

COLONIZING CONTRASTING LANDSCAPES. THE PIONEER COAST SETTLEMENT AND INLAND UTILIZATION IN SOUTHERN NORWAY 10,000–9500 YEARS BEFORE PRESENT

Summary. This article contributes a western Scandinavian perspective to the discussion of the human colonization of former glaciated landscapes. Four assumptions concerning the peopling of the Norwegian coast are discussed: 1) a delayed colonization, 2) an immigration from the 'North Sea Continent', 3) reindeer as the main economic factor, and 4) a rapid rate of expansion along the coast. It is argued that only the first and last suppositions still appear credible, but need to be confirmed. A gradual major development is evident. Stage 1: Marine hunters colonized the resource-rich coastlines of south-west Sweden and southern Norway about 10,000 y.BP. Stage 2: Soon after, based on short seasonal moves, some coastal groups started exploiting reindeer in recently deglaciated mountain areas in south-west Norway. A similar subsistence pattern developed in north-west Norway. With its remote location, distinct landscape development and many-faceted environments, Norway appears as ideal for exploring human colonization processes on different geographical scales. More C14-dates and osteological material are, however, still needed.

INTRODUCTION

The aim of this paper is to review the state of research and to discuss the background, timing, progress and character of the pioneer settlement in parts of southern Norway. Examples will mainly be taken from south-west Norway. Here widely differing landscape types are represented within short distances, especially along the east–west axis, where large variation in relief implies significant climatic and biological difference. During the Pleistocene/Holocene transition, and in the Early Postglacial, environmental contrasts in this region were even more pronounced – and under rapid transformation.

The concept of colonization includes both the very first scouting trips and the incorporation of previously unfamiliar landscapes into the annual cycle of resource procurement. Colonization should be considered in the light of human intellectual challenges, basic logistical factors and previous large-scale variations in climate and landscape rooms. Consequently, the environmental situation in north-west Europe around 10,400 radiocarbon years before present (y.BP)¹ will be presented as background factors to take into consideration, before the focus is turned to the earliest human encounters with the landscapes which form southern Norway today.

A main point is to outline the acculturation process. By this I suggest we need to distinguish between initial *colonization* and later *exploration* and eventually *exploitation* of surrounding, less accessible landscape types. This may be termed landscape learning. The gradual development of extended resource utilization patterns is most conveniently studied within topographically composite and marginal uninhabited areas such as the virgin, recently deglaciated landscapes of south-west Norway.

THE LATE GLACIAL ENVIRONMENT UNDER CHANGE

During the end of the last Glacial, the geography of north-west Europe was dominated by the Scandinavian Inland Ice, the ice-dammed Baltic Ice Lake, a lowered and restricted North Sea basin, the North Sea Continent, and a wide North European Plain cut by large river systems flowing into the Ice Lake or the North Sea (Fig. 1). The main landform types in this area during the period between 10,500 and 10,300 y.BP, each representing essentially different habitats, are outlined by the letters A–F on the map.

- A: A wide inland plain consisting of sandy outwash lowlands and moraine elevations reaching 2–300 m a.s.l., cut through by tunnel valleys and rivers running mainly north (e.g. Schild 1996).
- B: Eastern, mostly till-covered, undulating coastal plains containing extensive lakes and rivers (the present Oder and Vistula), with estuaries bordering the former Baltic Ice Lake.
- C: Low-lying western coastal plains of till and unconsolidated aeolian sand deposits, with a large estuary (of the present River Elbe) somewhere on the northern coastline of the North Sea Continent, which is insufficiently defined and poorly understood as an environment for human groups (Jelgersma 1979; Kolstrup 2002; Behre 2007).
- D: A wide isthmus protruding between the Baltic Ice Lake and the restricted North Sea basin, geographically forming a north-eastern extension of the European plain sharply distinguished from the Scandinavian Caledonians (Larsson 1996; Eriksen 2002).
- E: An archipelago of low-relief skerries and islands occupying potentially resource-rich cold tidal waters confronting lowland coasts to the east, inland ice to the north, and sea to the west (Kindgren 1996; Schmitt *et al.* 2006).
- F: Narrow, rocky land-edges and fjord-mouth areas with open coastlines or sheltered skerries encompassed between inland ice and the North Atlantic Ocean (Anundsen 1996; Bjerck 2009).

