First evidence of eastern Preboreal pioneers in arctic Finland and Norway

Erste Beweise für östliche präboreale Pioniere in den arktischen Gebieten von Finnland und Norwegen

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Abstract - Recent archaeological research into the earliest postglacial settlement of northern Finnish Lapland and the North Norwegian coast has produced evidence of an apparent Early Mesolithic interface zone between the Epi-Ahrensburgian (western) and Post-Swiderian (eastern) traditions in the extreme north of Europe. The initial spark for the research was the discovery of Sujala, the first Post-Swiderian site in the region, at the shore of an inland lake in 2002. In 2009, a second site of the eastern tradition, called Fállegoahtesajeguolbba, was identified in the Varangerfjord area on the Norwegian arctic coast. This paper presents the research history of both sites and discusses their lithic technology, highlighting the similarities between the two assemblages. These finds have implications concerning the pioneer settlement of northernmost Lapland, the relationship between the ethnic groups involved, the adaptation of inland hunters to a maritime environment, and the spread of pressure blade technology into northern Scandinavia.

Zusammenfassung - *Neue archäologische Forschungen zur frühesten postglazialen Besiedlung des nordfinnischen Lapplands und der nordnorwegischen Küste belegen eine offensichtliche frühmesolithische Kontaktzone zwischen Epi-Ahrensburger (westlichen) und Post-Swidry (östlichen) Traditionen im äußersten Norden Europas. Der Auslöser dieser Forschungen war die Entdeckung von Sujala, der ersten Post-Swidry Fundstelle in dieser Region am Ufer eines Binnensees im Jahr 2002. Eine zweite Fundstelle der östliche Tradition, Fállegoahtesajeguolbba, wurde 2009 nachgewiesen; sie liegt im Varangerfjord an der norwegischen Eismeerküste. In dieser Abhandlung wird die Forschungsgeschichte beider Fundstellen präsentiert und die lithische Technologie diskutiert mit der Hervorhebung der Ähnlichkeiten beider Inventare. Diese Funde haben Auswirkungen auf die Interpretation der Pionierbesiedlung des nördlichsten Lapplands einschließlich der Beziehungen zwischen den betroffenen ethnischen Gruppen, der Adaptation von Binnenlandjägern an eine maritime Umwelt sowie die Ausbreitung der Drucktechnologie bei der Klingenherstellung nach Nordskandinavien.*

Keywords - Lapland, Mesolithic, pioneer settlement, Post-Swiderian, blade technology, culture contact
Lappland, Mesolithikum, Pionierbesiedlung, Post-Swidry, Klingentechnologie, kultureller Kontakt

Introduction

In spite of its distance from the present centres of population in the Fennoscandian countries, the northern coast of Norway has been researched archaeologically for more than a hundred years. While the research in the inland areas on the Finnish side of the border was initially much more sporadic, we can also soon celebrate the centenary of the first archaeological publication concerning this region (Itkonen 1913). The earliest settlement of the north Norwegian coast has been among the topics most enthusiastically discussed over the decades. Ever since Anders Nummedal's first discovery of Early Mesolithic artefacts on Komsa mountain near Alta, Finnmark county (Nummedal 1927; 1929), one of the key questions in the debate has been the origin of the earliest population and the direction of the initial migration into the area.

Thanks to Nummedal's active fieldwork, the number of Early Mesolithic sites grew rapidly in the late 1920s and early 1930s. In their extensive treatise on that material (Bøe & Nummedal 1936), Nummedal and his co-author Johs. Bøe, struck by the coarse quality of the earliest finds, defined them as Palaeolithic and suggested that the people who had left these artefacts on the high-lying terraces above the current shore of the Arctic Ocean had arrived in the area from Central Russia. The idea of the eastern origin of what had become known as the Komsa Culture was accepted by several scholars (e.g. Gjessing 1945; Äyräpää 1951; Luho 1956; Meinander 1984), but others saw more

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similarities with the Fosna Culture of western and southern Norway and argued for an origin in the west (e.g. Ekholm 1929; Clark 1936; Freundt 1948; Odner 1966).

The early debate was based mostly on typological similarities and differences between assemblages in different regions, as well as on arguments concerning voids in the geographic distribution of known sites, both in the east and in the west. In addition, the contemporary knowledge about deglaciation was employed in discussing possible routes into the area. Peter Woodman (1993, 1999) was the first scholar to apply technological analyses to Komsa assemblages. Today, most scholars accept that the origin of the Komsa population lies in western Norway, and ultimately in the Late Palaeolithic Ahrensburg Culture of north-western Europe (e.g. Woodman 1993, 1999; Bjerck 1994; Fuglestvedt 1999, 2005, 2007, 2009; Grydeland 2005). The possibility of an eastern origin was, however, still mentioned by Olsen in 1994, even though he could point to no artefacts with eastern characteristics.

Woodman divided the Mesolithic of northern Norway, formerly lumped *in toto* under the blanket term Komsa Culture, into three distinct phases. The earliest of the three was originally dubbed the "Komsa phase" by Woodman (1993, 1999) but has been subsequently referred to in Norway simply as Phase I (Olsen 1994). It was dated to 10 000 - 8 500 BP by Woodman and to 10 000–9 000 BP by Olsen. The second phase was called the Sæleneshøgda phase by Woodman and later simplified to Phase II. Woodman dated its beginning to 8 500 BP without giving an end date, but later accepted Olsen's beginning date of 7 500/7 000 BP for Phase III, originally called the Trapeze phase by Woodman (Woodman 1993, 1999; Olsen 1994).

Phase I is characterised by a macrolithic technology consisting of both blade and flake production. The blades are large and irregular and appear to be detached with direct soft percussion. Woodman (1993: 70, 74) mentions the possibility of indirect percussion, but this is unlikely, since the use of a punch has not been firmly identified in Scandinavia before c. 7 000 calBC (Sørensen 2006: 286, 291). A typical feature of Phase I assemblages is the virtual absence of blade cores. Globular, bifacially worked flake cores, on the other hand, are common, as are flakes from their reduction (e.g. Bøe & Nummedal 1936). Tools include large tanged points, single-edged points, flake axes, crude scrapers, and burins (Bøe & Nummedal 1936; Woodman 1993, 1999; Olsen 1994).

Phase II assemblages differ considerably from Phase I. Typical components are conical blade cores, regular blades that are often retouched along the edges, microblades, small rounded scrapers, and burins on breaks. The blades are frequently broken at right angles to their long axis, a feature that Woodman explained by characteristics of their raw material (Woodman 1993: 72-75). Phase II technology is usually linked with corresponding developments on the western coast of Norway, under the assumption that cultural influences travelled from south to north (Woodman 1993, 1999; Olsen 1994).

Phase III is the most ephemeral of the three. According to Woodman (1999: 301), trapezes and scrapers are typical artefact types, but the phase is also characterised by inland settlement and oblique points, as well as an increased use of quartz and a concomitant rise in bipolar reduction (Olsen 1994; Woodman 1999).

One of the main characteristics of the North Norwegian Early Mesolithic is its apparently exclusive maritime adaptation. No Phase I or Phase II sites have so far been encountered in the inland region. Even though it might be argued that this may, in Norway, be due to a lack of research beyond the coastal stretch, the same does not apply to Finland. The northernmost regions of Finnish Lapland have been the subject of intensive research over the last few decades (e.g. Rankama 1996; Halinen 2005), but until recently, no evidence of Preboreal human presence has been found. Since these areas lie at a minimum of only a few kilometres from the ancient shoreline, but do not reach the coast, an inland aspect of the North Norwegian Phase I, should such a thing exist, ought to have been encountered here. Up to the last decade, the only evidence of contacts with the shore in this region has consisted of a few stray artefacts (Kankaanpää & Rankama 2005), which are not sufficient to support the idea of an inland adaptation of the Norwegian Phase I population.

This paper deals with the research of the Lapland Pioneers project in northernmost Finland and Norway. We introduce two newly discovered sites that provide unprecedented evidence of an influx of people from north-western Russia to northernmost Fennoscandia during the Late Preboreal. One of these sites, Sujala, lies in the inland region in Finland, while the other one, Fállegoahtesajeguolbba, lies on the Varangerfjord shore in Norway. We describe the mode of discovery of these sites, the fieldwork carried out so far, and their dating. The artefacts from both sites consist of products of blade manufacture. Since the technology of blade production is what provides the evidence that allows us to define these assemblages as deriving from the east, we describe the blade technology of each site and compare them to each other, taking the opportunity to discuss the Sujala technology, which forms the base of the comparison, in more detail than has been possible before (cf. Rankama & Kankaanpää 2007; 2008). Finally, we discuss the implications of the discovery of these two sites for subsequent cultural development in northern Norway and outline further research that is necessary before a full understanding of the repercussions of this eastern cultural influence in the region can be reached.

The Sujala site: discovery, fieldwork, and dating

The Lapland Pioneers Project was initiated in 2002 as the result of an archaeological survey carried out by the authors at Lake Vetsijärvi, a tundra lake located in the eastern part of Utsjoki Borough, Finnish Lapland. The original goal of the survey was to search for inundated Stone Age sites in the shallows near the lake shore by kayak. According to the observations of Quaternary geologists, water levels in Lapland lakes rose after the earlier part of the Postglacial (e.g. Hyvärinen & Alhonen 1994; Eronen et al. 1999; Sarmaja-Korjonen et al. 2006), suggesting the possibility of discovering underwater archaeological sites with possible organic preservation through a boat-based survey.

The kayak survey of the shoreline was not very successful and produced only a few individual quartz artefacts; no clear sites could be discerned. However, several Stone Age sites were discovered on a sandy ridge rising some 6 m above the lake's surface and forming a long peninsula extending out from its southern shore. Most of these sites represented the typical quartz flake industry that characterises Finnish archaeological sites from the Early Mesolithic to the Bronze Age, but one – the Sujala site (Fig. 1) – produced a number of odd-looking artefacts made of non-local chert-like raw material, first characterised as flakes and tentatively dated to the Early Metal Period (Bronze Age/Early Iron Age) on the basis of the exotic raw material and some evidence of bifacial production.

Closer study of the "flakes" back at the laboratory awakened a suspicion that some of them might actually be fragments of blades. At the time, true blade technology was known in Finland only from a few of the very earliest pioneer sites in the southern part of the country. These sites – Lahti Ristola (Edgren 1984: 22; Takala 2003, 2004) and three test-excavated sites at Kuurmanpohja, Joutseno (Jussila 2001, 2003; Jussila & Matiskainen 2003; Jussila et al. 2010) – represented a Post-Swiderian blade tradition based on imported flint but with no evidence of in situ core reduction, suggesting short-term forays from the south or southeast, i.e. Estonia or Central Russia, or the import of ready-made artefacts to an existing population (cf. Hertell & Tallavaara 2011).

Fig. 1. Northern Lapland with national borders, showing the location of the Sujala and Fállegoahtesajeguolbba sites.

Abb. 1. *Nördliches Lappland mit den Staatsgrenzen und den beiden Fundstellen Sujala und Fállegoahtesajeguolbba.*

These southern Finnish sites, however, are located nearly a thousand kilometres from Lake Vetsijärvi and their likely "mother areas" are even farther away. A much closer manifestation of Early Mesolithic blade technology was to be found in Phase I of the northern Norwegian coast, the nearest sites of which lay only some 60 km northeast of Sujala. The relative proximity of the Norwegian sites, as compared to the vast distance to the nearest Post-Swiderian ones, as well as a superficial resemblance between the Sujala and Phase I finds, led us to tentatively assign Sujala to the western rather than the eastern sphere (Rankama & Kankaanpää 2004). As mentioned, however, known Phase I sites were all coastal, while Sujala lay some 30 km inland from the head of the nearest ancient fjord.

Additional support for the hypothesis of coastal origin came from geologists, who identified the Sujala raw material as weakly metamorphosed sandstone of a type not found in the vicinity of Lake Vetsijärvi and suggested an origin on the Varanger Peninsula in northern Norwegian Finnmark, some 100 km northeast of the Sujala site and well within the territory of the Norwegian Phase I culture (R. Kesola, T. Manninen, and J. Välimaa, pers. comm.).

A test excavation combined with an intensive surface survey was carried out at the Sujala site in 2004, resulting in the identification of two small but dense concentrations of lithic finds made from weakly metamorphosed sandstone. One concentration centred on the location of the original find and a second one lay some 200 m to the south of it, also on the crest of the same ridge. The latter concentration produced two blade cores and a tanged point, while both concentrations yielded a number of very regular blades and core reduction waste.

One of the cores was a semi-conical single-platform core while the other was first interpreted as a bi-directional core with a rather acute platform angle, reminiscent of a type known from, e.g. the Høgnipen sites in southern Norway (Skar & Coulson 1985: 175, Fig. 8: 2). The tanged point, however, was clearly a Post-Swiderian type, with the tip formed by symmetrical invasive retouch on the ventral side and the tang likewise symmetrically formed with steep retouch from both sides, the central ridge of the original blade forming the central axis of the point from tip to butt. Though somewhat short for a Post-Swiderian point, it closely resembled a point from the Mikulino 1 site of the Butovo Culture, located near

Fig. 2. The excavation at the Sujala site in 2005 (photo: J. Kankaanpää).
Abb. 2. *Die Ausgrabung der Fundstelle Sujala von 2005 (Foto: J. Kankaanpää).*

Moscow (Sorokin 1981: Fig. 5: 23).

A full-scale area excavation of the southern find concentration was carried out at the site in 2005-6 (Fig. 2). The excavation covered an area of 77 m^2 (not including outlying test squares) and produced c. 6 250 finds in addition to the c. 430 artefacts recovered in the survey and test excavation. 98.6% of the finds were weakly metamorphosed sandstone; the remaining 1.4% was mostly quartz (Rankama & Kankaanpää 2007, 2008). The site itself appears to have consisted of a light dwelling and a number of working or dumping sites around it (Kankaanpää 2010; Kankaanpää & Rankama 2011). The dwelling was marked by a roundish stained area some 2 m in diameter, containing charcoal, burnt bone, burnt sand, and lithics. The activity areas were clusters of lithics with no associated organic remains. One small apparent refuse pit containing burnt bone and charcoal was observed outside the dwelling. Finds included a large number of well-made prismatic blades and blade segments, core reduction refuse, and tools, including tanged points (many of them fragmentary) as well as scrapers and burins on blades.

