

Southwest Norway at the Pleistocene/ Holocene Transition: Landscape Development, Colonization, Site Types, Settlement Patterns

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This article contributes a western Norwegian perspective to the ongoing debate on the timing and nature of the earliest colonization of northern Europe. Despite there being a theoretical possibility of Late Glacial settlement, currently available data indicate a populating of the area around the termination of the Pleistocene ca. 10,000 (uncalibrated) yr BP. The earliest radiocarbon date in southwest Norway so far, 9750 BP, is only a terminus ante quem. Environmental, economic, technological and social factors involved as a result of the colonization process are discussed briefly, and trends in the archaeological record are emphasized and commented on. The economy reflected by the first complete annual subsistence patterns is interpreted as having been logistically mobile, highly adaptive and generally of opportunistic character. Particular attention is paid to Early Preboreal coastal and inland settlement of the 'Boknafjord' and 'Myrvatn/Fløyrlivatn' groups, the latter characterized by well-preserved site structures such as tent rings and hearths providing high-resolution radiocarbon dates and palaeo-botanical evidence.

INTRODUCTION

The focus of this article is the populating of southwest Norway, a 250 km long stretch of coast between the peninsula of Lista and the island of Bømlo. With open, unprotected maritime shorelines, the lowland plain of Jæren, a wide fjord basins dotted with islands, narrow fjords and a hinterland of valleys and highlands, the study area forms a landscape of manifold natural resources and human challenges during most prehistoric time period.

Until recently, investigation of the pioneer settlement of Norway has to a large extent been carried out in the shadow of find- productive and relatively well-preserved settlement sites in the classical south Scandinavian and continental European areas, allowing detailed artefact analyses and chronology schemes. By nature, 'the northern dimness' can be understood and partly explained by a lack of adequate finds over a long period of time. One urgent question, still far from resolved, is the character and timing of the first settlement. So far, two alternative interpretations have been put forward: (1) The first, the Promised Land axiom, presupposes that parts of the coastline of southern Norway were settled more or less spontaneously, almost as early as Denmark and Scania or at least during the Allerød chronozone. The lack of compelling archaeological evidence supporting this is explained mainly as a research lacuna (Rolfsen 1972). (2) The second interpretation, the No Man's Land theory, presumes that accessible coastal parts of Norway were colonized by Man around the Pleistocene/Holocene transition, which means several thousand years later than the earliest possible date. The find gap is interpreted as a settlement blank, and accordingly historically valid (Bjerck 1994, 1995).

Although still mainly a question of personal conviction, the first alternative has gained most general support. Some researchers even consider the matter as verified by osteological or archaeological find material (Lie 1990, Johansen & Unda's 1992)

The coastal areas of southwest Norway, by virtue of an early deglaciation and a geographical position directly confronting the wide Flachland areas on the North European plains, and confirmed to have been settled during the Late Pleistocene, may prove important for our understanding of Man's expansion of habitat into former glaciated landscapes and of early maritime adaptation patterns not directly archaeologically attainable in other areas. Moreover, the environmental changes at the Holocene boundary have been more abrupt, of larger amplitude and appear more sharply defined along the western seaboard of Scandinavia than in most other areas (Lowe et al. 1994).

To shed further light on these matters I will deal with the following natural and cultural historical themes:

- The environmental situation during the Late Pleistocene and Early Holocene
- The process of colonization and possible archaeological manifestations
- Site types and economic adaptation in the pioneer phase within two main ecological zones: coast and inland
- A brief discussion of the current archaeological evidence within a North European perspective.

The chronological frame is the closing of the Pleistocene and the first millennium of the Postglacial, covering the period ca. 12,000–9000 yr BP. All dates are quoted uncalibrated, which means about 1200–1500 years younger than absolute calendar values (Becker & Kromer 1991, Gulliksen et al. 1998), and the litho- and biostratigraphical chronozones are defined according to inter-Nordic convention (Mangerud et al. 1974) in spite of the recently criticized lack of precision and detail resolution (Björk et al. 1998).

ENVIRONMENTAL SETTING

The North Sea Basin and its surrounding lands were largely inhabitable during the Last Glacial Maximum (ca. 18,000 yr BP). Most of this region was mantled by ice sheets, or rendered sufficiently inhospitable by their proximity, that human occupation was either impossible or undesirable. Deglaciation of the outer coastline between 15,000 and 14,000 yr BP represents *a terminus post quem* for the colonization both of present southwest Norway and Norway in its entirety, and precludes the hypothetical possibility of far earlier (interstadial) activity.

The ice-free coast and outer fiord areas bordering the inland ice during the Bølling chronozone was a park tundra landscape with patches of willow shrubs and open birch vegetation in sheltered areas (Paus 1988), a subarctic climate dominated by katabatic winds and a July mean temperature reaching about 10°C (Wishman 1979). The terrestrial macrofauna is not known, except for reindeer, which can be traced back to 12,500 yr BP at Blomvåg outside Bergen (Lie 1986). For physical reasons the reindeer may only have migrated to the coastal strip from the south by crossing the sea-covered areas in the present North Sea basin on winter ice. During the Bølling, the sea temperatures remained low. Greenland seal and whale are represented in the Blomvåg assemblage along with a rich variety of seabirds and saltwater fish. Greenland right whales also occur in the shape of five stranded individuals dated between 12,400 and 11,400 yr BP found further south in the Boknafjord basin (Prøsch-Danielsen 2000).

After a short-termed cryomer (Older Dryas), the marine biological production steadily increased, and a strong current of warmer Atlantic water found its way along the west coast of Norway (Jansen & Bjørklund 1985, Hald & Aspeli 1997). In southwest Norway, as in most other parts of northern Europe, the Allerød chronozone represents a climatic optimum with the July mean reaching 14°C (Paus 1989), succeeded by marked vegetational changes and higher sea surface temperatures. This environmental setting has been characterized as ‘Man’s paradise on earth’ (Fischer 1991). Paradoxically, the development of a dry and warm climate may have proved critical for the survival of the arctic sea and land fauna, and thus unfavourable to the existence of humans along the Norwegian coasts.

The Younger Dryas (Dryas III) cryomer, starting about 10,900 yr BP, resulted in large glaciers advancing from the high mountains and completely filling up valley systems and narrow fjords, such as the 40 km long Lysefjord (Fig. 1). Boknafjord and the outer coasts were not physically affected by this event, but were influenced by meltwater and calving ice. The subfossil record is meagre, limited to the occurrence of a polar bear C14- dated to 10,700 yr BP in the Boknafjord (Blystad et al. 1993), a grey gurnard – eaten by the same bear (Thomsen 1983) – and reindeer antler in marine sediments on the Egersund coast deposited ca. 500 years later (Lie 1990). As a result of inflow from the Gulf Stream of warm high-salinity seawater along the western coast around 12,200 BP, the wealth of marine species probably increased. Climatically as well as botanically, the Preboreal chronozone brought about changes of even more dramatic character. The first vegetational responses to climatic amelioration are recorded locally as early as approximately 10,500 yr BP (Paus 1989), and the main change from arctic to boreal conditions took place around 10,300 BP (Rokoengen et al. 1991).