The climate under the first and middle parts of the Younger Dryas is generally understood as cold, dry and windy, creating low winter temperatures with periodic permafrost on

1 All radiometric dates treated in the text, or referred to in figures, are stated in *uncalibrated C14-years*, as presentations and discussions of the earliest archaeological sites and their natural surroundings until now have been based on this scale in the Norwegian literature. I am fully aware that *calibrated BC dates* entail truer pictures of both time spans and duration. According to the IntCal09 database, segments of 500 calendar years within the Mesolithic period vary in length from 280 to 580 radiocarbon years, a difference equivalent to 300 years or ten generations of people. Furthermore, C14-dates generally prove to be 1500–2000 years younger than calendric dates from the Glacial/Holocene transition. For reasons of comparison, calibrated ages are also given in Table 1.

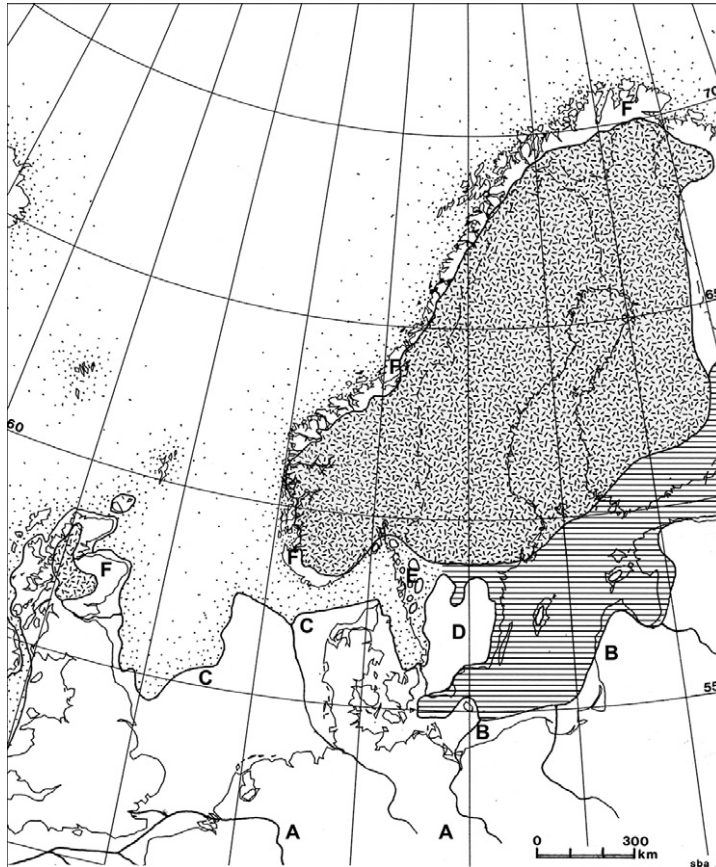


Figure 1

A generalized palaeo-geographical map of northern Europe and the North Sea around 10,400 y.BP, showing the main landform types (A–F). Compiled by the author from a large number of sources.

the European plains (Isarin and Bohncke 1999). The northern coastal areas, such as western Sweden and south-west Norway, were governed by a typical subarctic environmental regime favouring sea mammals like seals and polar bears (Blystad *et al.* 1983; Fredén 1988; Berglund *et al.* 1992).

In a final phase of the Younger Dryas, probably caused by the increased freshwater inflow to the North Atlantic and Arctic Oceans from the vanishing Laurentide and Eurasian ice sheets (e.g. Nesje 2009), both sea and air temperature abruptly flickered between cold and interstadial periods (Bakke *et al.* 2009). Owing to a milder climate and ice-recession, the Ice Lake around 10,300 y.BP drained the last 25 m of its enormous water content westward, probably over only a few years, and was replaced by the Yoldia Sea after a short-lived phase of brackish water (Björck 1995). In addition to this, large parts of north-west Europe, including now ice-free and probably still uninhabited areas in Norway, were covered by ash layers from the Vedde volcanic eruption in Iceland (Lowe and Turney 1997).