The presumed dwelling floor and refuse pit yielded sufficient quantities of charcoal and bone to allow several radiocarbon datings (Fig. 3). Three charcoal samples – two from the dwelling floor and one from the refuse pit – gave dates of 9 265 ± 65 BP (Hela-1102), 9 140 ± 60 BP (Hela-1441), and 9 240 ± 60 BP (Hela-1442), respectively, while the bone samples gave dates of 8 940 ± 80 BP and 8 930 ± 85 BP (Hela-1103 and -1104). The dates calibrate to

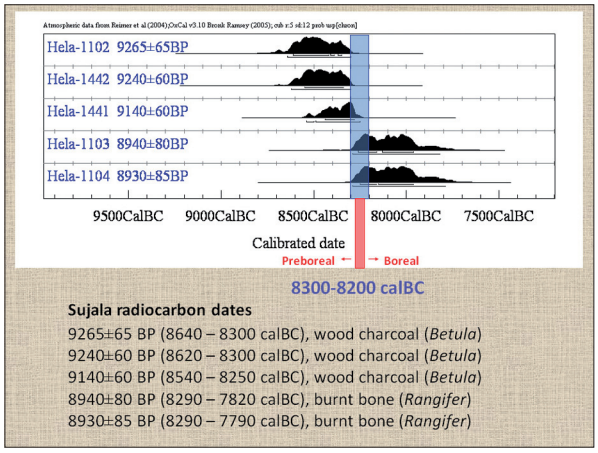

Fig. 3. The radiocarbon dates from the Sujala site.
Abb. 3. *Die ^{14}C-Daten der Fundstelle Sujala.*

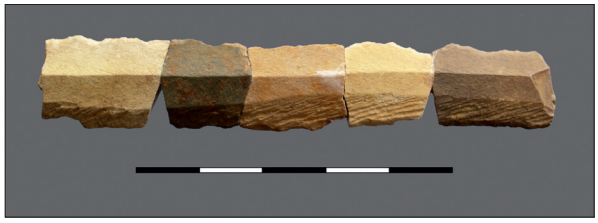

Fig. 4. Refitted blade from the Sujala site. Refit by L. Koxvold (photo: J. Kankaanpää).
Abb. 4. *Zusammengesetzte Klinge aus der Fundstelle Sujala. Zusammensetzung von L. Koxvold (Foto: J. Kankaanpää).*

Area 2 chert artefacst	2004-2006
Blade cores, incl. fragments	14
Tanged points, incl. fragments	47
Tanged point preforms, incl. fragments	2
Blades and blade fragments, unretouched	1 739
Blades and blade fragments, retouched	401
Blade scrapers, incl. fragmentary	18
Blade burins, incl. fragmentary	45
Blade side scraper-burins	1
Blade borers/reamers	1
Blade insets	2
Blade tools, unspecified	9
Microburins	1
Burin spalls incl. fragments	48
Burin spall implements	1
Piercers on a trimming blade	1
Core tablets/ platform rejuvenation	356
Burins on core tablet	1
Retouched core tablets	12
Core face rejuvenation blades/flakes	8
Core shaping blades/flakes	16
Core-edge trimming flakes, unretouched	1 368
Core-edge trimming flakes, retouched	4
Blade-like flakes	4
Flakes, unretouched	142
Flake tools, retouched	12
Flake tools, other	1
Fragments, unretouched	2 069
Fragments, retouched	18
Total	**6 341**

Fig. 5. Artefact categories from the Sujala site.
Abb. 5. *Artefaktklassen der Fundstelle Sujala.*

c. 8 640–8 250 BC for the charcoal and 8 260–7 790 BC for the bone, making them the earliest archaeological radiocarbon dates from Finnish Lapland. Part of the age difference between the charcoal and bone dates may be ascribed to the "old wood" phenomenon, i.e. the age of the trees used for firewood. However, samples of the charcoal – including one dated piece – were identified as birch (*Betula* sp., Timonen 2006), which does not regularly live much beyond 100 years. The difference between the mean calibrated ages of the samples is over 400 years, which seems too long to be due purely to "old wood". However, the calibrated Oxcal curve for the bone dates is clearly bimodal, with the older mode at c. 8 200 calBC, while the curve for the youngest charcoal date peaks around 8 300 calBC and those for the two older dates end rather abruptly around the same time. A "most probable" date bracket of 8 300–8 200 calBC (i.e. straddling the Preboreal/Boreal border) may thus be suggested for the Sujala site, since the context renders it extremely unlikely that the charcoal and the bone could have derived selectively from two different occupational events at precisely the same location in practically featureless terrain.

Area 2 chert artefacts	2004-2006
Blade cores and core fragments	14
Blades and blade fragments, including implements	2 266
Core trimming and rejuvenation debris and implements thereof	1 766
Flakes and flake fragments, including implements	155
Burin spalls and implements thereof	49
Blade-like flakes	4
Unclassifiable fragments, unretouched and retouched	2 087
Total	**6 341**

Fig. 6. Technological units within the Sujala assemblage.
Abb. 6. *Technologische Einheiten innerhalb des Fundinventars von Sujala.*

The Sujala blade technology

The possibility of an eastern connection led us to examine the blade technology more closely and to compare it against the technologies of the Norwegian Phase I and the Post–Swiderian technologies of Russia and the Baltic States.

The Sujala assemblage consists of the remains of a sophisticated blade technology executed in fine-grained, weakly metamorphosed sandstone, black or dark green in colour when fresh, but now mostly weathered into different shades of brown (Fig. 4). The method of analysing the finds has been devised in the course of the work and is still under development. The aim of the analyses has been to distinguish the features that best describe the assemblage and give clues concerning the techniques of its production. The emphasis is thus not on implement typology but on technology and the *chaîne opératoire*. This places the focus on the whole assemblage, not excluding the waste products that even today often receive less attention.

The artefact categories recovered from the site are presented in Figure 5. Apart from the unclassifiable fragments (i.e. small fragments that lack the diagnostic features that would allow placing them firmly in any of the categories), the most numerous categories are blades and blade fragments, core edge trimming flakes, and core tablets, i.e. platform rejuvenation flakes. Condensed into technological units (Fig. 6), the data indicate that the assemblage derives exclusively from blade manufacture and modification into various tool categories. The small number of flakes in the tables represents different episodes of core shaping and include, e.g. platform rejuvenation flakes without the diagnostic core face remains on the edge. Flake core reduction is not present.

The absence of cortex and initial core shaping debris indicates that the primary shaping of the cores did not take place at the Sujala site and, consequently,

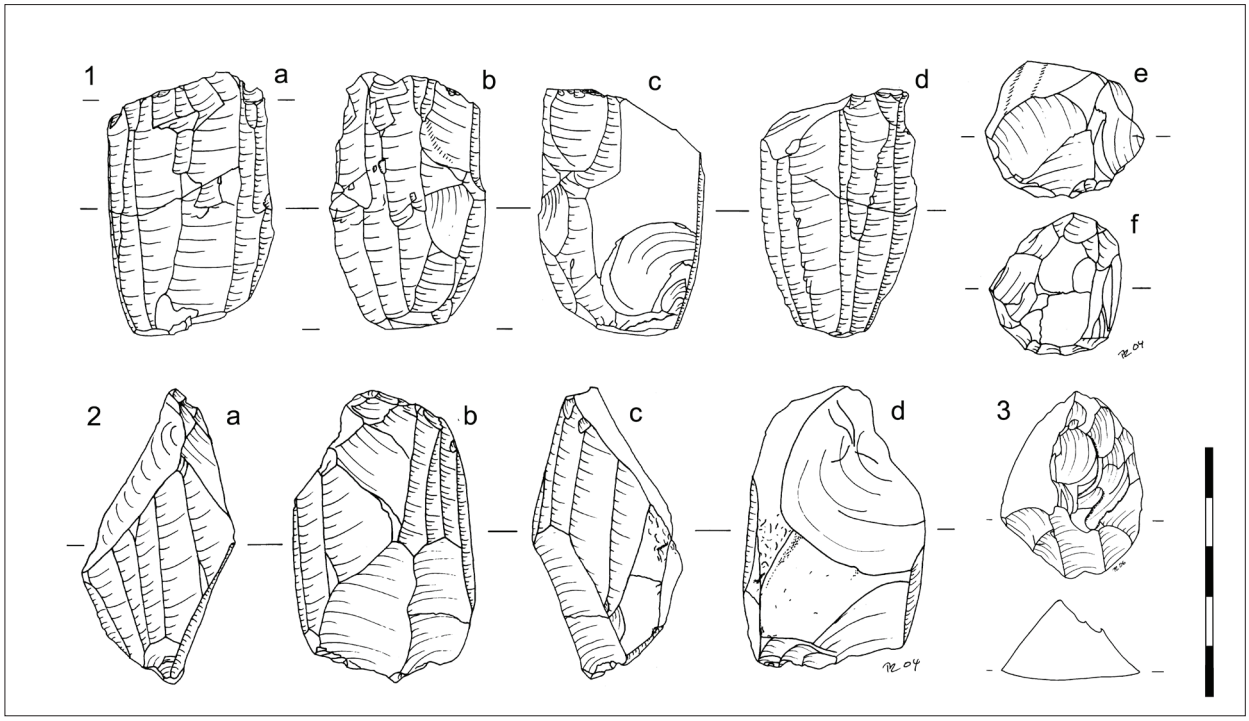

Fig. 7. Blade cores from the Sujala site, ⅔ nat. size (drawings: T. Rankama).
Abb. 7. *Klingenkerne aus der Fundstelle Sujala,* ⅔ nat. Größe *(Zeichnungen: T. Rankama).*

the process cannot be reconstructed. A few recovered crested or partially crested blades, however, suggest that it involved forming a bifacial crest on a block of raw material and proceeding from there (cf. Inizan et al. 1999: 73, 139, fig. 64). The fourteen blade cores and core fragments recovered all represent the same sub-conical single-platform shape, where the fluted core face usually only covers part of the circumference of the piece, while the back of the core is shaped by flaking. The two largest cores are shown in Figure 7. Their lengths are 53.2 mm (Fig. 7: 1) and 59.6 mm (Fig. 7: 2).

Core 2 in Figure 7 is the one originally interpreted as a bidirectional one. Closer inspection has revealed that its fluted surface shows blade removals only from one direction. The wider scars from the opposite direction seen in Figure 7: 2b-c are not true blade detachments but apparently represent core maintenance. Figure 7: 1e shows the platform and Figure 7: 1f the base of core 1; Figure 7: 3 is the piece detached from core 2 by a frost fracture.

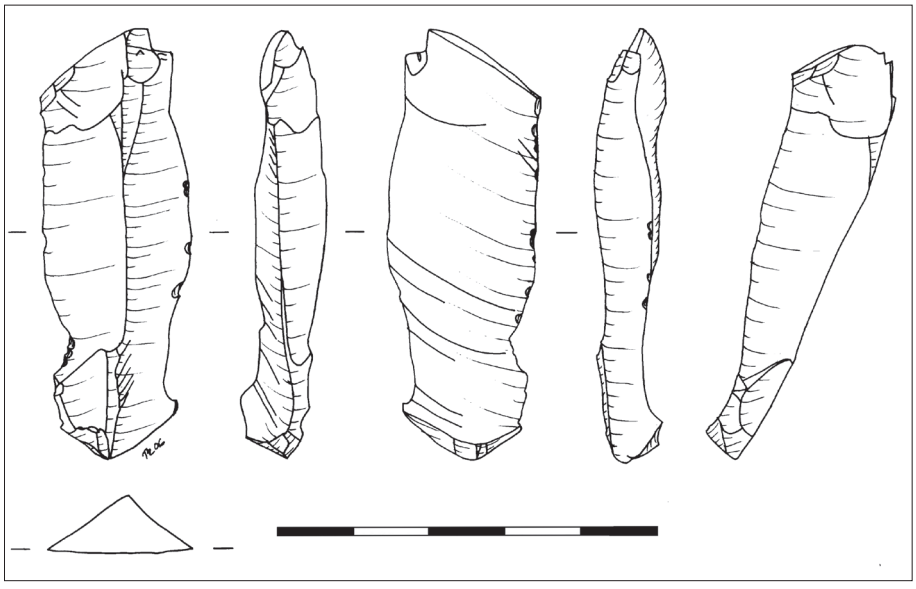

Fig. 8. Overshot blade from the Sujala site (drawings: T. Rankama).
Abb. 8. *Kernfußklinge aus der Fundstelle Sujala (Zeichnungen: T. Rankama).*

The blade scars on the cores are even and parallel-sided, and at least one face shows true fluting. The base of the cores is flat. If it became too pointed during blade reduction, this was remedied by detaching a small conical flake. This was probably to reduce the possibility of plunging (cf. Binder 1984: 82), which, nevertheless, occasionally happened (Fig. 8). The detached base fragments are usually less than 10 mm in length, but one piece, apparently from a very narrow core, is 30.5 mm in length but only 17.7 mm in diameter. As seen in Figure 7: 1e, the striking platform was formed by repeated detachments of core tablets. Platform rejuvenation was frequent and resulted in a large amount of waste products (Fig. 5), the presence of which provides clear evidence of *in situ* blade production. The core tablets usually terminate in hinges (Fig. 9). This can be interpreted as a deliberate strategy aimed at preventing the tablet from plunging and destroying the core face on the opposite side of the platform, which, nevertheless, happened with core 1 (see Fig. 7: 1d) and led to its rejection. The fact that hinge terminations are common when detaching pieces from a flat surface (Cotterell & Kamminga 1987: 701) probably made this method easier to master. The size of the largest core

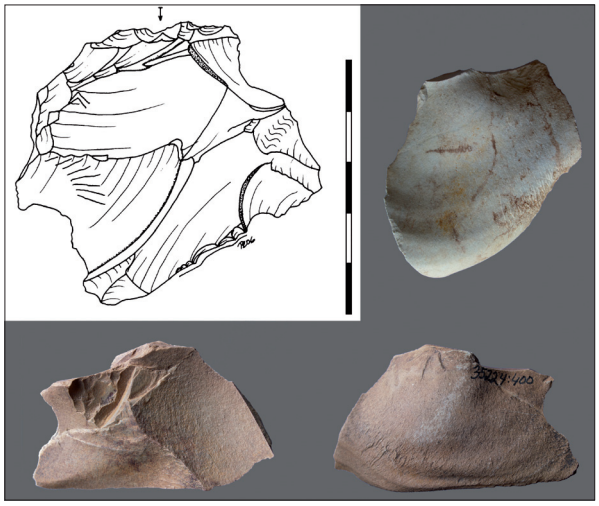

Fig. 9. Core tablets from the Sujala site. The bottom row shows two sides of the same tablet (photos: J. Kankaanpää, drawing: T. Rankama).