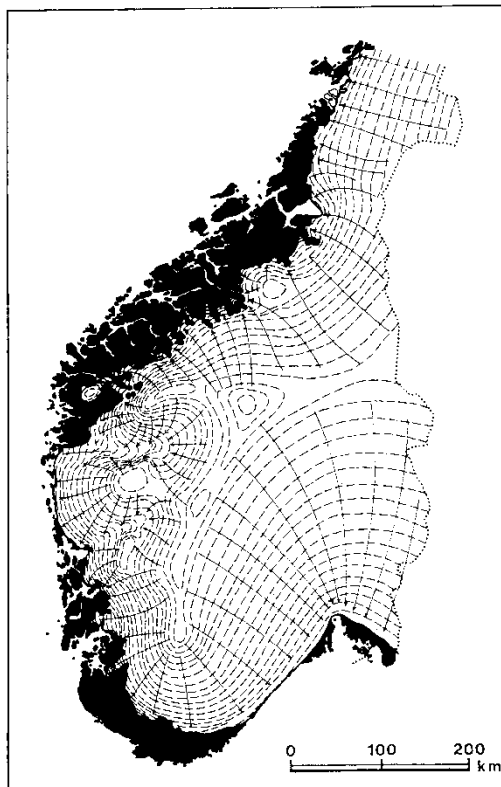


Fig. 1. *The extension of inland ice and deglaciated areas in southwest and northwest Norway during the Younger Dryas cryomer according to Sollid & Reite (1982), with land areas dyed black by me. Owing to ice pressure, accessible land bordering the Oslofjord appeared more restricted than shown on the map (cf. Fig. 2).*

Greenland ice cores indicate a sudden warming of about 7°C and to have occurred within a 50-year period during the Pleistocene/Holocene transition (Dansgaard et al. 1989). The sea surface warmed to temperatures similar to modern levels within fewer than 100 years, reaching a maximum at about 9200 BP (Lehman & Keigwin 1992, Hald & Aspeli 1997). Combined with rapid humus formation, the climatic change involved a considerable thickening of the vegetation, now made up of regular birch woods (Paus 1988). During the *Corylus* rise ca. 9500 yr BP, most coastal areas in south-west Norway appear to have been densely forested (Paus 1989, Prøsch-Danielsen 1993).

The inland ice sheet reacted to the rapid rise in temperature by receding from the Younger Dryas advance moraines. A recession rate of up to 300 m per year has been suggested in parts of western Norway (Andersen 1980). By about 9600 yr BP the ice had retreated to the eastern mountains of southwest Norway (Anundsen 1985), making progressively larger inland areas accessible for exploitation. With the exception of a single find of a stranded minke whale, the Preboreal sea and land fauna are not known. However, owing to thickening of the vegetation, reindeer herds are assumed to have left the coastal zone and moved to unforested mountain areas to the edge of the inland ice, being replaced in the lowland zone by a new large game fauna probably dominated by red deer and elk (Lie 1988).

The palaeo-topography of the North Sea area is a background factor of paramount importance to understanding the cultural development. As a result of enormous amounts of water still tied up inland in the form of glacier ice, creating a globally far lower sea level, the central and southern parts of the North Sea remained as dry land until Dogger Bank was finally transgressed around 7800 yr BP (Jelgersma 1979, Blystad 1989). The exact position of shorelines and the environmental character of this 'North Sea Continent' around the Pleistocene/Holocene transition are not fully known. A speculative reconstruction of the topography, fauna and possible human occupation (Coles 1998) presents the area as just as hospitable and habitable as any neighbouring region. However, as tentatively illustrated in Fig. 2, three geographical distinctive features appear to be indisputable:

- A continuous low-relief land connecting Denmark, England and the North European Plain. The detailed extent and content of these now deeply submerged areas are relatively unknown.
- The mouth of the confluent rivers Elbe and Weser situated somewhere on the fossil northern sandy sea coast.

- A 100–150 km wide bay, the present Norwegian Trench, separating southern Norway from the North Sea Continent and its southern extension by the European plains.

The eastern Oslofjord area is generally believed to have been settled via Bohuslän, southwest Sweden. Combined with a higher sea level due to depression of the landmass, the extension of the inland ice sheet would have prevented any eastern immigration by land to southwest Norway. The Norwegian trench thereby offered the shortest and only logical way of access from the continent to the Norwegian coast between Lista and North Cape. Whether this wet border between two radically different landscape types represented a gateway facilitating the further expansion of human settlement, or a topographical (and mental?) bar obstructing and deleting it, is an essential point that may only be solved on the far, northern side of the trench.

THE PROCESS OF COLONIZATION

The populating of new land areas such as the coast of Norway should be considered as having been a gradual, multistage process rather than a single event (cf. Bang-Andersen 1996b). Hunter-gatherers by nature needed a solid base of geographical knowledge about the new alternatives before deciding to leave native soils to face a landscape without history or prior descriptions. Accordingly, some kind of resource monitoring or ‘scouting’ had to be carried out initially. This could be termed the phase of discovery. Archaeological traces from such sporadic human enterprise, which probably took place within a limited number of years, might appear extremely difficult to trace and diagnose – if at all discernible.