During the next few centuries the unstable climatic and topographical situation further escalated, when the northern margin of the North Sea Continent, owing to eustatic rise, started moving south (e.g. Coles 1998), widening the arm of sea between present southern Norway and the European plain. The Scandinavian Ice Cap started retreating, accelerating at a pace of up to 300 m per year in central western Norway (Andersen 1980; Anundsen 1996). Further, the average air temperature virtually exploded, increasing probably by 7° C within less than 50 years (Dansgaard *et al.* 1989), mean annual precipitation almost doubled, and the lowland shrub and heathland vegetation increased in density (Paus 1988). The marine regime also changed when the Norwegian Sea current, with warmer and saltier Atlantic water, resumed a strong northern course along the coast, probably closer to land than ever before (Mörner 1993).

As early as between 13,400 and 12,400 y.BP the continental parts of north-west Europe, including present-day England, were repopulated by groups of big game hunters which had survived the glacial maximum in remote refuge areas (Housley *et al.* 1997). With radically new and rapidly changing environmental conditions around 10,000 y.BP, descendants of the continental reindeer (or wild horse, aurochs or elk) hunting groups, living as part of the ecological system, had to react either by cultural adaptation or by migrating northwards (Terberger 2004).

ENCULTURATION OF THE SCANDINAVIAN WEST COASTS

The rugged coastal areas of south-west, north-west and northern Norway were deglaciated and potentially available for exploitation as early as between 16,000 and 13,000 y.BP (Andersen 1979; Anundsen 1996), and the seaboard of central western Norway about 2500 years later (Karlsen 2008). In spite of this, no conclusive archaeological evidence of human settlement pre-dating *c.*10,000 y.BP has come to light from the 3000 km long biologically rich seaboard between the northern Varangerfjord and southern Oslofjord, or on the adjoining Kola and Bohuslän coasts. The 3000-year, or even longer, period of non-use has attracted a considerable amount of debate during the last two decades (see e.g. Bjerck 1994; 2009; Fischer 1996; Bang-Andersen 1996a; 2003a; Fuglestad 2001; Grydeland 2005). What actually exists is a large number of Early Preboreal, open air, typically shore-bound sites situated, in particular, on islands, skerries, promontories and fjord heads overlooking wide expanses of sea water. These are widely accepted to be the material remains of the human *Colonization Proper*, as long-distance seasonal utilization from the North Sea Continent, or from the Ahrensburgian mainland further south as has been proposed for western Sweden, appears less likely (Table 1).

The earliest possible C14-date of the 'Hensbacka culture'² in western Sweden, at 9960 ± 130 y.BP from *Sköttegården* outside Stenungssund (Streffert and Nyqvist 1996),³ relates to a possible hearth structure with no artefacts. Consequently, this is a date which is not conclusive but could prove to be important. While a transgressed site, *RAÄ-205-Nösund* on the nearby island of Orust, has a geological minimum age of 10,000–9900 years according to shoreline chronology (Schmitt 1994), the other sites in the Bohuslän region from the pioneer phase have only been typologically dated to the closing stage of the Younger Dryas or the Early

2 The term 'culture' is used here in order to connect with the existing research tradition and literature, and not necessarily to imply cultures in the sense of groups of living individuals. It simply refers to groupings of material (lithic) assemblages.

3 This dating has earlier and erroneously been referred to as 9960 ± 310 y.BP in Nordqvist and Streffert 1992, 57.

TABLE 1

List of C14-dates discussed in the text. All results are stated within one Sigma (68% probability) age range. Calibrations according to CalCurve CalPal_2007_HULU (Danzeglocke *et al.* 2010). See comments in footnote 1