Abb. 9. *Kernscheiben aus der Fundstelle Sujala. Die untere Reihe zeigt die zwei Seiten derselben Kernscheibe (Fotos: J. Kankaanpää, Zeichnung: T. Rankama).*

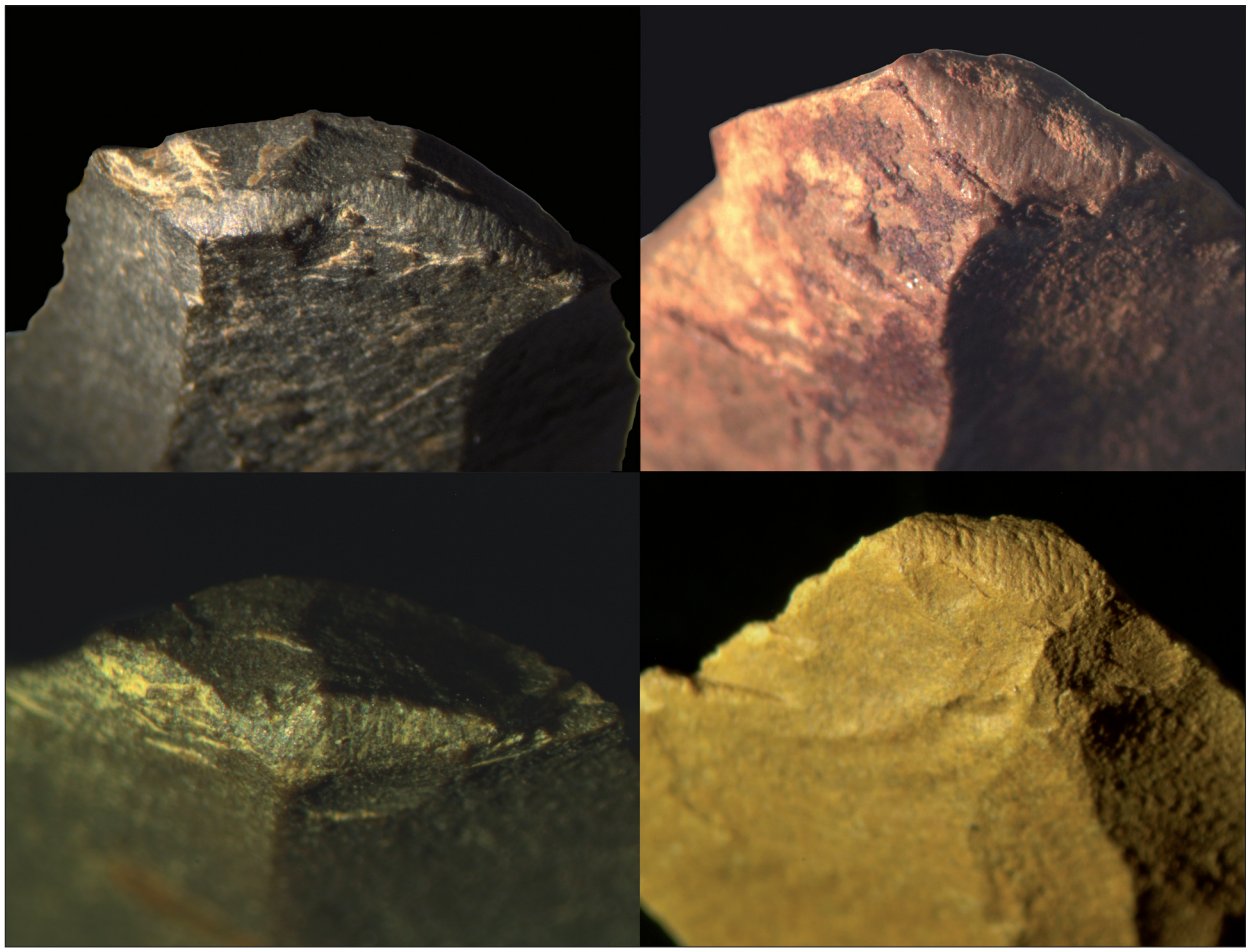

Fig. 10. Abraded platform edges on blades from the Sujala site (photos: J. Kankaanpää).

Abb. 10. *Abrasionsspuren auf Abbaukanten von Klingen aus der Fundstelle Sujala (Fotos: J. Kankaanpää).*

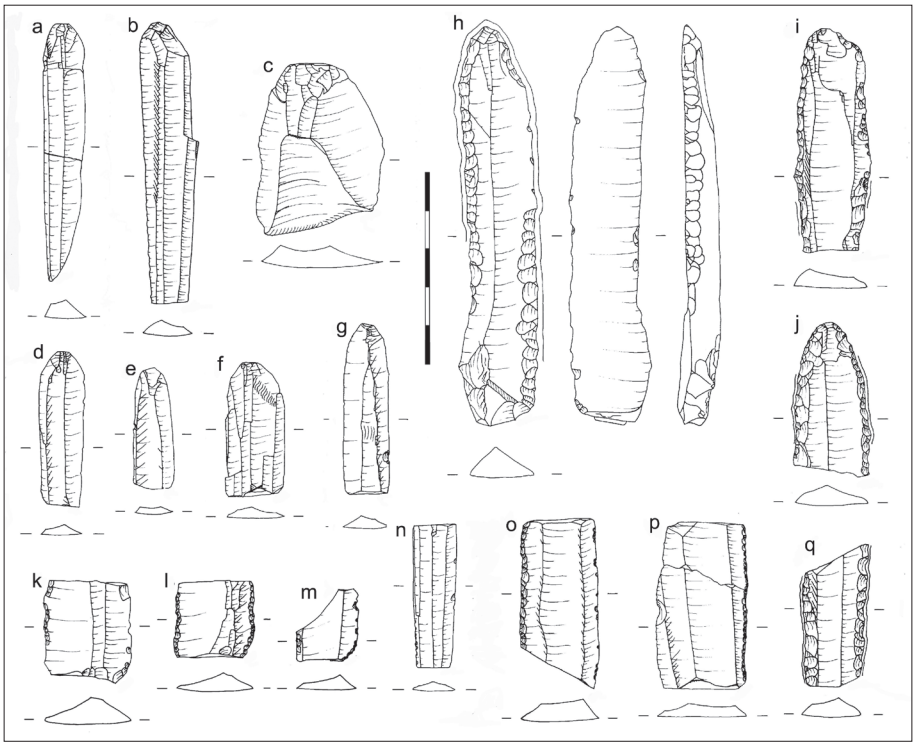

Fig. 11. A selection of blades from the Sujala site, ½ nat. size (drawings: T. Rankama).
Abb. 11. *Auswahl von Klingen aus der Fundstelle Sujala, ½ nat. Größe (Zeichnungen: T. Rankama).*

tablets shows that, although the exhausted cores are rather small, the ones originally brought to the site were considerably larger, with platform dimensions easily exceeding 75 mm.

The platform edge was carefully prepared before blade detachment. Trimming of the overhang can be seen in 96% of the proximal ends. In addition, at least 69% of the platform edges of the blades show heavy abrasion. Striations in the abrasion display the direction of the abrading movement, which was across, not along the core edge (Fig. 10).

Fig. 12. Profiles of large refitted blades from the Sujala site, ⅔ nat.size (photo: J. Kankaanpää).
Abb. 12. *Profile großer, zusammengesetzter Klingen aus der Fundstelle Sujala,* ⅔ nat. Größe *(Foto: J. Kankaanpää).*

The blades produced (Fig. 11) are regular and parallel-sided, with straight dorsal ridges following the alignment of the edges. The careful trimming of the proximal end typical of the blade assemblage can be seen in Figure 11: a-g, j. Figure 11: c shows another typical artefact: a wide blade terminating in a *languette* fracture, while Figure 11: f appears to represent core face rejuvenation.

The length profile of the blades is remarkably straight even in the widest of the blades, and no mesial "belly" on the ventral side (cf. Pelegrin 2006: 42) can be detected in the longest refitted pieces (Fig. 12). Blade width varies between c. 2 and 40 mm. The most common width of the proximal ends is between 10 and 12 mm, with 72% falling between 6 and 16 mm; the medial fragments not included in the statistics include even wider pieces. The width diagram (Fig. 13) indicates no separate macro- and microblade components, but suggests a continuum from the widest to the narrowest blades. The recovered cores thus, represent the end of a long *chaîne opératoire* that began with the preparation of cores capable of producing blades as much as 42.6 mm in width and exceeding 120–130 mm in length. Whether the largest blades were produced at Sujala or brought there ready-made is not known; however, as indicated above, the cores transported to the site must have been substantial in size.

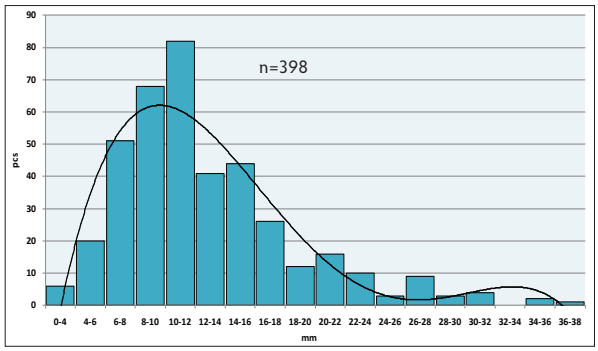

Fig. 13. Width diagram for whole blades and proximal ends from the Sujala site.

Abb. 13. *Breitendiagramm für vollständige Klingen und Proximalenden der Fundstelle Sujala.*

A closer look at the proximal ends of the blades reveals small platform remnants, in c. 67% of the cases less than 2 mm in thickness and in 88% of the cases less than 10 mm in width (Fig. 14). A comparison of the widths and thicknesses of the platform remnants with those of the proximal fragments of blades emphasises the small size of the former, but also the thinness of the blades themselves, as 77% of them fall under 4 mm in thickness.

In accordance with the small size, the surface of the platform remnant is usually plain (Fig. 15); there is little space for arrises. The butt types present are Type 2 (plain, 45%), Type 3 (dihedral, 17%), Type 4 (facetted, 27%), Type 6 (winged, 7%), Type 9 (linear, 2%) and Type 10 (punctiform, 2%; cf. Inizan et al. 1999: fig. 62).

The maximum width of the blades is reached rapidly, giving them fairly straight "shoulders". Bulb shape is often short and rounded, and 96% of the platform remnants have a lip on the ventral side, suggesting the use of a soft fabricator in blade production (Fig. 16; see also Inizan et al. 1999: 144).

The core and blade characteristics outlined above speak of a technology capable of producing blades that are very near the "ideal blade" in shape. The straight and regularly parallel ridges and the sub-conical shape of the cores suggest the use of the pressure technique (Inizan et al. 1999: 78-79). This interpretation is supported by blade attributes, such as the extreme regularity of the edges and arrises, the straightness of the length profile indicative of production on support, the thinness, the absence of a mesial "belly", the small butt, the rapid widening of the blade from the butt onwards, and the short and rounded bulb (Inizan et al. 1999: 79; Pelegrin 2006). The large size of some of the blades seems, on the basis of Pelegrin's experiments on flint, to imply the use of a lever. In the absence of blocks of raw material, however, this assumption cannot as yet be ascertained experimentally. In addition to pressure, part of the core shaping appears to have been carried out with indirect percussion (J. Pelegrin & M. Sørensen, pers. comm.).

The secondary modification of the blades most commonly took the form of semi-abrupt retouch along the blade edges (see Fig. 11: h-j, k-m, o-q). Very few pieces other than blades show evidence of secondary modification or use (see Fig. 5). Both retouched and unretouched blade edges were used, as evidenced by the distinct signs of wear on many of them.

The next stage of modification was snapping the blades into shorter segments at right angles to the long axis (Fig. 11: k-p). Snapping is so common and the fragments are so evenly distributed over the site that they can hardly have resulted from post-depositional processes, such as the occasional traffic on the track that crosses the central part of the site. The same is indicated by refitting: the fragments of the blade shown in Figure 4, for example, were found in different parts of the site at distances of up to 5.5 m from each other. Had the snaps been the result of post-depositional processes, the fragments ought to

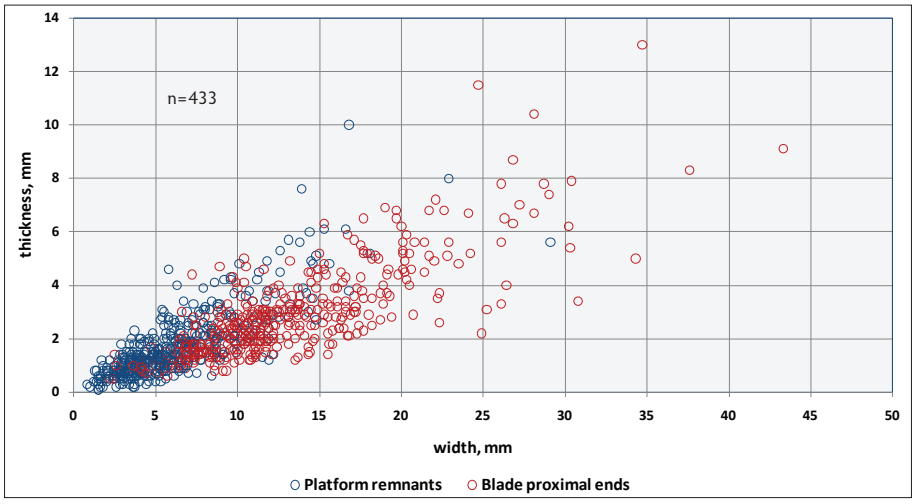

Fig. 14. Blade proximal end and platform remnant measurements in the Sujala assemblage.