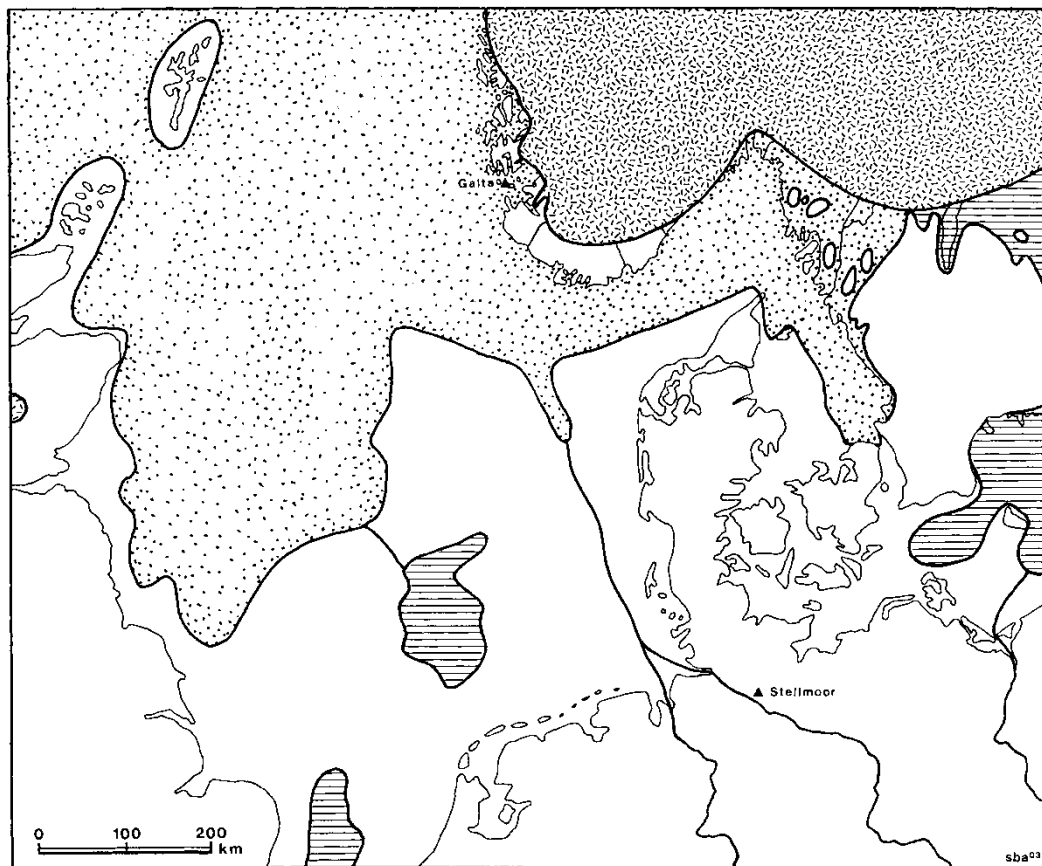


Fig. 2. Tentative reconstruction of the palaeo-environment of the North Sea basin around 10,300 yr BP, based inter alia on Jelgersma (1979), Anundsen (1985), Blystad (1989) and Coles (1998), which appear partly contradictory. The shoreline is at 65 m below present sea level, and estuaries, river courses and lakes on the North Sea continent are speculative.

A logical next step may have been a pioneer phase, when the economic resources of the actual areas were exploited, not on a year-round basis but as part of seasonal extraction movements covering wide annual territories, including the existing home base territory. In addition to pre-established geographical knowledge, a decisive prerequisite for such regular moves would have been efficient and reliable means of transportation: in the actual case seaworthy boats capable of crossing the 100–150 km wide Norwegian trench or sledges making crossing winter ice possible. Campsites should be relatively easily recognizable, provided they have not been superimposed or destroyed by later sea-level alterations.

A concluding immigration phase, the colonization proper, will appear by residential campsites making up a complete annual exploitation network within the new territory. As different parts of southern and western Norway were probably taken into use from the outside world on different occasions before or around the Pleistocene/Holocene transition, this is unlikely to have happened just once. Archaeological settlement remains should appear evincible, manifold and unambiguous.

The time dimension of this hypothetical cultural development may have varied from a few generations to several millennia, depending on the colonizers' inducement to move, their technological basis and logistic skills for going through with it. Purely economic conditions, such as famine resulting from the reduced availability of food due to environmental changes or a rapidly increasing population on the north European plains, need not necessarily have been the triggering factor. The process might just as well have been motivated by immanent non-rationalistic human factors such as curiosity, spirit of inquiry and a desire to move borders by exploring the unknown. It may also have taken place in a much more compressed manner than outlined above, e.g. in two steps with immigration following immediately on a phase of discovery.

Stig Welinder (1981) has suggested that the arctic-subarctic coastal zone of south Norway and west Sweden may have been initially occupied during the time span 13,000–10,000 yr BP by Late Glacial continental task groups closely related to the tanged point traditions gradually extending their social territories by seasonal extraction movements. Implementing a wide geographical perspective and time dimension is important to the discussion of the first settlement of Norway, and the main point paid to marine resources as probably a more-coveted nutritional niche than reindeer. The latter marks a revival of economic interpretations that dominated the archaeological discussion until the end of the 1940s (e.g. Gjessing 1941). Welinder presented a four-phase model to describe the gradual socio-economic process leading up to the establishment of annual territories in Norway. However, because of the total blank of sites capable of supporting and dating this, and of a lack of discussion about the topographical and technological factors involved in the process, Welinder's theory has a highly hypothetical character.

Significant to the discussion are three articles by Hein Bjerck (1990, 1994, 1995) focusing on the marine/maritime aspects of the colonization both from a nutritional point of view and as a matter of physical accessibility. One of Bjerck's main assertions is the role played by seaworthy boats, a prerequisite for crossing the Norwegian trench, for the further northwards expansion along the rugged and demanding Norwegian coast, and as mobile 'kill platforms' during seal hunting (Bjerck 1990). According to Bjerck (1994, 1995), the colonization proper was delayed by three or four thousand years, until satisfactory sea craft were developed around the Pleistocene/Holocene transition by hunter-gatherer groups on the continental side of the trench probably as a response to environmental changes. As soon as the threshold represented by the Norwegian trench was passed, most or all coastal parts of present Norway were settled in the course of some few hundred years, facilitated by the improved maritime technology (Fischer 1993, Bjerck 1995, Thomassen 1996, Waraas 2001). Compared with the rapid spread of the Arctic small tool tradition from Alaska to East Greenland (e.g. Møbjerg 1990), the colonization process may even have been completed all the way up to the Varanger peninsula within a few generations.

As a consequence of this interpretation, the lack of definite traces of Late Glacial human activity in southwest Norway may be culturally-historically relevant as a sign of a 'No Man's Land'.

THE ARCHAEOLOGICAL RECORD: COAST/LOWLAND ZONE

No conclusive evidence of Late Glacial settlement has so far come to light anywhere in southern Norway, despite allegations of the opposite in connection with apparently worked flint implements occurring together with the faunal assemblage in the above-mentioned Blomvaag find. Possible indicators of a human presence in southwest Norway in the Allerød and Younger Dryas chronozones, apparent as C14-dated anthrax fragments (Simonsen 1973) and macrofossil charcoal (Thomsen 1983), have still to be confirmed by archaeological hardware. A few stray finds, among these a tang point of flint found in 1951 at Snik on the mainland coast of North Rogaland (Rølfesen 1972, Bang-Andersen 1988), may not be regarded as diagnostic Late Glacial artefacts (Bjerck 1994, Fischer 1996).

Considering both the distinctively wasteful, primitive flake technology and the size and high visibility of finished points of the Brommian industry, sites and stray finds from the Allerød should ideally have been proven – if they ever existed. Consequently, the Late Glacial ice-free lowland areas of southwest Norway, unlike mainland and insular Denmark and southernmost Sweden, most likely existed as a ‘No Man’s Land’ between the inland ice and the ocean shore: potentially exploitable, probably occasionally recognized from voyages, or even visible from the North Sea Continent on clear days, but unexplored and unexploited.

Just 25 years ago the oldest known settlement sites were the Viste cave on the Stavanger peninsula and the open-air Lego site at Jæren, both with basal layers typologically dated to the Sværdborg phase of the Late Boreal, around 8000 yr BP (Mikkelsen 1971), which has partly been confirmed by radiocarbon analyses (Indrelid 1978). A number of stray finds known from the outer coast, in particular flake axes of typological early forms (e.g. Brøgger 1910), nevertheless suggest some sort of human presence in the area during the Preboreal. Since 1977, settlement remains of unmistakable Early Mesolithic character have come to light in Rogaland county in central southwestern Norway at an increasing rate – now amounting to 60 sites (Fig. 3).