Site	Lab. no. (method)	Material	y.BP	cal BC
Sarnes B4, Finnmark, Norway	Beta-67585 (AMS)	Charcoal/fossil humus?	10,280 ± 80	10,154 ± 243
Kaupaneset, Rogaland, Norway	T-8821 (conv.)	Antler (<i>Rangifer tarandus</i>)	10,255 ± 80	10,100 ± 236
Sköttegården, Bohuslän, Sweden	St-11155 (conv.)	Charcoal (not specified)	9960 ± 130	9569 ± 217
Lagesiid'bakti 1, Finnmark, Norway	Wk-11598 (AMS)	Charcoal (<i>Pinus</i>)	9940 ± 100	9515 ± 174
Store Fløyrlivatnet 6, Rogaland, Norway	Beta-141301 (AMS)	Charcoal (<i>Salix, Betula</i>)	9750 ± 80	9130 ± 147
Nyhamna 48, Møre & Romsdal, Norway	T-16973 (conv.)	Charcoal (<i>Betula</i>)	9695 ± 95	9072 ± 163
Slettnes VII, Finnmark, Norway	Beta-58660	Charcoal (undetermined)	9610 ± 80	9012 ± 150
Store Myrvatnet D, Rogaland, Norway	T-8295 (conv.)	Charcoal (<i>Salix, Betula</i>)	9610 ± 90	9010 ± 156
Evjen III, Nordland, Norway	T-7083 (conv.)	Charcoal (not specified)	9580 ± 90	8983 ± 157
Reinsvatnet R1, Møre & Romsdal, Norway	TUa-6248 (AMS)	Charcoal (<i>Betula</i>)	9495 ± 65	8904 ± 167

Preboreal (e.g. Kindgren 1996; 2002). The age of this latter category of artefact assemblages, lacking both geo-stratigraphical evidence and radiocarbon dates, should be considered with some reservation (Fig. 2).

Dating sites which may relate historically to the first peopling of the Norwegian coast has proved to be similarly problematic. The earliest radiometric date of any archaeological context, at 10,280 ± 80 y.BP from *Sarnes B4* on the Magerøya island in Finnmark (Thommessen 1996, 236), naturally generated immediate widespread national and international interest. Critical examination has, however, demonstrated that the dating sample may have consisted of old humus, and not charcoal resulting from human activity (Blankholm 2004, 49–51). Second earliest is the site of *Lagesiid'bakti 1* in Varangerfjord, C14-dated to 9940 ± 100 y.BP (Grydeland 2005, 43) by pine charcoal found within a presumed tent-ring. Pine made its first appearance on the northernmost coasts of Norway by 8000 y.BP. As the fuel evidently represents driftwood with a great potential for giving too an high age (Blankholm 2008), this result is also difficult to accept. With support from the typological character of the lithic material, *Slettnes VII* on the island of Sørøya with a date of 9610 ± 80 y.BP (Hesjedal *et al.* 1996), and *Evjen III* near Saltstraumen on the Nordland coast C14-dated to 9580 ± 90 y.BP (Hauglid, cited in Thommessen 1996), until now seem to represent the earliest reliable traces of human activity in all of northern Scandinavia.

Owing to uncertainties connected with the archaeological C14-record in Finnmark, the site of *Galta 3* on the island of Rennesøy close to Stavanger, geologically and typologically dated between 10,400 and 9800 y.BP (Prøsch-Danielsen and Høgestøl 1995; Fuglestedt 2007) or possibly as late as 10,000–9700 y.BP (Bøe *et al.* 2007), still ranks as the earliest known site on the Norwegian coast. The oldest site on the north-western coast determined by radiocarbon analysis is *Nyhamna 48* in Aukra, dated to 9695 ± 95 y.BP by birch charcoal from the bottom of a hearth (Bjerck 2008, 217–56). As birch was amply represented in the local vegetation 10,000 years ago and does not regularly live much beyond 100 years, this result may be considered as reliable. Within the range of statistical confidence, it may even challenge the last proposed minimum age of *Galta 3*. However, as will be demonstrated later, the most consistent radiocarbon evidence of human existence on the