Abb. 14. *Messungen von Klingenproximalenden und Schlagflächenresten des Fundinventars von Sujala.*

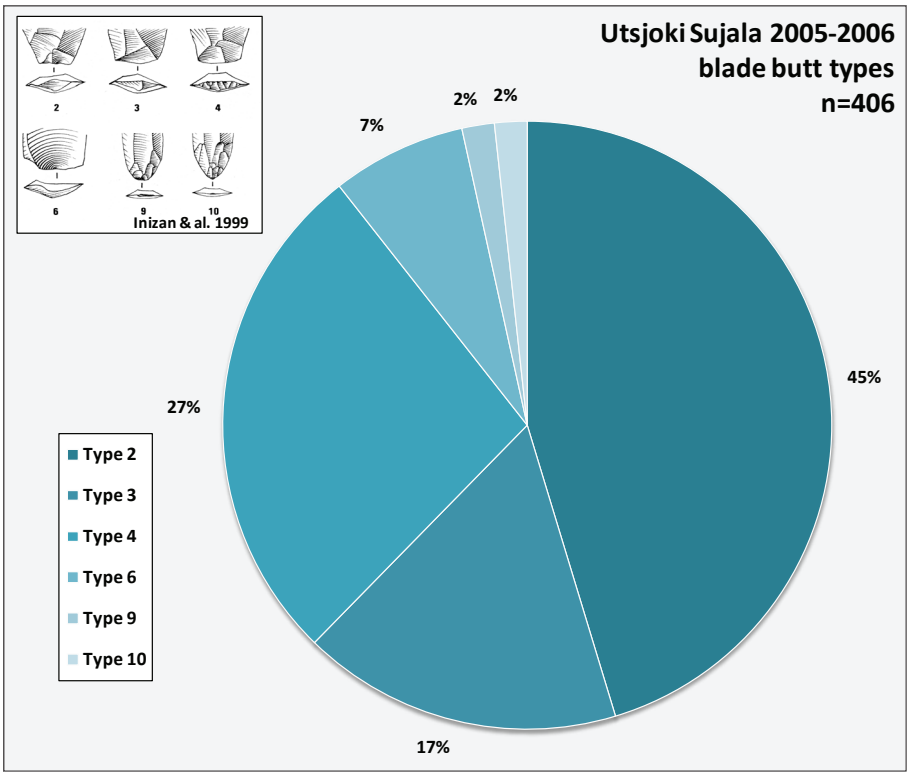

Fig. 15. Blade butt types in the 2005-2006 assemblages from the Sujala site (butt types from Inizan et al. 1999, Fig. 62).

Abb. 15. *Verschiedene Ausprägungen des Proximalendes des Fundinventars von 2005-2006 der Fundstelle Sujala (Typen von Proximalenden nach Inizan et al. 1999, Fig. 62).*

Fig. 16. Ventral views of blade proximal ends from the Sujala site (photos: J. Kankaanpää).

Abb. 16. *Ventralansicht von Klingenproximalenden aus der Fundstelle Sujala (Fotos: J. Kankaanpää).*

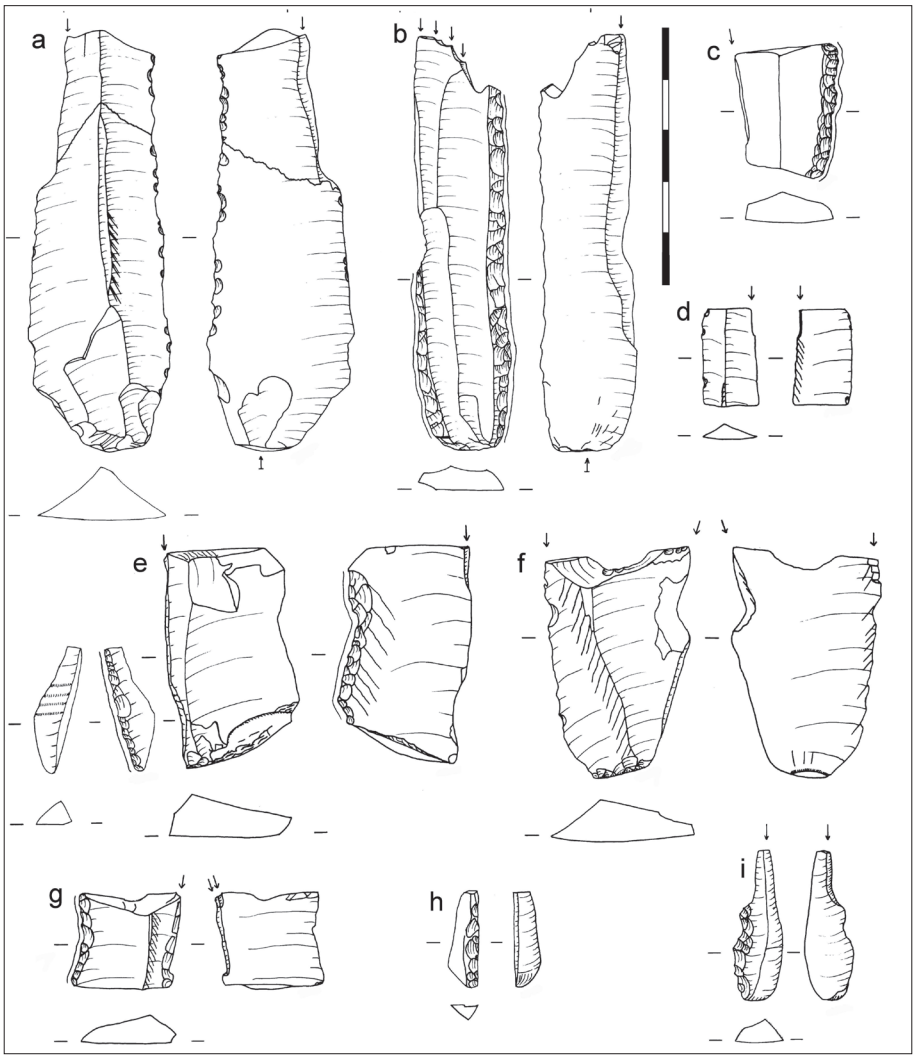

Fig. 17. Blade burins and burin spalls from the Sujala site, ⅔ nat. size (drawings: T. Rankama).

Abb. 17. *Klingenstichel und Stichelabschläge aus der Fundstelle Sujala*, ⅔ nat. Größe *(Zeichnungen: T. Rankama).*

have been found close to each other, since the track had not broken through the topsoil. Perpendicular breaks can be achieved, for example, by bending, i.e. placing a blade on the edge of a flat stone, holding one end firmly and pressing the other with a firm motion (Sjöström & Nilsson 2009: 792-793; M. Sørensen, pers. comm.). Alternatively, a sharp blow on a blade placed on an anvil can be used (e.g. Bergman et al. 1987). In the Sujala assemblage, breakage by bending is common, but some break surfaces display an eraillure scar, and a point of impact can occasionally be seen next to the break, which suggests the use of the latter method in at least some cases.

The microburin technique is not a part of the Sujala technology, nor does the assemblage include microliths. A couple of rectangular blade insets with invasive retouch on one edge have, however, been encountered.

The short, edge-retouched blade segments were used again, and sometimes resharpened. It was also fairly common to produce burins on the snaps (Fig. 17). Forty-five blade burins are included in the assemblage. The burin spalls often have retouched edges (Fig. 17: e, h, i), showing that burination was a type of reuse of blades that had already been used for something else.

The only time retouch occurs on the snapped surface is when the pieces have been modified into scrapers. These are rather uncommon in the Sujala assemblage. Only 18 are included, all made on blades (Fig. 18). Two of the scrapers are stemmed. One (Fig. 18: a) has a stem shaped by coarse retouch; the other one (Fig. 18: b) has been shaped by burin blows. The scrapers are often heavily worn.

The assemblage also includes 47 whole or fragmentary tanged arrowheads (Fig. 19). They are all identical in manufacture. The tip of the points has invasive retouch on the ventral side. The tang, which is always at the proximal end of the original blade, has been shaped bifacially or partly unifacially to reach a diamond-shaped cross section. The points are always aligned along the long axis of the blade, with the main dorsal ridge as close to the centre as possible. Placing

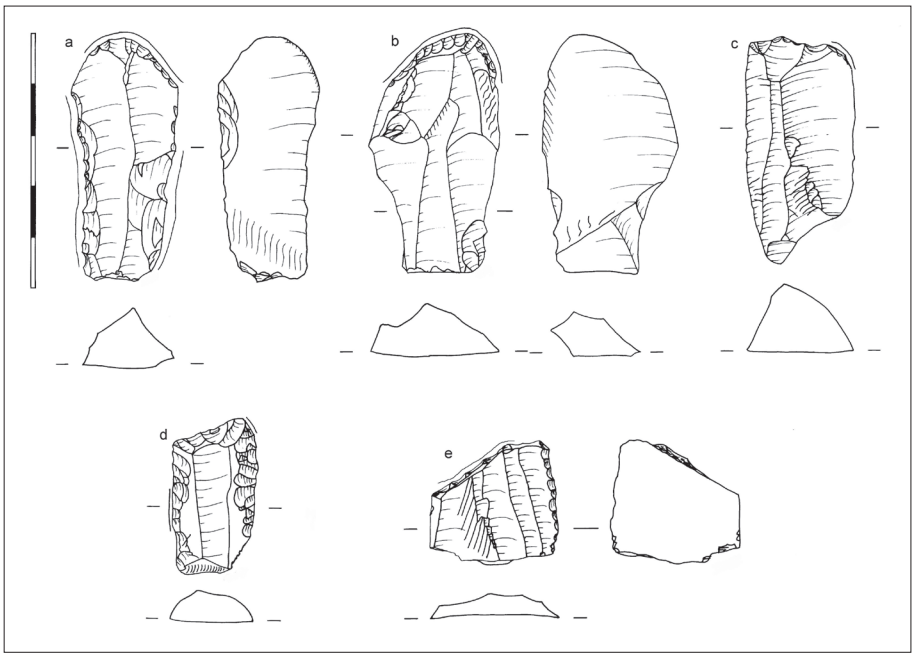

Fig. 18. Blade scrapers from the Sujala site, ⅔ nat. size (drawings: T. Rankama).
Abb. 18. *Klingenkratzer aus der Fundstelle Sujala, ⅔ nat. Größe (Zeichnungen: T. Rankama).*

the tip at the main dorsal ridge – i.e. at the strongest point – has been important, as shown by the points that are asymmetrical due to the position or curving of the ridge towards the distal end (e.g. Fig. 19: b, g). Point manufacture began with the invasive ventral retouch of the tip, as seen from the single recovered preform (Fig. 19: h).

The *chaîne opératoire* of the Sujala assemblage thus proceeds from raw material procurement (in an unknown location) to the shaping of blade cores with the help of a bifacial crest (mostly away from the Sujala site) and then, at the Sujala site, to repeated blade detachments by pressure, preceded by platform rejuvenation with repetitive detachments of core tablets terminating in hinges towards the centre of the striking platform of the core, core edge preparation by trimming away the overhang and abrasion, and isolation of the blade platform. At least one short hinged blade shows evidence of the platform having been isolated at one dorsal ridge, but the force having detached a wide enough piece to have included also the next dorsal ridge. The hinging after a couple of centimetres is probably the result of the force not having been strong enough to succeed in detaching this wider blade completely. The core face appears to have been occasionally rejuvenated, since rather wide blades with several narrow blade scars on the dorsal surface occur.

After detachment the blades were either used without secondary modification (as shown by use damage on their unretouched edges), modified by edge-retouch, or shaped into tanged points. The edge-retouched (and other) blades could be further modified by snapping at right angles to the long axis, either to merely remove the proximal and/or distal ends, or to produce shorter sections. The snapped pieces could then be again shaped into tanged points, burinated, shaped into insets, used as side scrapers, or modified into end scrapers. No doubt repair and re-tooling has taken place during the use-life of the artefacts. The exact use of the pieces is not known, since use wear analysis has so far been impossible, due partly to the weathered surface of the bulk of the artefacts, partly to the fact that – in the absence of a known raw material source – it has not been possible to carry out the experiments necessary for reliable use wear analysis. Macroscopic use damage is, of course, seen on many of the pieces: for example the scraper in Figure 18: e has a strongly undercut blade.

It is not known whether all of the recovered blades of the dominant raw material were produced at Sujala or if some of them might have been brought there ready-made. At least one blade, a long striped one brought to the site complete and snapped there to produce a burin (Fig. 17: a), was not manufactured at the site, since, refitted, it is the only piece of its raw material present.