Of 43 sites found in the lowland zone, as many as 32 (75%) are situated on promontories on islands and fjord mouths in the outer part of Boknafjord. About half of the sites that have been excavated and analysed as part of multidisciplinary ‘rescue excavation’ initiated projects (e.g. Prøsch-Danielsen & Høgestøl 1995, Kutschera & Waraas 2000) share a number of diagnostically common traits:

- *Location*: open, exposed shorebound situations on raised beaches overlooking large expanses of sheltered seawater. The elevation ranges from 1 to 30 m, generally increasing from west to east, with the majority of sites at levels between 15 and 16 m a.s.l. The original elevation is generally believed to have been about 2 m. Most sites would have proved inaccessible or useless without the use of boats.
- *Site size* is highly variable, with ca. 20 and 600 m² as extreme limits. The majority of sites are small, often far less than 50 m² in extent. The largest sites, for instance the totally excavated Bratt-Helgaland and the partially investigated Galta site 3, seem to have been repeatedly reused, and in regard to artefact inventory and horizontal find scattering cannot be taken as representative of the extent of separate encampments. Small, chronologically ‘clean’ sites, probably existing in large number, have not been demonstrated convincingly so far.
- *Preservational state* is generally poor, as none of the lowland sites is blanketed by sealing agents (beach ridges, windblown sand, bog sediments). Intact occupation layers are seldom found because of natural decay and later land-use, in particular ploughing. Charcoal, osteological or other kinds of organic material of Preboreal provenance are absent entirely.
- No *dwelling structures* of any kind have been proved in the lowland sites, despite some allegations to the contrary. A presumed hut pit at Dyrnes, Venja (Floor 1986) is probably a tree-fall or the result of secondary cultural activity, and a hypothetical tent ring at Moldvika, Årvik (Gjerland 1990) has to be regarded with scepticism. However, 6–10 m² large stone-cleared areas that probably evince circular dwellings of some kind frequently occur further north on the coast of Hordaland (Nærøy 2000).

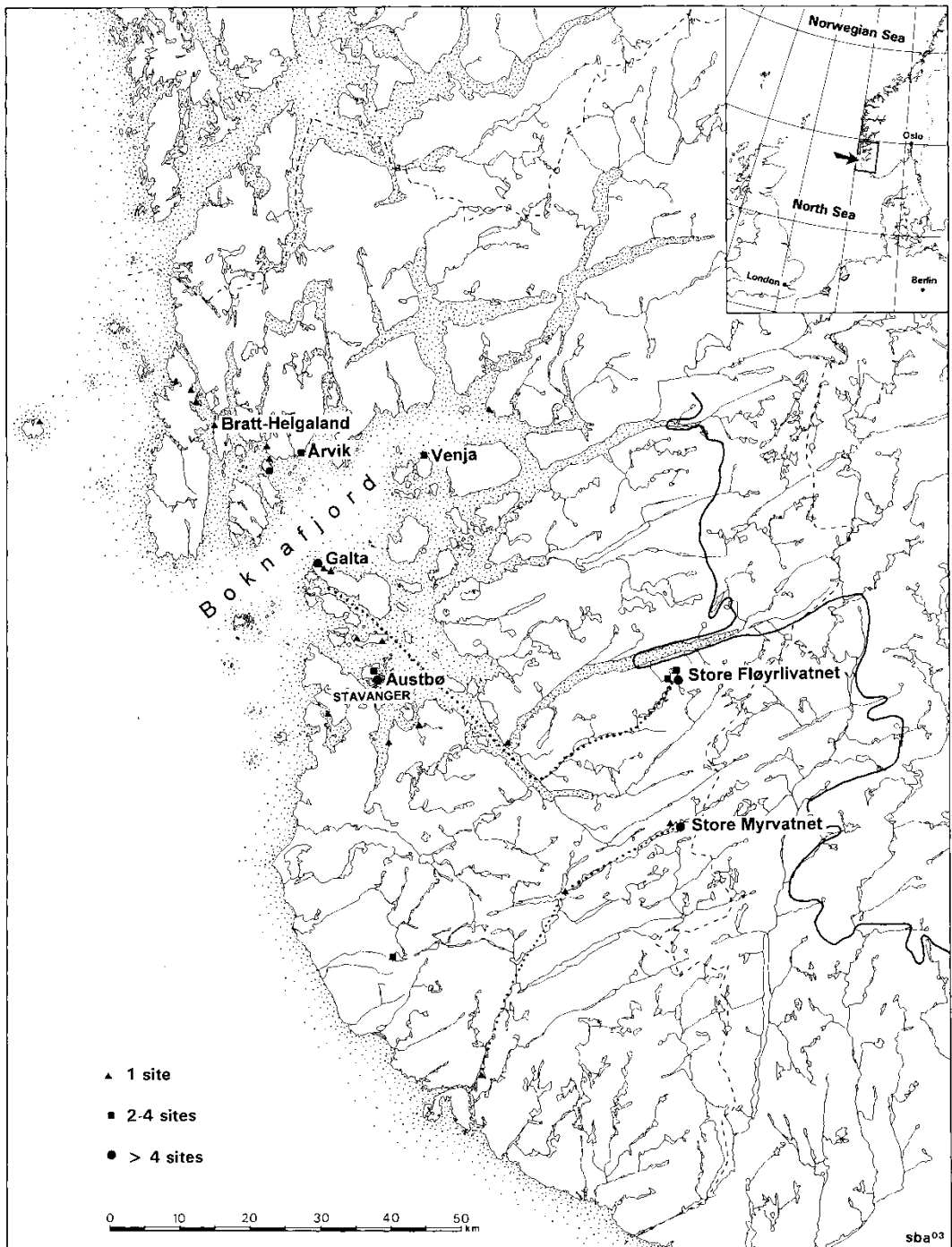


Fig. 3. The geographical distribution of settlement sites older than ca. 9000 yr BP in Rogaland, southwest Norway, with sites discussed in the text, the presumed ice-front position around 9600 yr BP (solid line) and probable coast-inland migration routes (dotted lines) indicated.

- The total lithic *artefact inventories* appear largely unknown, as most sites have only been partially excavated. The recorded find, often including intrusions from secondary visits, ranges from 1,400 to 39,600 lithic artefacts, almost exclusively of flint. Some localities, such as Galta site 3, may have been more productive, with a total find potential probably far exceeding 50,000 artefacts.
- *Index artefacts* are small tanged and single-edged points, simple lanceolate microliths and Zonhoven points, scrapers, side-blown and asymmetrical flat-trimmed flake adzes generally outnumbering core axes (as the Lerberg type), and slender unifacial blade cores with one or two tilted platforms (Waraas 2001). The blade- and flake industry is predominantly macrolithic, processed by 'soft hammer' direct percussion. In clear contrast to the south Scandinavian sites, bipolar reduction occasionally occurs, particularly on rock crystal.
- *Economy*: As is evident from the location of sites close to the sea-board and favourable boat landing places, most frequently on larger islands, marine resources (seal, fish, seabirds and, possibly, shell food) must have been of major importance. The large numbers of projectile points also indicate regular hunting of land mammals (probably red deer and elk, but certainly not reindeer in these densely vegetated coastal/marine environments) as important parts of the subsistence pattern. The general occurrence of flake adzes at the sites need not necessarily reflect tree-felling or woodwork. These tools, like the Inuit 'Ulu', could just as well have served as cutting knives for removing the bladder from seals (e.g. Schmitt 1995).
- *Probable dating* ranges between 10,400/ 9800 and ca. 9000 yr BP, based mainly on typology and shoreline dating, as no sites have yet proved possible to date by radio- carbon analysis. Age determinations based on coarse-grained, uncalibrated local shore level chronology, however, are uncertain, and should be regarded with reservation unless verified *in situ* by sediment analyses.

