varying core-shaping methods), handle core/wedge-shaped core traditions should in fact be the results of a diffusion of ideas, we could not state that there was an all-embracing circumpolar "culture" in a narrower sense. It would be premature to start talking about a "wedge-shaped core/handle core culture"; of course we cannot, by picking out a single material trait, draw any exhaustive conclusions about cultural affinity. All of this may seem obvious, but I do think it is important to keep in mind.

It is rarely an easy task to explain the occurrence of such a widespread everyday technological feature as a blade technique, even though in this particular case it is comparatively specialized and part of a technological kit including wedge-shaped cores/handle cores, bone points with inserts, and frequently keeled scrapers/boat shaped tools (see Morlan 1967) and burins. The wide distribution of these artifacts tells us only that microblade production from oblong, wedge-shaped cores must have been a successful technology that was utilized by many cultural groups in many parts of Eurasia, North America and Greenland during an immense time span (from the Upper Paleolithic to Christian times, although not all the time in all these areas).

However, it is tempting to see this technology, common to a vast area throughout the circumpolar area, as an expression of a common way of thinking, but exactly what implications and connotations it had are still largely unknown to us.

Whatever the "reasons" for this widespread wedge-shaped core/handle core technique, whether it be migration/diffusion of ideas or some adaptation to similar living conditions leading to independent core areas, or something else, I strongly suspect that the final word in this discussion can not be expected for quite a while.

English revised by Laura Wrang.

ABBREVIATION

RAÄ Riksantikvarieämbetet

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