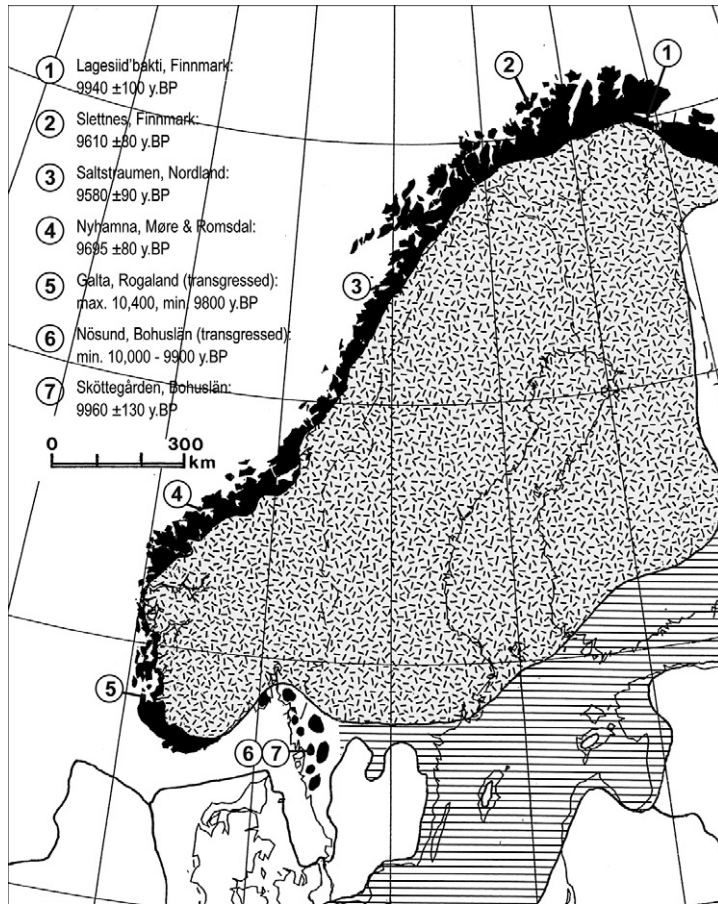


Figure 2

A map of deglaciated areas on the Scandinavian peninsula c.10,200–10,000 y.BP. The location of Early Postglacial key-sites discussed in the article is indicated. Drawn by the author.

Norwegian coast as early as 9750 y.BP or before – paradoxically – derives far above sea-level from areas in the geographical interior.

According to the available scarce, scattered and partly biased datings briefly discussed above, the outer coasts of western Sweden and Norway, possibly all the way north to Finnmark, were taken into use within the time span between 10,200 and 9800 y.BP. The character of the lithic artefact inventories from the habitation sites, the homogeneous types and settings of the sites, and the palaeo-environments all point to a common economic and cultural background or origin for the Ahrensburgian-like *Hensbacka/Fosna* complex (Schmitt 1994; Fischer 1996; Kindgren 1996; Bjerck 2009). The pioneer sites of the Hensbacka have been interpreted by earlier scholars both as a seasonal coastal adaption by groups from the North European continent, and as a regional culture that inhabited and exploited the area on a year-round basis.

In the present author's view, the earliest occupation on the Norwegian coast should be understood as the result of further *westward*-oriented movements of restricted numbers of people by seaworthy skin vessels from the northern/central Bohuslän area, as soon as their social structure and logistic abilities permitted it. The push, fuelled by hopes of economic yield and triggered by human curiosity, may have been facilitated by outward-going, anti-clockwise currents in the Skagerak icefjord (Schmitt *et al.* 2006). A group of sites, typologically dated to the Holocene/Pleistocene transition both by typology and by their elevation of 95–125 m a.s.l., which were discovered and excavated during 2006–2008 in Brunlanes on the western shores of the outer Oslofjord (Jaksland 2008), partly contributes in bridging a former geographical gap between the eastern and western parts of the Fosna-Hensbacka.

This challenges earlier theories of a *northward* direct influx of immigrants to southern Norway from postulated settlements on the margins of the North Sea Continent (Fig. 2), which has existed almost as a truism for 70 years (Rust 1942). Its main argument, that the colonizers were groups of specialized reindeer hunters from the North European Plain pursuing retreating continental tundra reindeer tribes, by moving north and crossing the Norwegian Channel in boats or on winter ice (e.g. Bjerck 1994; Bang-Andersen 1996b; Fuglestad 2003), has, however, lost impetus. It is now known that reindeer existed, and were still hunted, in Denmark and Scania until 9200 y.BP, almost 1000 calendar years later than had at first been believed (Liljegren and Ekström 1996; Aaris-Sørensen *et al.* 2007). Further, there is no evidence at all of reindeer on the Norwegian coast after c.10,200 y.BP.