Without the support of radiocarbon and pollen analyses, in most cases the campsites belonging to what may be termed the *Boknafjord group* are impossible to date precisely. However, both the earlier and the later part of the Preboreal are obviously represented. The earliest sites, for instance Austbø K/L site 3 (Hemdorff 2001), contain a strong dominance of tanged points, while the younger sites, such as Bratt-Helgaland (Kutschera & Waraas 2000), are characterized mainly by lanceolates. Both groups normally have a mixture of both, however.

As the sites of the earlier and later groups occupy the same exposed landscape types of island or fjord mouth promontories close to former sea level, the utilization of marine resources such as sea mammals and fish must have remained of major importance (Fig. 4). Presupposing also the larger and most find- productive sites as expressing a series of repeated, horizontally partly overlapping short-time stays (Nærøy 2000), the economy behind the sites has to be interpreted as broadly based within a highly mobile settlement pattern. At the initial stages of occupation in highly scattered populated areas mobility is a prerequisite also for establishing contacts within a higher group level (e.g. Worbst 1974).

The earliest typologically or shoreline dated settlement site found so far is *Galta site 3* on the island of Rennesøy in Boknafjord just north of Stavanger, investigated in the period 1989–1990 (Prøsch-Danielsen & Høgestøl 1995). This site contained almost 300 tanged points, Zonhoven points and simple lanceolates of flint as well as 13 symmetrical or asymmetrical flake adzes of flint. Typologically important is the occurrence of axes in the lowermost and obviously oldest parts of the find strata, the use of soft hammer percussion technology, a number of the tanged points exhibiting close formal parallels with the classical Ahrensburg complex (Fischer 1996), and any sign of the microburin technique lacking. Both the estimated size of the find-bearing area, about 1000 m², and the artefact material indicate Galta 3 to be the product of repeated occupations. Since charcoal is not preserved, the site has been dated, by shoreline chronology and sedimentological analyses, as between 10,400 and 9800 yr BP.

Considering the highly increased number of sites discovered and investigated in the Boknafjord basin during recent years (cf. Fig. 3), the lack of evident Late Glacial settlement appears even more striking.

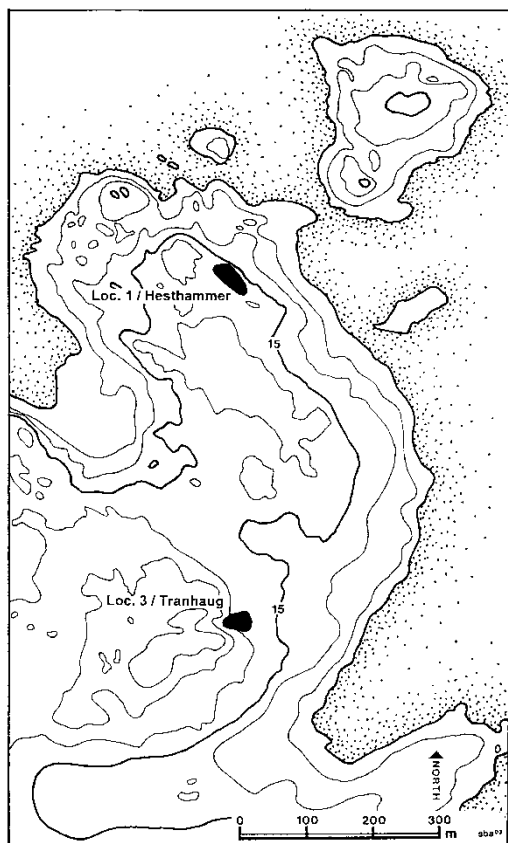


Fig. 4. Map showing the topographical setting of early Preboreal coastal sites at Galta (Rennesøy, Boknafjord area) with former sea level at ca. 15 m a.s.l. indicated. Contour interval: 5 m.

To my eye, Hein Bjerck's theory of a delayed settlement of Norway starting just before or around 10,000 yr BP is substantially confirmed by this extended evidence. The oldest lithic elements at Galta 3 may represent remains from an initial phase of resource monitoring, while the remaining products are of repeated regular settlement stays.

Between 10,200/10,000 and 9800/9600 yr BP not only southwest Norway but also the former archipelago of eastern Oslofjord and most of the coastline and islands in West, Mid- and north Norway appear to have been settled on an annual basis by what is traditionally termed the Fosna and Komsa cultures. A closely parallel development is noticeable along the coast of west Sweden by the earliest Hensbacka sites (Kindgren 1996, 2002). These, in almost every respect identical lithic complexes, evidently reflect *one* common cultural-historical trend: the gradual northwards expansion and rapid settlement of small groups of sea-coast adapted hunter-gatherers – the Dawn of Civilization at the border of human habitat in northern Europe (Welinder 1981, Fischer 1993).

THE ARCHAEOLOGICAL RECORD: INLAND/MOUNTAIN ZONE

To any Late Glacial/Early Postglacial population occupying the coasts of present Norway, the still existing Scandinavian inland ice sheet represented a new major geographical challenge: forbidding or alluring. A generally accepted interpretation of Man's exploitation of interior areas as significantly delayed compared to the earliest settlement on the outer coast (e.g. Indrelid 1994) is now refuted by the results of intensified Stone Age research in the county of Rogaland during the past few decades.

Since 1984 an increasing number of Preboreal sites (now 17) have been localized and investigated in the mountain area to the south of Lysefjord. These sites border the lakes Store Myrvatnet (610 m a.s.l.) and Store Fløyrlivatnet (760 m a.s.l.) situated 20 km apart (Fig. 3). Both lakes are surrounded by open low-alpine landscapes, today only sporadically used by wild reindeer.

Six Early Mesolithic sites have so far been proved at Myrvatn, 10 at Fløyrlivatn. These are all open-air locations dominated by lithic inventories devoid of organic remains other than charcoal. Due to water level alterations for hydro-electrical purposes since the early 1920s large beach zones now emerge strongly eroded.

In both areas the physical preservation of the sites varies according to differential exposure to the main erosion processes: annual inundation, wave abrasion and ice pack. The Myrvatn sites, owing to super-imposition of thick bog formations, generally present the physically best-preserved cultural layers. Notwithstanding this, the most complete dwelling structures have come to light at Fløyrlivatn.

A total of 10 Preboreal sites have been excavated: 3 at Myrvatn between 1985 and 1998 (Bang-Andersen 1990) and 7 at Fløyrlivatn in 1999 (Tørhaug & Åstveit 2000). The investigated sites contain highly restricted find-bearing activity areas with lithic inventories ranging from about 100 to 3900 artefacts. According to 26 radiocarbon analyses of contextual charcoal, the Myrvatn sites date between ca. 9600 and 9050 yr BP (Bang-Andersen 1990) and the Fløyrlivatn sites between ca. 9750 and 9350 yr BP (Bang-Andersen 2000).