The origin of the Sujala technology

The technology and tools described above differ considerably from those of the geographically closest Early Mesolithic complex, Phase I of the Norwegian Barents Sea coast, which is characterised by a direct percussion technique where fairly irregular blades were produced with a soft hammer (Woodman 1993). As mentioned above, blade cores are extremely rare in Phase I assemblages, but in southern Norway the Ahrensburg-related cores are usually unifacial and often bidirectional, with an acute platform angle

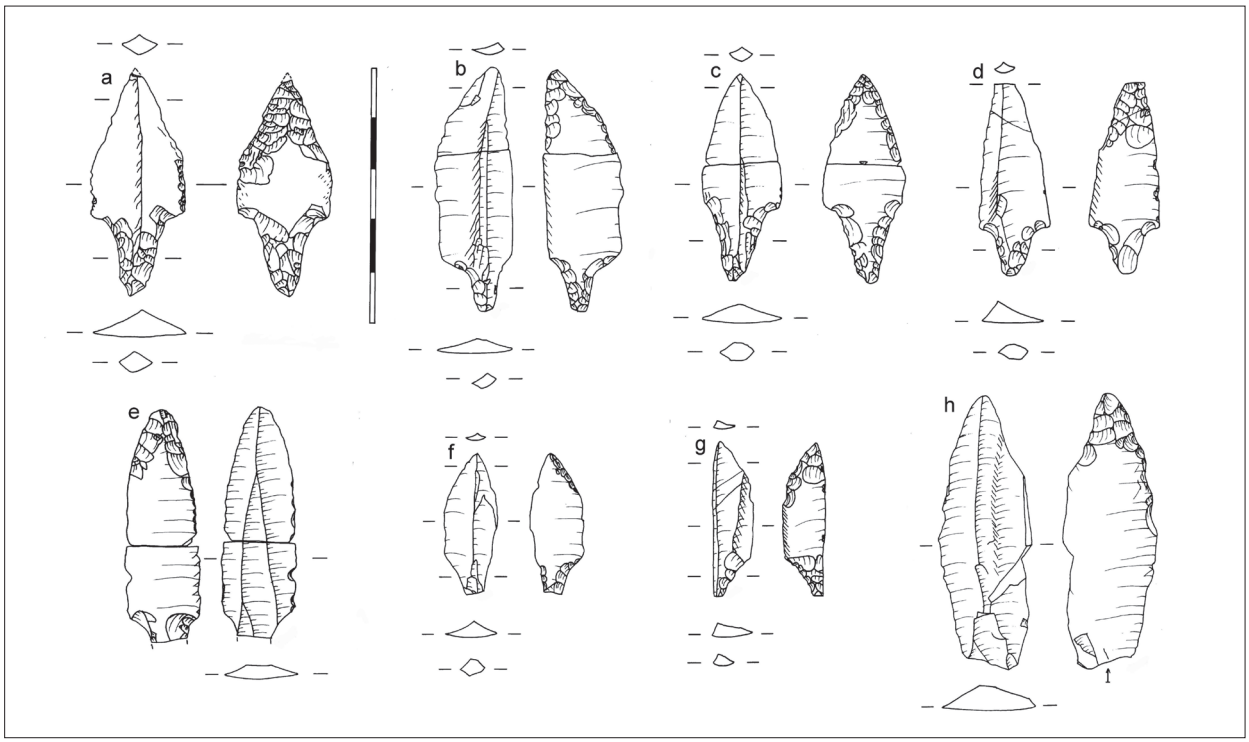

Fig. 19. Tanged points and a preform (h) from the Sujala site, ⅔ nat. size (drawings: T. Rankama).
Abb. 19. *Stielspitzen und eine Rohform (h) aus der Fundstelle Sujala, ⅔ nat. Größe (Zeichnungen: T. Rankama).*

(Bjerck 1986: 107, 110, Fig. 5; Waraas 2001: 89; Fuglestvedt 2009: 118-120). Their platforms are not rejuvenated as regularly or in the same way as at Sujala, and core tablets are rare in the assemblages (but see Skar & Coulson 1985: fig. 4; Fuglestvedt 2007: fig. 9 for examples). Although, as noted above, the presence of indirect percussion in Norwegian early Mesolithic contexts is sometimes claimed (e.g. Woodman 1993; Fuglestvedt 2007, 96), this has recently been challenged. The arrival of indirect percussion, as well as pressure, for blade production in Western Europe, including southern Scandinavia is, according to recent research, dated not earlier than c. 7 800 BP (Pelegrin 2006: 40; Sørensen 2006: 286, 291; M. Sørensen pers. comm.). It is also conspicuous that flake core reduction, especially from globular bifacial cores, was common on the Barents Sea coast (e.g. Bøe & Nummedal 1936: Pl. XL-XLII; Woodman 1993, 1999) but completely absent from Sujala.

Like the assemblages further south, the Early Mesolithic assemblages in northern Norway show evidence of the microburin technique for producing blanks for microliths and projectile points (Waraas 2001: 40-49; Hesjedal et al. 2008: 167-199, 384; Fuglestvedt 2009: 116). Tanged points are included in the Phase I assemblages, but they are technologically completely different from the Sujala points (Fig. 20). Ahrensburg-related points are usually asymmetrical, with one edge of the tip retouched and one feathered and sharp. They are often manufactured diagonally from the blade, but parallel points also occur. Their tangs are not bifacially worked, or diamond-shaped in cross-section, and ventral retouch does not occur (Woodman 1993, 1999; Prøsch-Danielsen & Høgestøl 1995: fig. 4; Waraas 2001: 38-45; Hesjedal et al. 2008: 177, fig. 3.50; Fuglestvedt 2009: 130-133).

Even though the raw material used at Sujala originates from the coastal sphere, it differs from that used on the coast. The earliest coastal inhabitants were happy to use quartz and rather coarse-grained quartzites for their blade – and flake – production (Woodman 1993: 61; Grydeland 2000: 13-20). These raw materials are not suitable for Sujala-style blade production.

Instead of the geographically closest area, parallels for the Sujala technology and typology can be found more than 1 000 km away in north-western Russia, among the so-called Post-Swiderian complexes. Especially the Butovo Culture assemblages centred in the Volga-Oka interfluve, with dates ranging from c. 9 800 BP to 7 000 BP (Koltsov & Zhilin 1999; Hartz et al. 2010), bear many similarities to the Sujala material, as do the Kunda Culture assemblages in the East Baltic region (starting c. 9 300 BP; Veski et al. 2005: table 2; Kriiska & Lõugas 2009: fig. 26.3) and the Parch assemblages on the River Vychegda (starting c. 9 500 BP; Volokitin 2005). A few sites with Post-Swiderian material and Late Preboreal dates, as well as stray finds of Post-Swiderian nature, have also been found in southern Finland (Takala 2003, 2004; Jussila & Matiskainen 2003; Jussila et al. 2007, 2010; Hertell & Manninen 2010, 2011).

The similarities between the Sujala and the Post-Swiderian assemblages include the use of the pressure

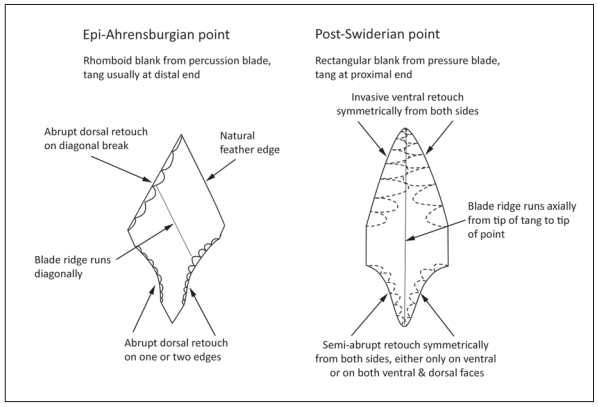

Fig. 20. Schematic representation of Epi-Ahrensburgian and Post-Swiderian tanged points on blades, illustrating main diagnostic differences (drawing: J. Kankaanpää).

Abb. 20. *Schematische Darstellung von Epi-Ahrensburg und Post-Swidry Stielspitzen, um die wichtigsten diagnostischen Unterschiede zu zeigen (Zeichnung: J. Kankaanpää).*

technique in blade production from semi-conical single-platform cores, resulting in extremely regular blades and core faces, platform rejuvenation with flakes that terminate near the centre of the striking platform, the absence of the microburin technique and microliths, while instead snapping the blades into shorter sections at right angles, semi-abrupt retouch along the blade edges, and burins on snaps along the blade edges. The points found at Sujala are identical in shape and manufacturing technique to the Post-Swiderian points, the longest and most spectacular of which are often called Pulli points after the earliest site in Estonia (Sorokin 1981, 1984; Zhilin 1996, 1999, 2003, 2005; Koltsov & Zhilin 1999; Ostrauskas 2000; Zhilin & Matiskainen 2003; Volokitin 2005, 2006; Žilin 2006; Hartz et al. 2010). These similarities, and the differences between Sujala and the coastal Phase I assemblages, leave little doubt as to where the origin of the Sujala population lies.

The raw material of the Sujala finds

As pointed out above, the raw material of the Sujala finds, identified as weakly metamorphosed sandstone, is not local to the immediate vicinity of the site. The site lies within the Fennoscandian Shield, a large Precambrian formation practically devoid of sedimentary rocks (Fig. 21), while the edge of the younger formations of the Scandinavian Caledonides lies some 60 km to the north, running along the southern shore of the Varangerfjord. The raw material used by the Sujala knappers is fine-grained and homogeneous, dark green or black when fresh, but weathers into a brown or even almost white colour when exposed to the elements. It resembles the rock that Simonsen (1961) called "dolomitt" and Hood (1992) redefined as tuffaceous chert, which is found on several Mesolithic and Neolithic coastal sites in eastern Finnmark,

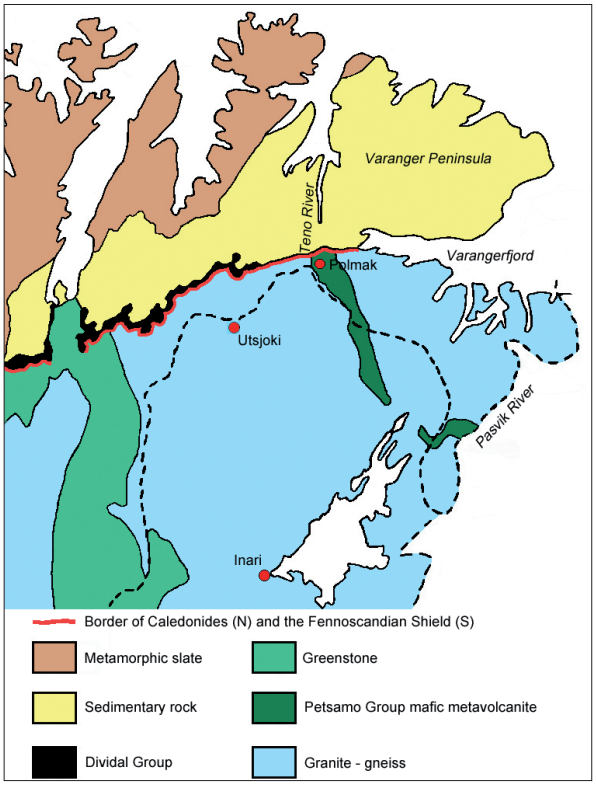

Fig. 21. Simplified map of Pre-Quaternary rocks in northernmost Fennoscandia (modified from Grydeland 2006, fig. 3.1, based on Silvennoinen et al. 1987).

Abb. 21. *Vereinfachte Karte von präquartären Gesteinen im nördlichsten Fennoskandinavien (verändert nach Grydeland 2006, fig. 3.1, basierend auf Silvennoinen et al. 1987).*

particularly in the Varangerfjord area directly north-east of the Sujala site.

According to Hood (1992: 91-93), the tuffaceous chert probably derives from the Fennoscandian Shield, more precisely the metavolcanites of the Petsamo Group that stretches from the Pasvik River area in eastern Finnmark through eastern Utsjoki Borough and on to the River Teno near Polmak Village. The Sujala raw material has been studied by Reino Kesola, formerly of the Geological Survey of Finland, publisher of the Näätämö sheet of the Geological Map of Finland/Pre-Quaternary Rocks (Kesola 1994, 1995). The Näätämö sheet covers part of the mafic metavolcanic rock formation (Petsamo Group) referred to by Hood. According to Kesola, however, the Sujala raw material is too weakly metamorphosed and homogeneous to be part of the Petsamo Group, which consists of strongly metamorphosed and partly deformed rocks. While the Sujala raw material looks uniform, on closer inspection it becomes clear that the assemblage consists of several slightly different sandstones. Therefore, a thin section of one sample would only reflect the characteristics of one particular block, but not necessarily the others. All of the blocks, however, represent the wide selection of sandstones found on the Varanger Peninsula (R. Kesola, pers.

comm.). The identification of the raw material as Varanger sandstone has later been confirmed by Anna Siedlecka, formerly of the Norges Geologiske Undersøkelse, who is an expert on the geology of the Varanger area (A. Siedlecka, pers. comm; cf. Siedlecka et al. 1998).

The coastal connection: the Fállegoahtesajeguolbba site

The probability that the raw material of the Sujala finds originated in northern Norway raised several interesting questions. It appeared that the Sujala people had obtained their raw material from the Varangerfjord area, but the question was, how?

As archaeological finds showed the Varangerfjord to have been occupied in the late Preboreal by the Ahrensburg-derived "Komsa" or "Phase I" people who had moved up the Norwegian coast, perhaps several hundreds of years previously, there appear to be three possible options: either the Sujala people had traded with the coastal inhabitants for the raw material, had made quick raids to the coast to steal it, or had visited the coast for lengthier periods without raising the animosity of the local inhabitants. An additional twist to the question was provided by the fact that from the beginning of the Boreal period, i.e. rather soon after the Sujala occupation, sites on the Norwegian coast began to show evidence that the original Phase I direct percussion technology – inherited from the ancestral Ahrensburg culture – was being superseded by a more controlled Phase II technology producing regular blades. In order to try to find sources of the Sujala raw material and possible evidence of visits to the coast by the eastern pioneers, we began in 2007 to survey the Varanger Peninsula and the Varangerfjord area. Though several small sites with more or less asymmetric flakes of Sujala-like raw material were noted along the southern shore of the Varangerfjord, no outcrops or nodules of weakly metamorphosed sandstone similar to the Sujala stone were discovered. However, during a visit to a local museum, the Várjjat Sámi Musea/Varanger Sámi Museum in Varangerbotn in the fall of 2007, we noted a number of evident pressure blades made from a familiar-looking raw material in one of the showcases. Upon enquiry, it turned out that they were surface finds collected by a local enthusiast from an undocumented site. The exact location, however, could not be determined at this time as the only person with the information – the director of the museum, Dr. Kjersti Schanche – was on leave.

In the summer of 2008, we were able to go through the museum's Mesolithic collections. There were several small collections of artefacts, most of which represented the typical "Komsa Phase" or "Phase I" industry. However, one collection was very different, with numerous regular, symmetric blades and blade fragments. Both the blades and the flakes of this collection displayed the small platform remnants typical of pressure and indirect percussion. The finds that had originally drawn our attention in the showcase came from this very same collection.