To what extent the peopling of southern and western Norway had the character of a rapid exodus, or developed as a multi-stage process including phases of intrusion, seasonality and permanence, is unknown owing to a lack of high-resolution dates from the earliest coastal sites, which are datable only within a rather coarse typological framework. As a consequence, it is almost impossible to distinguish between absolute and relative contemporaneity between sites. This also affects our understanding of the geographical range of the colonization; whether in the first round it already involved the entire 3000 km long stretch north to Varangerfjord and Kola, or just the parts below the Arctic Circle. A closer examination of the typological attributes of the so-called Komsa culture seems, however, to confirm ages which are fully comparable to the earliest dated sites in southern Norway (Woodman 1999).

A maximum time span of 200–300 years has been suggested for the expansion along the Norwegian coast (Bjerck 1994). Compared with the Late Glacial recolonization of the continental parts of northern Europe, estimated to have reached c.700 km by 1000 years (Housley *et al.* 1997), such a rate may appear as a high estimate. However, in the light of archaeological data from more comparable coastal environments, such as the spread of the 'Arctic Small Tool Tradition' from Alaska to north-east Greenland, the colonization of the Scandinavian Atlantic seaboard may well have been completed within just a few generations. With an average progress of 30 km of coastline per year, which does not appear to be unrealistic for typical maritime-adapted groups with a developed boat technology, it would take no more than 100 years to cover the distance. Such a momentum severely challenges earlier theories of a far more slowly developing acculturation process (Welinder 1981).

Irrespective of who they were, where they came from, how they came and how many came, what kind of natural environments and economic opportunities did the pioneer population meet with? It is widely accepted that rough seascapes fed by fresh water from melting glaciers flowing through sounds or fjords and meeting inflowing salt sea water, as in the Late Glacial outer Oslofjord/Bohuslän archipelago (Fig. 1, landscape type E) and along the Norwegian west



Figure 3

Early morning in the glacial, biologically high-productive coastal waters of Thule, north-west Greenland, with a kayaker heading out for narwhales. Photo by courtesy of Per Michelsen, Stavanger.

coast (landscape type F), are extremely nutritious and biologically productive. As convincingly advocated earlier by Bjerck (1994; 2008; 2009), Fischer (1996), Kindgren (1996), Schmitt (1994), Schmitt *et al.* (2006; 2009), Nordqvist (2009) and others, the pioneers were obviously skilled navigators with well-adapted sea crafts and marine hunting methods comparable to those of the indigenous population, for instance, in present-day central and north-western Greenland (Fig. 3). Apparent 'Paradise conditions' may, however, have been brutally disrupted by local climatic perturbation such as calving fjord glaciers and katabatic winds from the nearby ice sheet. Periodically, certain inshore areas were affected also by crustal instability, creating earthquakes, faulting and tsunamis (Bøe *et al.* 2000; 2007), and sudden environmental challenges to any human group staying here.

Habitation sites of a diagnostic Early Mesolithic character have come to light in several coastal areas in Rogaland, south-west Norway, at an increasing rate over the course of the last 25 years. In addition, a large number of stray finds of flint flake axes and tanged points are available. Of 45 confirmed sites, about 75 per cent are situated on raised beaches on the promontories of islands and fjord mouths in the wide Boknafjord basin (Bang-Andersen 1996a; 2003a) (Fig. 4). The sites, dated tentatively to 9500 y.BP or before by typology or shoreline displacement chronology, are either extremely small in extent and artefact number, or evidently represent a palimpsest of series of relatively short visits.

This, together with the sea-oriented location, appears to reflect a pronounced mobile settlement pattern, probably based mainly on seasonal utilization of a broad spectrum of littoral/marine resources such as seals, walrus, small whales, sea fish and birds. The terrestrial food component is impossible to evaluate owing to the absence of faunal and botanical material in the sites. A marked occurrence of projectile points in the tool inventories, as many as 250 specimens of different kinds from the typically shore-bound Galta 3 (e.g. Prøsch-Danielsen and Høgestøl 1995), nevertheless indicates also some element of land game hunting in the immediate vicinity.



Figure 4

The 'Galta 3' site viewed during excavation in 1990 in an easterly direction towards the Boknafjord basin. A 16 m higher relative sea level during the Pleistocene–Holocene transition reached into the immediate vicinity of the site.

Photo: Evy Berg, Museum of Archaeology, University of Stavanger.