The radiological time setting is in accordance with the artefact material in the sites. A pronounced typological trend in the lowland, where sites older than ca. 9500 BP contain a dominance of tanged points and the Late Preboreal inventories are equally characterized by microliths, is evident also from the mountain sites. Apart from the typological indicators, further divergence is recognizable in the increased and standardized use of the microburin technique. The previously expressed assumption of a partly contemporaneous use of tanged points and lanceolate microliths may no longer be called into question, according to the blanketed and chronologically clean Myrvatn I site (Bang-Andersen 1990) (see Table 1.)

Table 1. *The total lithic find and projectile inventories in representative Early, Middle and Late Preboreal coast and mountain sites in southwest Norway. Tanged points include single-edged forms.*

Site	Coast/ mountain	Recovered inventory	Tanged points		Microlith points		Approximate dating
			<i>n</i>	%	<i>n</i>	%	
Galta, site 3	C	17,500	188	75	63	25	>9800 yr BP
Austbø K/L, site 3	C	5200	26	87	4	13	>9500 yr BP
Fløyrlivatnet, site 6	M	2300	34	77	10	23	9750–9350 yr BP
Myrvatnet, site D	M	3900	37	64	21	36	9600–9400 yr BP
Bratt-Helgaland	C	39,600	28	19	123	81	<9500 yr BP
Myrvatnet, site I	M	1400	5	16	27	84	ca. 9050 yr BP
Venja, Dyrnes A	C	12,700	0	0	74	100	<9200 yr BP

The campsites belonging to the Myrvatn– Fløyrlivatn group exhibit a number of common traits:

- All are closely lakeshore oriented, normally positioned 2–10 m away from the original waterfront and overlooking wide landscape areas. With just one exception (Fløyrlivatn site 9), the sites are situated on well-drained fine-sorted late glacial out-wash (Figs. 5 and 6).
- Despite surface erosion, all find areas still contain remains of undisturbed cultural levels potent for defining roughly the former extension and main character of the sites. The horizontal scattering of artefacts is extremely restricted, ranging from ca. 8 to 50 m². As the two largest sites (Myrvatn D, Fløyrlivatn 6) have been subjected to repeated re-use, the space occupied per encampment episode hardly exceeds 15–20 m².



Fig. 5. Aerial view of Fløyrlivatn site 6 with two tent rings situated to the rear of a stream of boulders marking the former (Preboreal) shoreline. Photo Museum of Archaeology, Stavanger.

- The artefact assemblages consist of medium to high quality flint manufactured by unifacial blade cores with tilted platform(s), and minor amounts of rock crystal or quartz reduced bipolarity (except Myrvatn F).
- Formal tools are normally restricted to projectile points (in particular tanged and single-edged points and lanceolate microliths) and lower amounts of scrapers (Fig. 7). Other types, such as burins and borers, occur as a marked element only in Myrvatn D. However, with the exception of flint axes, the tool kit is characterized by the same artefacts as found in coastal areas.
- Highly important is the good preservation of contextual charcoal, providing the potential for high-resolution radiocarbon dates. This also forms a solid platform for reconstructing the micro-environment of the sites, in both areas characterized by a low-alpine scrub vegetation of willow and birch established on fresh mineral soil (Bang-Andersen 2003a).
- A matter of most particular interest, however, is the survival of evident dwelling remains in the shape of tent rings, in particular at lake Store Fløyrlivatnet (Bang-Andersen 2003b).

The tent rings of the Myrvatn and Fløyrlivatn sites comprise between 20 and 70 well- rounded weight stones, mostly ca. 20–30 cm in largest dimension. As some weights appear to be missing from most tent rings, these are absolute minimum numbers. The shape of the tent floors is circular, or slightly elongated as an irregular oval or rhombic. Two tent rings (Myrvatn K, Fløyrlivatn 7) are partly open alignments of stones, while the other four appear as closed. Both conical and ridged tent constructions seem to be represented, with a dominance of conicals.

The inner dimension varies between 1.8 and 3.8 m and the floor area from 4.5 to 11.4 m². As the weight stones have been rolled onto the edges of the tent covering, the inner diameter of the tent rings is a maximum tent size. Presupposing that a net living floor restricted to 80% of the tent ring area, the actual floor space of the Myrvatn and Fløyrlivatn tents has varied between 3.6 and 9.1 m², with 5.7 m² as a mean.

Interior hearths were used in at least two of six tent rings (Fløyrlivatn 6B and 7) centrally positioned on the tent floor. Contemporary exterior hearths appear to have existed in at least two cases (Myrvatn K, Fløyrlivatn 9) adjacent to postulated door openings. In the tent rings with internal hearths, most or all artefacts were concentrated indoors (Fig. 8).

Expressed in radiocarbon years, the earliest and youngest dates of the Myrvatn tent rings or hearths functionally related to these range between 9495 ± 75 and 9040 ± 130 yr BP, indicating a time span between 250 and 660 years. The corresponding values from Fløyrlivatn are 9750 ± 80 and 9360 ± 80 yr BP, or a period of use covering 230–550 years (Bang-Andersen 2003b). Calibration of the Myrvatn and Fløyrlivatn dating series according to the latest available data (Stuiver et al. 1998) confirms tents in both areas as having been used over a longer period of time than indicated by the radiocarbon ages.



Fig. 6. Aerial view of Fløyrlivatn site 9 with tent ring found in a stone-free area within the Lysefjord (Younger Dryas) frontal moraine. Former shoreline is to the left. Photo Museum of Archaeology, Stavanger.