According to Dr. Schanche, the site from which this aberrant collection derived had been discovered in

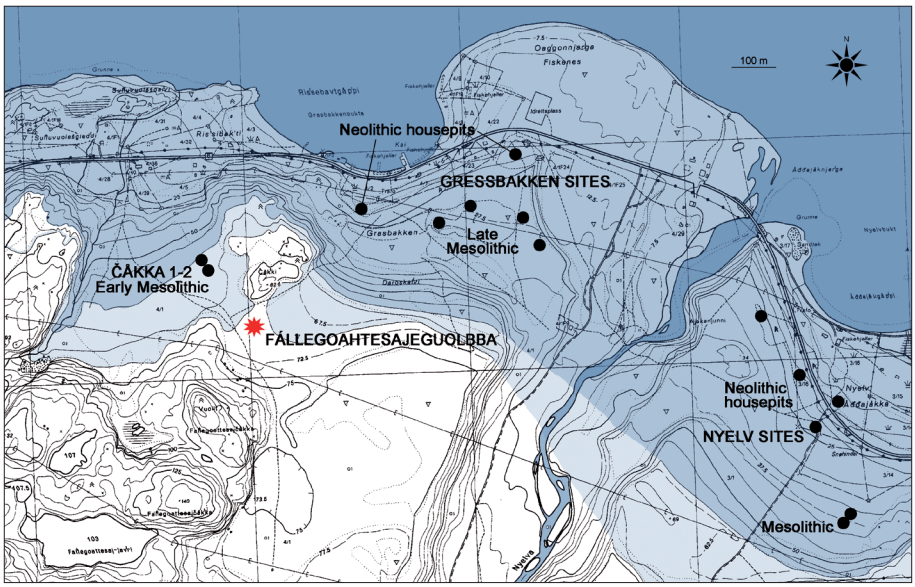

Fig. 22. The location of the Fállegoahtesajeguolbba site and other nearby Stone Age sites, showing the coastline at 50 m and 60 m elevation above current sea level (base map: Geovekst; site data courtesy of S. E. Grydeland & B. Hood).

Abb. 22. *Die Lage der Fundstelle Fállegoahtesajeguolbba und anderer, nahegelegener steinzeitlicher Fundstellen. Die Küstenlinie von 50 m und 60 m über dem heutigen Meeresspiegel ist dargestellt (Kartengrundlage: Geovekst, Fundstellendaten freundlichst zur Verfügung gestellt von S. E. Grydeland & B. Hood).*

Fig. 23. The Fállegoahtesajeguolbba saddle seen from the south. The site is slightly right of centre (photo: J. Kankaanpää).
Abb. 23. *Der Sattel von Fállegoahtesajeguolbba von Süden gesehen. Die Fundstelle liegt etwas rechts der Bildmitte (Foto: J. Kankaanpää).*

1978 by students working at M. A. P. Renouf's excavation at Nyelv on the southern shore of the Varangerfjord, some 15 km east of Varangerbotn. The students had regularly climbed up the hill from Nyelv to collect surface finds, but no actual survey or report of the site had ever been filed.

It was important for us to pinpoint the location of the site in the terrain, since this would determine its elevation above sea level and, through shore displacement dating, give us an idea of its age bracket and chronological relationship to Sujala. In the summer of 2009 we managed to locate the lithic scatter with the help of Dr. Schanche.

The find location is a sandy saddle between an outlying rocky outcrop and the inland cliffs (Fig. 22), lying only a few hundred metres south-west of the well-known Gressbakken sites studied by Nummedal and Simonsen (Nummedal 1936, 1937; Simonsen 1961: 248-391). The local Sámi (Lappish) name for the adjoining sandy plateau is Fállegoahtesajeguolbba. The vegetation is heather, low herbs, and lichen, with clumps of brush-like tundra birch, but large areas of vegetation have been eroded by a combination of wind and reindeer activity, so that bare sand and gravel cover a large proportion of the saddle in patches of varying size (Fig. 23).

During our first visit in 2009, we were not equipped for survey but noted the locations of some two dozen surface finds by GPS. The site appeared to be a small scatter no more than 13 m lengthwise and 6 m across, with perhaps 30 finds visible on the surface. We therefore visited the site again in the summer of 2010 to record the surface finds in preparation for a possible excavation. We also documented the finds in the Varanger Sámi Museum, although the precise provenance of the latter would, of course, remain unknown.

The intensive surface survey took four days to complete, instead of the expected afternoon, as the size of the site and the number of finds proved to be much larger than originally estimated. The eroded areas were inspected in small blocks and all surface finds were marked. A grid was then laid out and the coordinates of the finds were recorded, after which they were photographed and measured *in situ* and a description was written of each piece.

According to the survey, the surface find scatter covers an area of at least 230 m^2. The actual size of the site is probably somewhat larger, as it appears to continue into an area covered by surface vegetation. Not having permission for test excavation, we could not dig test pits to verify the true extent. The recorded surface finds numbered 238 and appeared to form two parallel bands roughly 8 m apart, running approximately WSW-ENE. The longer band was some 22 m and the shorter some 14 m long, although the latter may have continued under the vegetation (Fig. 24). No evidence of structures – hut floors, hearths, stone tent rings etc. – were observed in the find area. Given the mixed and eroded character of the surface sand, the absence of colour stains denoting human activity was not a surprise.

The finds were not collected but left in their original positions, in part for legal reasons but also to ensure that a future excavation with more precise surveying equipment could locate all finds still in the ground on the same grid.

At the Varanger Sámi Museum, we were able to photograph and measure all of the finds from the Fállegoahtesajeguolbba site with the exception of the

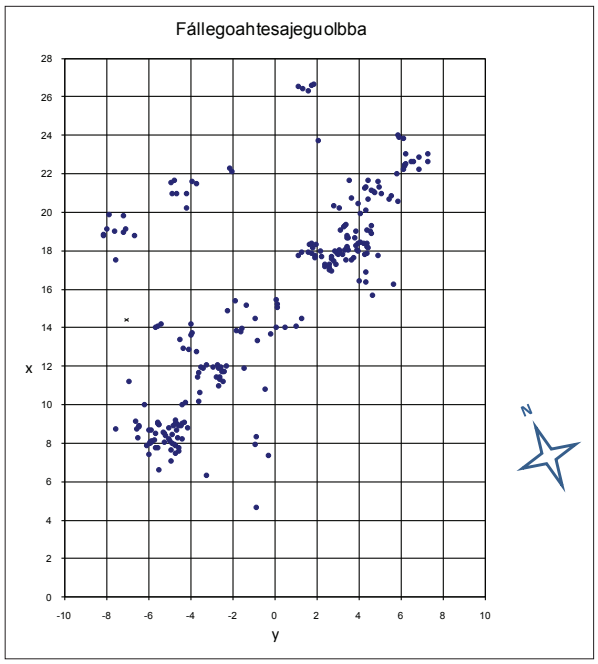

Fig. 24. Distribution plan of the Fállegoahtesajeguolbba surface finds; units are metres.

Abb. 24. *Fundverteilung der Oberflächenfunde von Fállegoahtesajeguolbba; Achseneinheit in Metern.*

Category	Museum	Site surface	Total
Core fragments	1	0	1
Blades and blade fragments	103	101	204
Core tablets/ platform rejuvenation	41	42	83
Probable core tablets	7	3	10
Flakes	42	34	76
Core edge trimming flakes	0	9	9
Burin spalls	6	2	8
Burins	1	0	1
Other tools	0	1	1
Core edge flakes	1	1	2
Undefined	3	5	8
Unclassifiable fragments	40	39	79
Ground tool fragments	0	1	1
Total	**244**	**238**	**482**

Fig. 25. Artefact categories in the Fállegoahtesajeguolbba surface and museum collections.

Abb. 25. *Artefaktklassen der Oberflächenfunde und Museumssammlungen der Fundstelle Fállegoahtesajeguolbba.*

artefacts that were in the exhibit showcase and would have been difficult to access. A few bags of diverse flakes and fragments were identified and counted but not measured or photographed due to the tight schedule. The documented museum finds numbered 244, bringing the total number of documented Fállegoahtesajeguolbba finds to 482. We have yet to view the finds collected by the students in 1978, which are kept at the Tromsø Museum.

The Fállegoahtesajeguolbba technology

Like Sujala, the Fállegoahtesajeguolbba assemblage appears to consist exclusively of the remains of blade core reduction. It must be remembered, however, that we are dealing with unexcavated finds, and that surprises may lie under the site surface. The fact that the site has not been excavated also means that the smallest size fraction of the artefacts is probably underrepresented. With these caveats in mind we can look at the main characteristics of the assemblage.

Most of the Fállegoahtesajeguolbba artefacts are made of very similar raw material as the Sujala finds. The assemblage includes, however, also some different raw materials. The most prominent among them is a porphyritic chert with rather large darker inclusions in a lighter matrix that appears to weather in much the same way as the Sujala raw material. This rock is represented by at least 18 pieces in the museum collection and 21 pieces among the surface finds. It does not, however, seem to work quite as well in blade production as the finer-grained raw materials.

As seen in Figure 25, the largest artefact category is formed by blades and blade fragments, with 103 in the museum collection and 101 recorded on the site surface. Core tablets form the second largest group (41 and 42, respectively), with flakes following close by (42 and 34). Since the flakes are made of the same raw materials as used in the blade reduction, it is probable that they derive from the same process and represent core shaping. Unclassifiable fragments are understandably a large category in a trampled surface assemblage, but modified tools are rare. So are core edge trimming flakes, most of which have probably gone undetected due to their small size. The only artefact category in the Fállegoahtesajeguolbba assemblage that is absent from Sujala is the fragment of a ground stone tool, probably an axe or an adze. On the other hand the Fállegoahtesajeguolbba assemblage is missing some key components of the Sujala assemblage, notably cores and tanged points.

The Fállegoahtesajeguolbba blades display the same characteristics as at Sujala (Fig. 26). They are regular and parallel-sided, and the dorsal ridges are aligned with the edges, suggesting the use of the pressure technique. The proximal ends are carefully trimmed, and occasional *languette* fractures (Fig. 26: c, Fig. 27) occur. Evidence of core face rejuvenation can also been seen (Fig. 26: i, cf. Fig. 11: f). As at Sujala, there are also a few crested or partially crested blades (Fig. 26: d).

The assemblage does not include any evidence of the microburin technique. Blades snapped at right angles (Fig. 26: a, d, h, i, m-s), on the other hand, are common, as is retouch along the edges, especially in the medial fragments. Blade width measured from the proximal ends varies between 6.6 and 52.9 mm, but the narrowest and widest blades are found among the medial and distal fragments (5.5 and 57.3 mm,

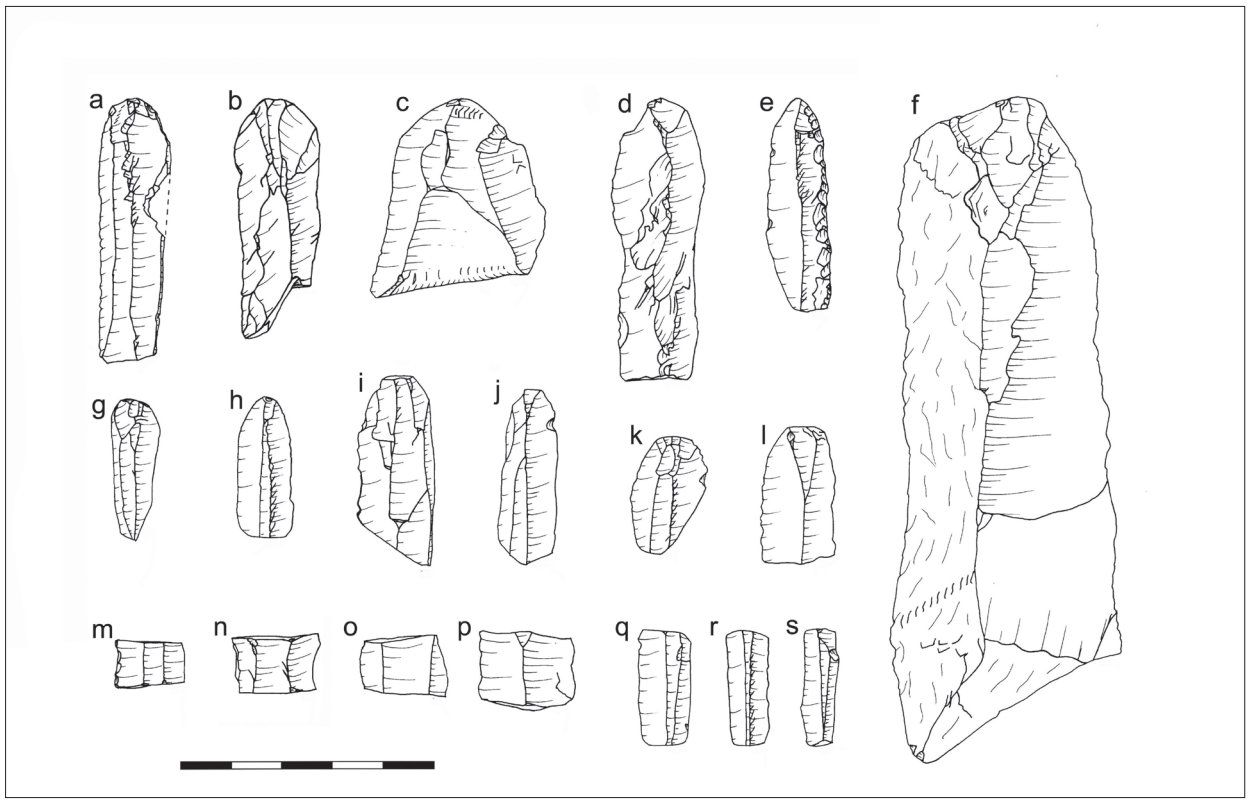

Fig. 26. A selection of blades from the Fállegoahtesajeguolbba site, ⅔ nat. size (drawings: T. Rankama).
Ab. 26. *Auswahl von Klingen aus der Fundstelle Fállegoahtesajeguolbba,* ⅔ nat.Größe *(Zeichnungen: T. Rankama).*

respectively). The widest blade is a *languette*-fractured distal end in spotted brown chert (Fig. 27).