CHANGES OF SCENE

Until now, the rejection of reindeer as the primary economic factor underlying the colonization of vast coastal stretches in the northern periphery of Europe is founded *ex silentio* on negative or indirect evidence. Absence of any subfossil reindeer bones or antler later than the remnants of several individual animals found incidentally underwater at Kaupanes off Egersund in south-west Norway, and dated to $10,255 \pm 80$ y.BP,⁴ may with future findings prove to be misleading as to the final age of reindeer in the lowland zone. However, other and more compelling indications are provided by the palynological record, witnessing a formation of semi-open woodland in the coastal zone of southern Norway during the final Younger Dryas and Early Preboreal (Paus 1988; Prøsich-Danielsen 1993). The forests gradually closed former tundra-like areas, and spoil the reindeer's traditional summer pastures and migration routes along the coast. Contemporary with this, a marked retreat of the Scandinavian ice sheet from about 10,300 y.BP and onwards (Andersen 1980; Anundsen 1985; Bondevik and Mangerud 2002) had opened up progressively larger inland and mountain areas. Furthermore, a drier and far warmer climate, which reached a July mean of at least 14°C about 10,000 y.BP (e.g. Paus 1990)

4 This assemblage, consisting of fragments of two or three adult tundra reindeer showing no sign of human interference, and found accidentally *in situ* in an underwater location in 1986, has not been published. The data derive from a preliminary investigation by the zoologist Rolf W. Lie, Bergen Museum, in 1986 (file report in Museum of Archaeology, University of Stavanger). Lie (1990, 15) quotes a preliminary date of $10,200 \pm 90$ y.BP, which has later been slightly corrected (see Table 1).

and accelerated the forest development, appears to have been unfavourable for the existence and survival of reindeer in the lowland.

The marine hunters populating the western Scandinavian seascapes about 10,000 y.BP, relating directly or indirectly back to Late Glacial reindeer hunter groups on the North European Plains (Schmitt 1994; Fuglestedt 2001), were probably still highly proficient at hunting with a bow, when required in marine/maritime settings. Their most diagnostic artefact, tanged points left on the camp sites or lost during hunting, exhibits close similarities with the armature of the late Ahrensburgian style (Fischer 1996; Waraas 2001). Essential questions are where, how and when the coastal population first responded to the dramatic environmental changes?

THE FIRST ENCOUNTER WITH MOUNTAIN AREAS

After a period of consolidation in former uninhabited areas, mobile hunter-gatherers by their very nature will almost inevitably soon start exploring and eventually exploiting surrounding, less accessible landscape types. This includes adjacent coastal areas as well as environments of diametrically different character. As progressively larger inland and mountain areas in southern Norway were laid open between 10,000 and 9000 y.BP by the gradual retreat of the Scandinavian ice sheet, landscape types, economic resources and logistical challenges of a diametrically new character arose (Fig. 5).

The clearest evidence derives from the south-western corner of Norway, where the earliest and best preserved traces of inland use on the Scandinavian peninsula so far came to light between 1985 and 2000 on the sandy shores of *Store Myrvatnet* (610 m a.s.l.) and *Store Fløyrlivatnet* (760 m a.s.l.). The two lakes, 20 km apart, are situated in desolate mountain environments on the southern margin of Lysefjord, c.50 km east of Stavanger (Bang-Andersen 1990; 1996a; 1996b; 2003a; 2003b; 2006) (Fig. 6).

The sites are represented by small horizontal scatters of lithic artefacts in the range c.8–50 sq m, with formal tool inventories normally restricted to projectile points (tanged points and simple microliths) and scrapers of flint (Fig. 7). Dwelling structures, represented as 2–4 m wide stone-lined tent-rings with outdoor or indoor hearths, have been preserved in both areas. Series of C14-dates from some 20 open-air sites concentrated on gravel terraces along the banks of Myrvatnet and Fløyrlivatnet extend back to c.9600 and 9750 y.BP respectively (Table 1). Despite the absence of faunal material due to unfavourable preservation conditions, there is little doubt about interpreting the sites as specialized reindeer hunting camps, as no other prey of economic or symbolic importance is likely to have existed in these areas at this early stage (Bang-Andersen, in prep.).