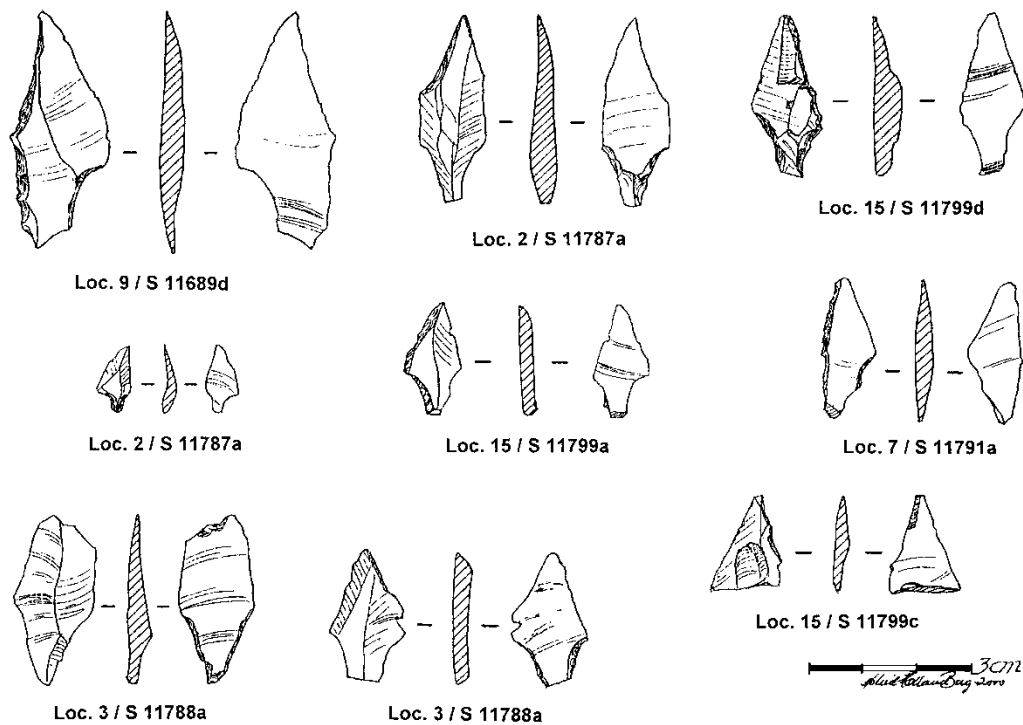


Fig. 7. Selection of tanged points of flint from Preboreal sites at Store Fløyrlivatnet illustrating a wide range of forms and format, and few or no 'lead types'. S 11799c is a tip fragment with impact spin-off.

Compared to the ice recession history of the area, both lakes are situated within or immediately behind the Younger Dryas frontal moraine, the 'Lysefjord' stage, tentatively dated around 10,700 yr BP (Andersen 1979, Anundsen 1995). The radiocarbon ages of a majority of the Myrvatn and Fløyrlivatn camp sites to 9600–9400 yr BP, or the middle part of the Preboreal, clearly suggest that short-termed seasonal occupations occurred before, under and soon after the 'Trollgaren' ice-advance stage ca. 9600 yr BP (Anundsen 1985). Sites at Fløyrlivatn may also have been used during a minor ice advance, e.g. the 'Blåfjell' event about 9300 BP (Andersen 1980) (Fig. 9). However, owing to the hitherto imprecise dating of the ice advances, and lack of palynological material relevant for reconstruction of the early Postglacial vegetation development, a direct correlation between human enterprise, landscape history and climatic conditions is difficult to ascertain. Another disturbing factor is that the plateau of constant radiocarbon ages proved to have occurred around 9550 uncalibrated yr BP, covering as many as 400 calendar years (Becker & Kromer 1991).

With the inland ice cap still covering mountain areas 20–25 km further east, the macro-environment of the sites in both areas is likely to have been a tree-less landscape, climatically influenced by neighbourhood to the inland ice (Fig. 3). Wild reindeer emerge as the only likely big game of importance potentially available as food resources in periglacial mountain landscapes. The interpretation of the Myrvatn and Fløyrlivatn sites as special purpose hunting camps seems supported by the expedient and highly restricted flint tool inventories in the sites. Logistically, the sites evidently emerge as products of short-lasting early autumn hunting activities performed by task groups with home territories somewhere else, probably on the coast of southwest Norway (Bang-Andersen 1990, 1996b). Radiocarbon dates in both areas point to discontinuous series of stays of a sporadic character not separated by extremely long intervals.

THE EUROPEAN CONNECTION

A striking similarity in the material culture inventories of the various cultural groups settling the margins of the North Sea Basin during the Late Glacial is perhaps attributable to the combination of a common cultural heritage, and the exigencies of adapting to an extreme environment. The rapid colonization of the outer coastal zone of southwest Norway, probably within a few generations, clearly demonstrates the maritime economic orientation and know-how possessed by some of these groups. Annexation of barren inland areas into the annual resource territories of coastal settlers as soon as ca. 9750 yr BP – maximum 250 years after their assumed first arrival on the shore of southwest Norway and probably less than 100 years after retreat of the ice sheet from the actual areas – is also noteworthy, further underlining the energy, adaptability and logistic skills possessed by the same groups.

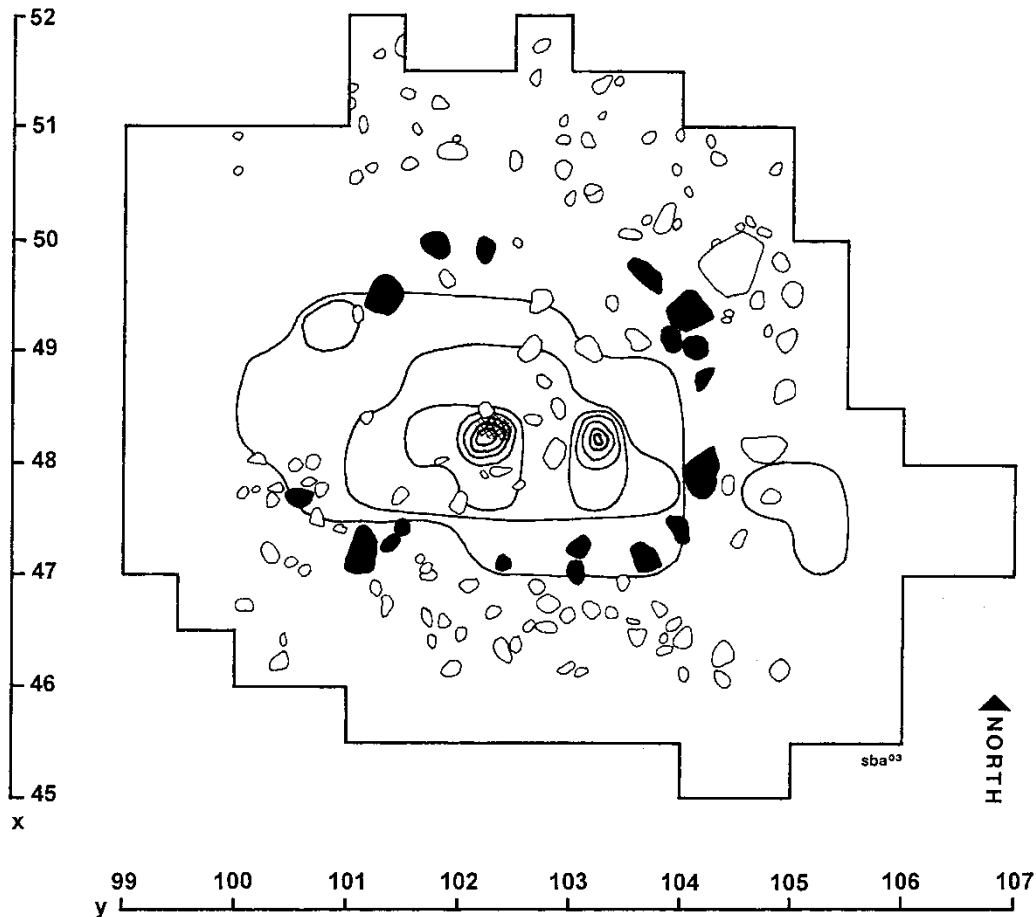


Fig. 8. Tent ring stones (in black), a centrally positioned interior hearth C14-dated 9360 ± 80 and 9400 ± 70 yr BP (cross-hatched) and distribution of lithic artefacts (isometric lines) at Fløyrlivatn site 7. The grid unit is 1 m, and line borders are at 10, 25, 50, 75, 100, 125 and 150 worked items per $\frac{1}{4}$ m².