The width distribution of the proximal ends is fairly similar to that of the Sujala blades (Fig. 28; cf. Fig. 13). The majority of the proximal ends are between 10 and 18 mm in width. The slightly stronger bias towards the narrower end displayed by the Sujala blades can probably be explained by the fact that in the unexcavated Fállegoahtesajeguolbba assemblage the larger end of the scale is overemphasised.

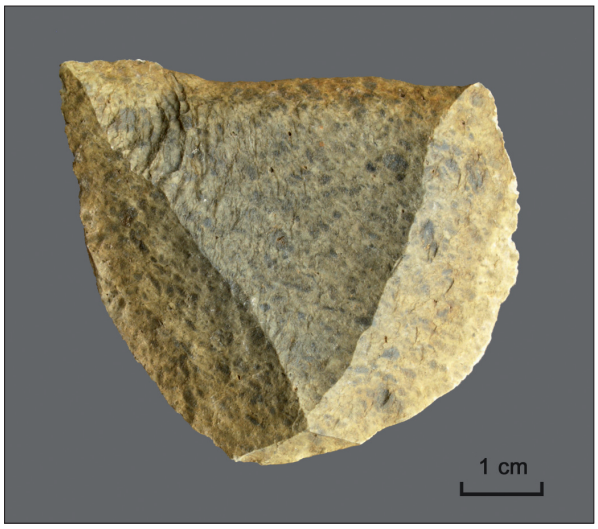

Fig. 27. *Languette*-fractured distal end from Fállegoahtesajeguolbba, spotted chert (photo: J. Kankaanpää).

Abb. 27. Languette*-Bruch von einem distalen Klingenende aus der Fundstelle Fállegoahtesajeguolbba, gesprenkeltes Rohmaterial (Foto: J. Kankaanpää).*

The proximal ends of the Fállegoahtesajeguolbba blades display the same elements of platform preparation as at Sujala. A comparison of the proximal end characteristics (Fig. 29) shows that trimming of the overhang is present in more than 90% of the proximal ends in both assemblages. Abrasion is even more common in the Fállegoahtesajeguolbba assemblage than at Sujala, reaching almost 75%. A lip on the ventral side of the platform remnant is present in almost all (98%) of the Fállegoahtesajeguolbba proximal ends, while eraillure scars and bending initiations are rare in both assemblages.

A comparison of butt type distributions (Fig. 30) shows that the selection of butt types is the same at both sites. The type frequencies are also almost similar. The clearest difference between the sites is in types 3 and 4: type 3 is more common at Fállegoahtesajeguolbba, while type 4 is more common at Sujala. To understand this difference requires more analyses.

The width and thickness measurements of the Fállegoahtesajeguolbba proximal ends and platform remnants display a distinct difference as compared with the Sujala assemblage (Fig. 31). While blade widths are fairly similar in both assemblages, blade thickness is higher at Fállegoahtesajeguolbba, concentrating below 6 mm, not below 4 mm as at Sujala (cf. Fig. 14). A comparable difference can be

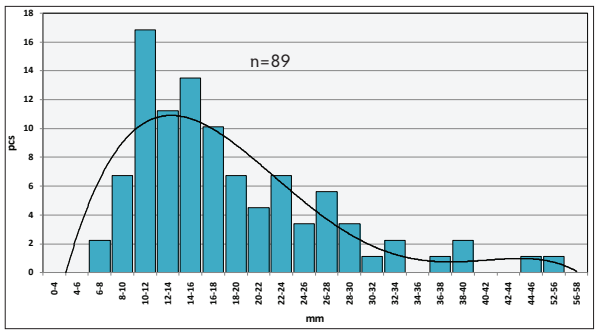

Fig. 28. Width distribution of blade proximal ends from the Fállegoahtesajeguolbba site.

Abb. 28. *Breitenverteilung der Klingenproximalenden der Fundstelle Fállegoahtesajeguolbba.*

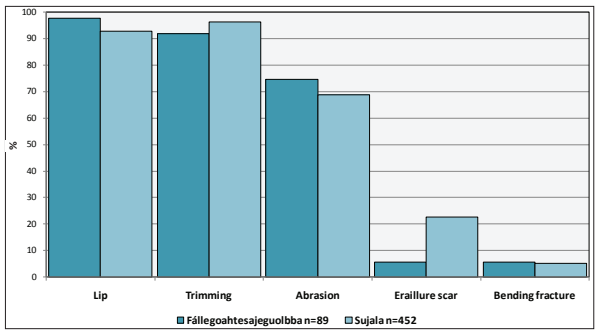

Fig. 29. Proximal end features in the Fállegoahtesajeguolbba and Sujala assemblages.

Abb. 29. *Merkmale am Proximalende von Klingen der Fundinventare von Fállegoahtesajeguolbba und Sujala.*

seen in the platform remnant measurements; at Sujala the bulk of them fall below 2 mm in thickness, while at Fállegoahtesajeguolbba the limit is 4 mm. This difference may, again, be partly explained through the skewed size distribution of the surface recorded and collected Fállegoahtesajeguolbba finds, but before an excavation is carried out it is impossible to say whether a further explanation needs to be sought somewhere else.

The platform rejuvenation flakes from Fállegoahtesajeguolbba (Fig. 32) are similar in all respects to the Sujala core tablets. Hinge termination is very common and the dorsal surfaces show the scars of the previous hinge terminated detachments. Only two complete platform detachments are included, both recorded on the site surface. One of them has plunged and destroyed the opposite edge of the core – an undesired result. The other is from an almost pencil-shaped core, since the diameter of the complete tablet is only 16.9 mm (Fig. 33).

Although the assemblage is incomplete due to the lack of a proper excavation, the Fállegoahtesajeguolbba *chaîne opératoire* can be reconstructed to some extent. It began with the procurement of blocks of raw material, not all identical. The blade cores were shaped by producing a bifacial ridge and the blade production proceeded in the same way as Sujala: the striking platform was shaped by repeated detachments of core tablets that terminated in hinges towards its centre, the overhang was removed by trimming, the edge was abraded, the platform was isolated, and the blade detached, probably by pressure. The core face was occasionally rejuvenated during the process. Judging by the smallest complete platform removal, at least some of the cores were used to a very small size before being discarded, which suggests that

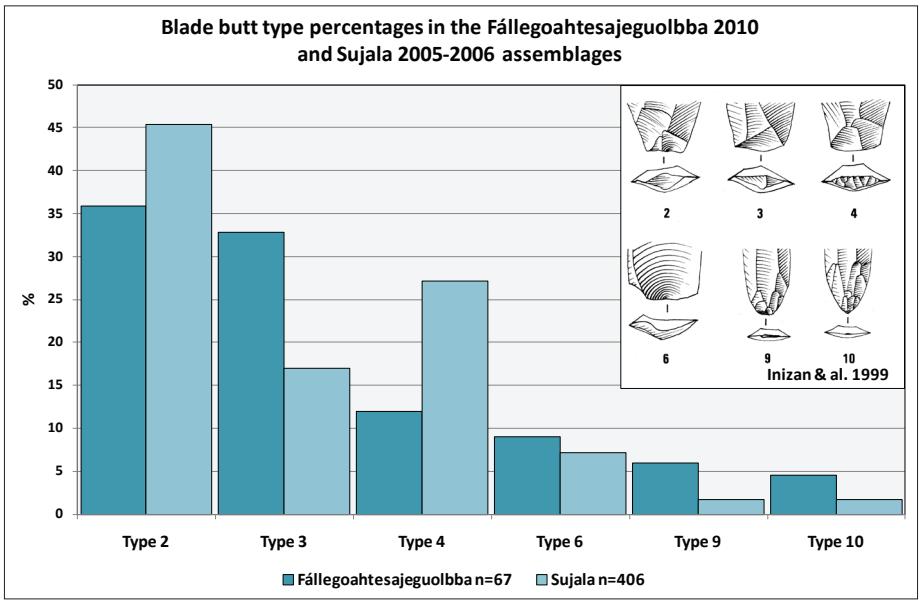

Fig. 30. Blade butt type statistics for the Fállegoahtesajeguolbba and Sujala assemblages (butt types from Inizan et al. 1999, fig. 62).

Abb. 30. *Statistische Verteilung der unterschiedlichen Typen von Proximalenden der Fundinventare von Fállegoahtesajeguolbba und Sujala (Typen von Proximalenden nach Inizan et al. 1999, fig. 62).*

they were clamped in some kind of a holding device during reduction.

The secondary modification of the blades took the form of retouch along the edges and the snapping of the blades perpendicularly. Burination was also fairly common; although only one certain burin has been identified, the assemblage includes eight burin spalls – a fair amount considering the generally small size of these artefacts.

The above characteristics of the Fállegoahtesajeguolbba artefacts show clearly that they do not belong to the same technological family as the Phase I assemblages of the North Norwegian coast. Instead, they show the same technological characteristics as the Sujala assemblage. Fállegoahtesajeguolbba is thus the first identified assemblage of eastern ancestry on the Barents Sea coast.

The age of the Fállegoahtesajeguolbba site

As no excavation has yet been carried out, the dating of the Fállegoahtesajeguolbba site relies on shore displacement. The exact elevation of the site has not been measured, but judging by the surface forms and the site's location as regards the 5-metre contours of the topographic map, an estimated elevation of 71 m above sea level may be considered fairly close to the mark. If anything, the true elevation is probably slightly higher rather than lower.

According to the most recent shore displacement curve for the southern shore of the Varangerfjord (Fletcher et al. 1993: 125, Fig. 6A), a location directly on the shoreline would give the Fállegoahtesajeguolbba site a date of nearly 12 000 BP. This is hardly likely, since the continental glacier would have prohibited an approach from the east at this time. A comparison of the Fletcher curve with other dated sites from the inner Varangerfjord (Fig. 34) reveals that all sites lie several metres above the concurrent shoreline (see Fig. 35 for the locations of the sites). One should note that the three earliest dates (Lagesiid'bakti, 9 940 BP at 71 m; Čåkki 1, 9 782 BP at 63 m; Niibiræppen 3, 9 550 BP at 53 m) are all on conifer (i.e. *Pinus*, in the first case possibly also *Picea* or *Larix*) charcoal (Grydeland 2006: 72) and derive from locations between c. 3–10 m above the concurrent shoreline while the four younger dates (Čåkki 1, 9 166 BP at 63 m; Mortensnes 2/R10, 8 500 BP at 40 m; Stuorrasiida 1, 8 365 BP at 37 m; and Stuorrasiida 2, 7 295 BP at 29 m) are on birch or unknown charcoal (Schanche 1988: 97; Grydeland 2006: 72) and derive from sites 6–21 m above the shoreline associated with the relevant date. Particularly interesting are the two Čåkki 1 dates, which are from the same feature, a stone tent ring that lies on a lower terrace only some 150 m north-west of the Fállegoahtesajeguolbba site. The difference between the uncalibrated ages of the conifer and birch samples from Čåkki 1 is roughly 600 years. While part of this difference may be explained by the "old wood" phenomenon (conifers as a rule live longer than birches), another relevant fact is that apparently there were no conifers in northern Lapland during the Preboreal (e.g. Hyvärinen 1975; Seppä 1996). It is thus very likely that the charcoal in question derived from driftwood of probable Siberian origin, which may have been floating around in the Arctic Ocean and thereafter lying on the beach for centuries before ending up in the campfire. Dead birches, on the other

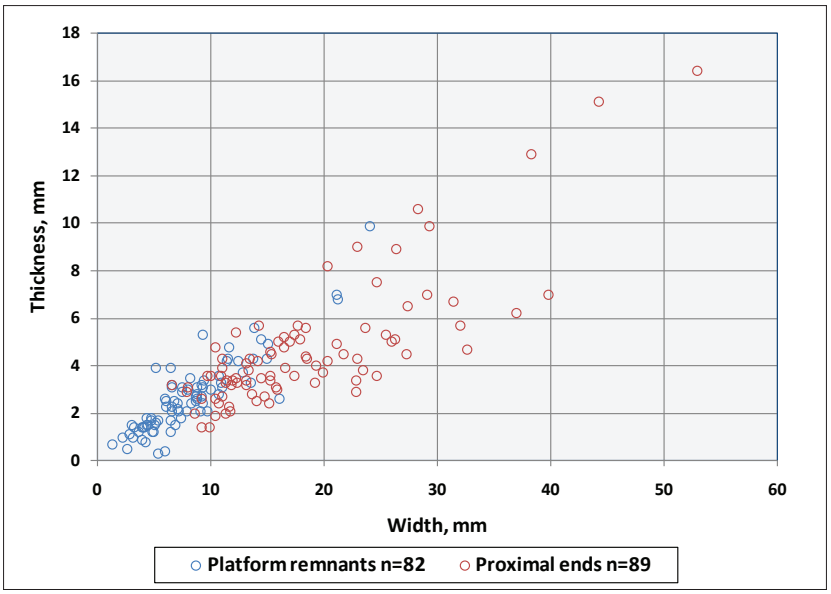

Fig. 31. The width and thickness of proximal ends and platform remnants in the Fállegoahtesajeguolbba blade assemblage.

Abb. 31. *Breite und Dicke der Proximalenden und Schlagflächenreste des Fundinventars von Fállegoahtesajeguolbba.*

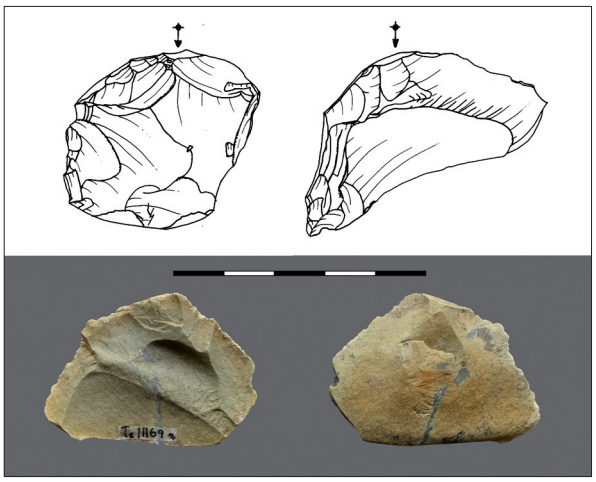

Fig. 32. Core tablets from the Fállegoahtesajeguolbba site. The photographs show two sides of the same tablet (drawings: T. Rankama, photos: J. Kankaanpää).