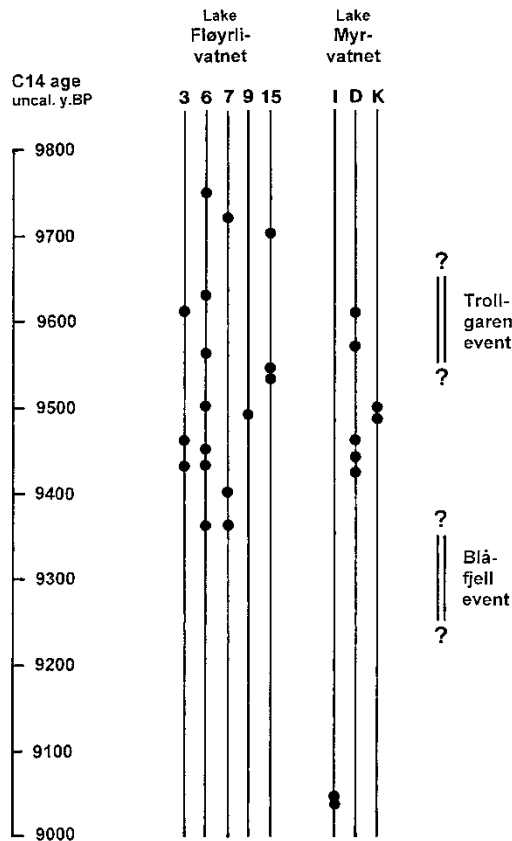


Fig. 9. The distribution of radiocarbon datings from five sites at Store Fløyrlivatnet and three sites at Store Myrvatnet, and assumed temporal setting of two Preboreal glacial advances.

However, environmental and historical agencies alone are not sufficient to account for the ongoing commonalities. The motivating factors for exploring new ecological borders need not necessarily have been of an economic character, or merely reflect the passive reaction of hunter-gatherers to environmental change. To a population living scattered in lowland areas with a multiplicity of maritime and terrestrial resources, seasonal acquisition of reindeer meat and hides in the mountains may appear extravagant. Factors such as social intercourse among the various groups have to be considered alongside historical and environmental agencies. 'Irrational' non-utilitarian human properties such as curiosity, adventure, superstition and the challenge of existing mythologies and world-views also have to be taken into account (Fuglestad 1999, 2001). These factors, along with biological reasons for extending social territories to prevent inbreeding, help us better understand the urge for geographical expansion across the Norwegian trench and coast inland.

As Early Preboreal coastal settlements comparable to the Norwegian sites are not available, except in west Sweden, it is impossible to make direct comparisons with and evaluate possible ethnic and social relations to contemporary continental European counterparts. The size and spatial organization of the inland sites at Store Myrvatnet and Store Fløyrlivatnet do, however, correspond closely with Late Glacial seasonal large game hunting camps attributed to the Hamburg, Bromme and Ahrensburg complexes in Denmark and south Sweden (Petersen & Johansen 1996, Fischer 1996, Larsson 1996).

The blade and flake industry in soft direct percussion, produced mainly from unifacial blade cores with tilted platforms, and the arrowhead armature dominated by small tang points frequently produced by *kerben und brechen* in the early Norwegian sites, also demonstrate close conformity with the flint reduction procedures and artefact inventories seen within the south Scandinavian and north continental Ahrensburgian. By contrast, in Norway and coastal Sweden the use of unifacial cores and tanged points survived throughout the Preboreal. The application of microburin technology in the manufacture of typologically 'true' microliths between 10,000 and 9500 BP, also clearly expressed in the Norwegian sites, may be taken to indicate continued cultural contacts within wide geographical areas despite increased geographical barriers expanded by a gradually higher sea level. On the other hand, an extensive use of flint axes and adzes is a phenomenon most clearly evident within the south Norwegian and west Swedish coastal settlements, and first apparent in south Scandinavian Maglemosian inland sites a few hundred years later.

As far as the labelling of these highly arbitrary artefactual inventories is concerned, there is currently a trend to include the earliest Fosna–Hensbacka sites as integrated coastal parts of the Late Ahrensburgian complex (e.g. Fischer 1991, 1993, 1996, Prøsch-Danielsen & Høgestøl 1995, Schmitt 1995, 1999, Fuglestedt 2001) and the later Preboreal sites as belonging to the so-called Barmose group (e.g. Kutchera 1999). However, in my opinion ethnic speculation should not be the main object of scholarly concern. What really matters is realizing the early Postglacial local groups of northern Europe as culturally related, socially interacting and yet individually unique.

In conclusion, the archaeological evidence treated above seems important within a wider European perspective for several reasons:

- Despite a wide ice-free zone proved to have been populated by reindeer and habitable for humans during the last phases of the Late Glacial, southern Norway, like Scotland and Ireland, remained a ‘No Man’s Land’ during the Late Glacial: probably vaguely known, but unattractive or inaccessible. One main explanation may have been insufficient boat technology to make safe crossings of the 100–150 km wide Norwegian trench possible from the former North Sea Continent or present Jutland (Bjerck 1994, 1995).
- The oldest sites of the Boknafjord group from the Pleistocene/Holocene transition, whether a direct part of the Ahrensburgian (e.g. Fuglestedt 2001) or not, mark Mother ‘loss of innocence’: Man’s penetration into former glaciated landscapes. In southern Norway this process took place chronologically delayed, but developed far faster than in most other parts of northern Europe (e.g. Fischer 1991, 1993, Housley et al. 1997). The population density undoubtedly remained low, sustaining a highly flexible mobility pattern.
- The earliest Norwegian settlements, together with contemporary sites in south-west Sweden, collectively represent the coastal dimension of the Late Glacial/Early Postglacial north European tanged point cultures. Similar ecological adaptations probably also existed in Denmark and along the northern margin of the European plain, where the actual sites now appear to be deeply inundated because of the rise of sea level (Fischer 2001). Despite a geographically peripheral situation in Europe, the south Norwegian sites reflect and integrate mainstreams of technological, economic and cultural development.
- The sites of the Myrvatn–Fløyrlivatn group suggest very early logistically based coast–inland interactions during a dynamic and unstable Postglacial environment, literally following immediately on the heels of the retreating ice sheet. This contradicts the traditional view of the Fosna Culture as an ‘all-time’ coastal phenomenon, demonstrating the continuation of traditions back to the Late Glacial reindeer hunting economy which probably faded out on the North European plain about 100 C-14 years earlier (Fischer & Tauber 1986).
- The widespread occurrence of flake adzes in lowland southern Norway and west Sweden, in both areas evident from about 10,000 yr BP or even a bit earlier (Prøsch-Danielsen & Høgestøl 1995, Kindgren 1996), may indicate this tool as a northern development connected with maritime activities rather than inland tree-felling. Whether resulting from the lack of (now submerged?) south Scandinavian coastal sites or not, this challenges the long-established *Ex Oriente Lux* way of thinking, presupposing most or all streams of cultural impacts to have been from the central south to a marginal north – from bright innovators to passive receivers.

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