Ab. 32. *Kernscheiben asu der Fundstelle Fállegoahtesajeguolbba. Das Foto zeigt die beiden Seiten derselben Kernscheibe (Zeichnungen: T. Rankama, Fotos: J. Kankaanpää).*

Fig. 33. Complete core tablet from the Fállegoahtesajeguobba site (photo: J. Kankaanpää).

Abb. 33. *Vollständige Kernscheibe aus der Fundstelle Fállegoahtesajeguolbba (Foto: J. Kankaanpää).*

hand, rot very quickly; thus, birch dates on the whole should be considered more dependable.

The Fállegoahtesajeguolbba site lies at the same elevation (c. 71 m) as the Lagesiid'bakti site, dated to 9 940 BP on conifer charcoal. Applying the 600 ± year difference between conifer and birch noted at the Čåkki 1 site would give Fállegoahtesajeguolbba a date of c. 9 325 BP and an original elevation of c. 10 m above sea level, while applying the elevation above shoreline for the Čåkki 1 birch date (c. 21 m) would give a date of c. 9 500 BP. Using the elevations above shoreline of the other birch dates would give even older ages. The range is rather wide, but what appears evident is that the Fállegoahtesajeguolbba site is earlier than the younger Čåkki 1 date, possibly by several hundred years. It may also quite possibly be earlier than the Sujala site itself, and the elevation suggests it might even be as early as the earliest "Komsa" presence in the Varangerfjord as currently represented by the Lagesiid'bakti site. One should take into account, however, that the current radiocarbon date for that site – being on conifer – may actually be too early.

The nature of the Fállegoahtesajeguolbba site

Above, we suggested three possible scenarios as to how the inland Sujala people might have obtained their coastal lithic raw material: trading, raiding, or residence. The location of the Fállegoahtesajeguolbba site is suggestive. Around the time when it was probably occupied and sea level stood at 50–60 m above its current elevation, the site lay in the middle of a sandy neck connecting the outlying granite cliff of Čåkki to the similarly steep and rocky mainland (Fig. 22). This means that regardless of whether the wind was blowing from the east or the west, i.e. along the fjord, there was always a sheltered beach available on the other side of the neck for embarking or beaching boats. The pinnacle of Čåkki also provided an excellent lookout perch for scanning the fjord in all directions, in addition to shielding the site from a northerly wind. Similar locations on sandy necks have also been occupied by historical fishing villages up to the present day, including Bugøynes and Ekkerøy in the Varangerfjord itself. Mesolithic sites from similar locations are also known from the area, one example being the Mortensnes R8 site on the northern shore at 62–64 m above sea level (Schanche 1988: 57).

The fact that the eastern pioneers camped on a relatively exposed beach that was optimal for maritime subsistence, as opposed to some more sheltered location further inland, suggests that they had already adapted at least to some degree to maritime hunting and fishing rather than remaining pure inland hunters like their forebears, and that the coast was a regular stop on their seasonal round. The open location also gives the impression that the campers were not overly concerned about being noticed or attacked, suggesting that they were on friendly or at least neutral terms with the coastal population.

Discussion

The Sujala and Fállegoahtesajeguolbba assemblages constitute strong evidence of people arriving from the North-West Russian Post-Swiderian sphere into northernmost Lapland during the Late Preboreal. The presence of eastern immigrants in the inland region was already established by the discovery of the Sujala site (Rankama & Kankaanpää 2007; 2008); the Fállegoahtesajeguolbba site makes it clear that they were spending time also on the Barents Sea coast and

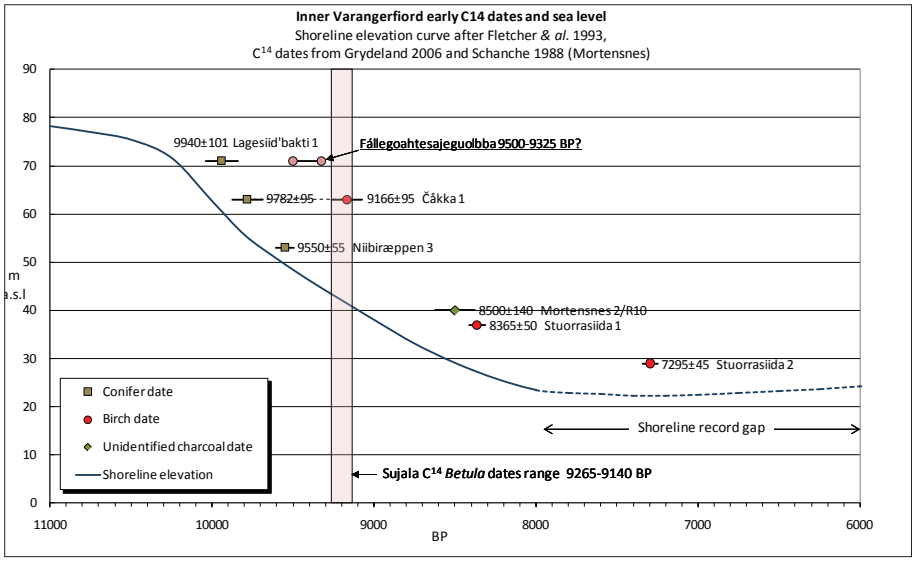

Fig. 34. Shoreline curve and radiocarbon dates of Early Mesolithic sites from the Varangerfjord, with Sujala birch date bracket and possible dates for Fállegoahtesajeguolbba.

Abb. 34. *Kurve der Küstenlinienhöhe mit ^{14}C-Daten von Früh-Mesolithischen Fundstellen am Varangerfjord, mit den Datierungen der Birkenholzkohle von Sujala und möglichen Daten von Fállegoahtesajeguolbba.*

using the coastal resources, not only lithic, but also probably biological. Thus, their adaptation and/or inclinations differed from those of the Norwegian Phase I population, who appear to have kept to the coastal sphere, not venturing into the inland regions.

We can, of course, not assume that the Sujala and Fállegoahtesajeguolbba sites were stops on the seasonal round of the same group of people. To make that claim, we would need to find a refit between the two sites. As pointed out above, we cannot even be sure that the sites are contemporaneous; Fállegoahtesajeguolbba might be earlier by a couple of hundred years. What seems clear, however, is that the lithic artefacts found on these two sites were manufactured by people – or descendants of people – who had arrived in the area from the Post-Swiderian sphere in north-western Russia.

The blade technology of the south-eastern immigrants suggests a rapid move north-westwards over the Fennoscandian Shield – a journey of at least 1 000 km (see Fig. 36). Since the Fennoscandian Shield is devoid of lithic raw materials that could lend themselves to the production of pressure blades, the move had to take place at the most within the span of one adult lifetime. Without a suitable raw material, it would not have been possible to practise or teach the

Fig. 35. Early Mesolithic sites in the Varangerfjord (drawing: J. Kankaanpää).

Abb. 35. *Lage von Früh-Mesolithischen Fundstellen am Varangerfjord (Zeichnung: J. Kannkaanpää).*

Fig. 36. Northern Europe c. 9 000 BP, showing the Fennoscandian Shield, flint-bearing Cretaceous and Carboniferous sedimentary formations, and possible early migration routes (coastline map with glacier from Donner 1995; geological formations based on Kinnunen et al. 1985).

Abb. 36. *Nördliches Europa um 9 000 BP mit dem Fennoskandinavischen Schild, feuersteinhaltigen kreide- und karbonzeitlichen Sedimentformationen, und möglichen frühen Ausbreitungsrouten (Karte der Küstenlinie mit Gletscher von Donner 1995, geologische Formationen basieren auf Kinnunen et al. 1985).*

method of producing pressure blades and thus keep the tradition alive in the group. Therefore, the same person(s) who had already mastered the necessary knowledge and know-how in the mother area had to reach the Varangerfjord, find the suitable raw material sources, and pass their skills to the next generation (Rankama & Kankaanpää 2007: 57, 2008: 895-896).

The identification of the Fállegoahtesajeguolbba assemblage as Post-Swiderian forces us to ask whether more evidence of pioneers of south-eastern origin might exist, so far unidentified, in the Varangerfjord area. The Norwegian Preboreal Phase I assemblages show a clearly different, western-derived, technology, but the Boreal Period Phase II, or Woodman's Sæleneshøgda Phase, brings with it a distinct change in technology and raw material use. The core type changes into a single-platform type and the blades become more regular. Although Woodman emphasises the microblade component of Phase II assemblages, he points out that they also include larger blades, up to 15 mm in width and more than 100 mm in length (Woodman 1993: 72-73, 1999: 301). These are often made of what he calls dolomitic flint – a term often used on the Varangerfjord shore for raw material that looks like the metamorphosed sandstone employed at Sujala and Fállegoahtesajeguolbba. Woodman suggests that this raw material "tends to fracture into segments either in use or post depositionally" (Woodman 1993: 72). To us, this suggests the same kind of intentional perpendicular snapping as at Sujala and Fállegoahtesajeguolbba, which is part of the Post-Swiderian technology.

Phase II assemblages include more edge-retouched blades than before, and burins, especially ones made from short blade fragments using the snapped surface as the platform and detaching the spall along the retouched edge of the blade, are also more frequent (Woodman 1993: 73-74, figs. 8 & 10; Olsen 1994: 31). These are also characteristics of the eastern blade technology.

Woodman based his definition of the Sæleneshøgda Phase on three assemblages, Sæleneshøgda and Starehnjunni ("Karlebotn hut excavations") in Karlebotn and Mortensnes R10 on the north shore of the

Varangerfjord (Woodman 1993; see also Schanche 1988; Engelstad 1990). These are all dated to the Boreal period, somewhat later than the Sujala and Fállegoahtesajeguolbba sites. We have not yet had the opportunity to see these assemblages ourselves, but photographs sent by colleagues in Tromsø (B. Hood, pers. comm.; A. R. Niemi, pers. comm.), as well as illustrations in Woodman (1993: Figs. 8 & 10) and Schanche (1988: 75, Fig. 24), show artefacts that look identical with the Sujala and Fállegoahtesajeguolbba finds both in technology and in raw material.

The Sæleneshøgda/Phase II technology is usually associated with Boreal Period developments in western and southern Norway (Woodman 1993: 74; Olsen 1994: 36; cf. Bjerck 1986). We suggest that it might be more fruitful to look at the eastern blade making tradition of the Post-Swiderian sphere for parallels of the technology and artefact forms. This would mean that, rather than a chronological unit, "Phase II" should be seen as a technologically distinct entity with a completely different origin than Phase I, and, consequently, as a distinct ethnic group. In the light of the fact that this eastern technological entity appears in the Barents Sea region already during the Preboreal Period, it is worth considering also the possibility that, instead of innovations always spreading from the south towards the north, in this case we might be looking at the opposite direction. Might the development in western Norway have had its roots in the north, and not vice versa?

Suggestions for further research

As the title of this paper indicates, we have here presented the first evidence that people from north-western Russia travelled north all the way to the Barents Sea coast during the Preboreal. We have hinted at the possible influence these people may have had on the subsequent cultural development in northernmost Finland and Norway, but the matter requires much further research. Therefore, it is prudent here to present suggestions for some of the lines of study indicated.

To our mind, an excavation at the Fállegoahtesaje-guolbba site would be of the first importance. This would ensure the recovery of as complete an assemblage as possible to compare with Sujala, hopefully including cores and arrowheads, as well as material for radiocarbon analysis. The latter is essential for ascertaining the position of this site in the chronological framework of the area.

Since it seems probable that the influence of the eastern immigrants will be seen among the finds currently known as Phase II of the North Norwegian Mesolithic, the next step would be re-analysing the known Phase II assemblages to ascertain the degree to which their technology corresponds to that of Sujala and Fállegoahtesajeguolbba. Recognising Post-Swiderian arrowheads among the finds would be a bonus. Subsequently, the same kind of analyses should be extended to the assemblages of similar character mentioned by Woodman that he did not include in his analyses. Likewise, the assemblages that, according to Bøe and Nummedal, were of a less macrolithic character than the typical Komsa Culture finds should be re-analysed. It would also be essential to carry out fieldwork in order to obtain material for more reliable dates for the assemblages.

Given the fact that sites with Post-Swiderian-type material have now been found both in the inland lake region and on the Varangerfjord coast, finding more Preboreal inland sites of eastern character should be possible. The task of locating them in the vast, mostly roadless wilderness of northern Finnish Lapland and Finnmark is, of course, enormous, but well worth the effort.

Only when substantially more data about the true extent and date of the eastern influence in the area has been collected can the discussion of east-west relations begin in earnest. This discussion would also require better dating of Phase I assemblages. As it stands today, the Phase I dates are so ephemeral that it is not possible even to be sure which population reached the area first.

A further matter that requires reflection is what happened to the Phase I population later. If the eastern technology is shown to win ground during Phase II and begin spreading westwards and southwards, the implication is that the western-derived Phase I population disappeared. What could have caused this development?

As the above discussion indicates, there are at the moment more questions than answers. What the research presented in this paper has achieved is to show that, when it comes to culture and population, the early post-glacial situation in the far north of Fennoscandia is anything but simple. If we want to understand it in all of its complexity, all of the research outlined above is absolutely necessary.

Conclusions

In this paper we have discussed two recently discovered Early Mesolithic assemblages from northern Finnish Lapland and the Varangerfjord coast in northern Norway. These assemblages bear unprecedented evidence that pioneer settlers from north-western Russia reached the area during the Preboreal period after travelling more than 1 000 km from their area of origin. In contrast to the coastal area's settlers of western origin, these immigrants were exploiting the resources of both the coastal sphere and the inland region. It is likely that, now that the technological signature of the eastern population has been identified, more sites of eastern character will be discovered both on the coast and in the inland regions of northern Finnish Lapland and Finnmark.

The eastern settlers probably had contacts with

the western population. Judging by the fact that several potentially eastern settlements exist in exposed locations, these contacts appear not to have been hostile. It is possible that the influence of the eastern settlers manifested in technological development eventually reached far beyond the area in eastern Finnmark and northern Finnish Lapland where evidence of their presence has so far been found.

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