The ice-recession and vegetation history of this mountain area are insufficiently mapped and dated in detail. Both lakes are, however, situated within or immediately behind the moraines of the Younger Dryas main stage. The radiocarbon ages of a majority of the sites suggest that occupation mainly occurred during and soon after the ‘Trollgaren’ ice-advance, c.9600 y.BP. The former environmental setting of the two mountain areas is very important: a virgin, white-washed and tree-less landscape, probably with parts still covered by dead ice (Fig. 8). On account of the complete lack also of palynological data from this early phase, wood-anatomy analyses of 1250 contextual charcoal fragments have been used to reconstruct the former surroundings of the sites: a low-alpine scrub made up of willow and birch, indicating a periglacial pioneer vegetation (Bang-Andersen 2006).

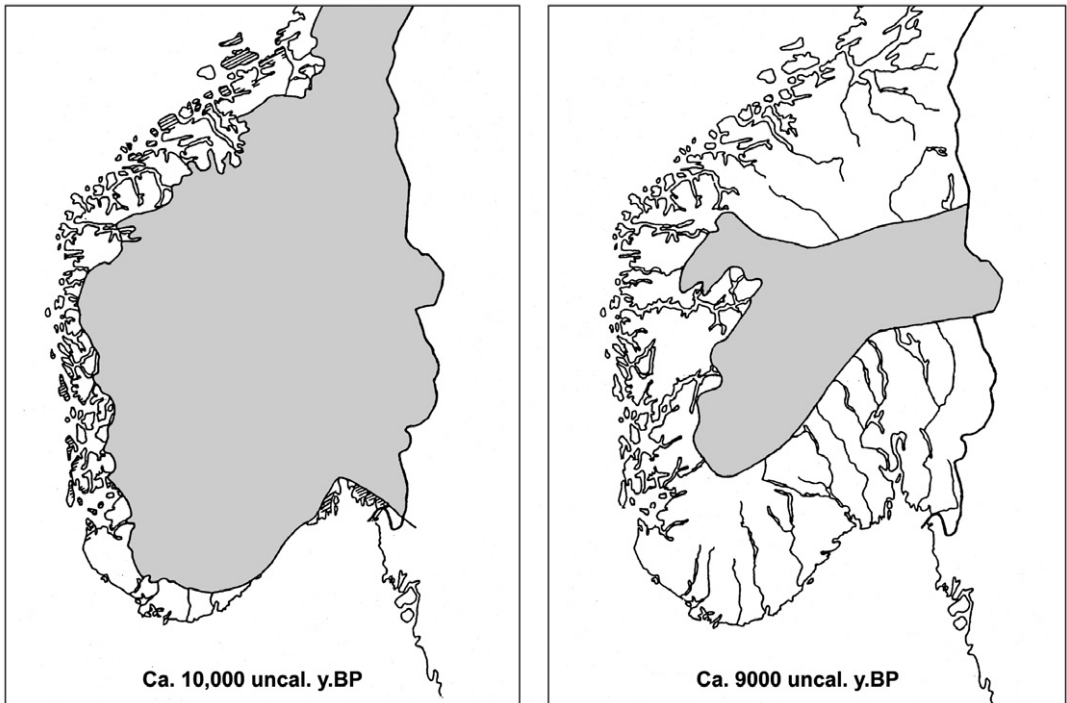


Figure 5

Maps of the palaeo-geography of southern Norway illustrating the ice-front position c.10,000 and 9000 y.BP. Coastal areas with pioneer settlement are shaded. Drawn by the author.

Most of the reindeer hunting activity is supposed to have taken place off-site, mainly within the zone bordering the inland ice-front c.15–20 km further east and north-east (Fig. 6). The abundant use of flint, and the types and attributes expressed by the lithic artefacts, clearly link the sites to the coastal areas of south-west Norway, where both earlier and contemporary sites are located. The Myrvatnet/Fløyrlivatnet complex is interpreted as the remains of short-term reindeer hunting camps, visited repeatedly but infrequently in the early autumn by small task groups from the coast (Bang-Andersen 1990; 2003b). Deeply penetrating fjord-arms together with 30 to 60 km long main watercourses consisting of rivers and lakes leading straight into the interior, which permitted the use of boats during most of these journeys, obviously functioned both as geographical routes and as lines of transportation.

In order to achieve a wider cultural-historical understanding, it is imperative to consider the early inland activity within even greater geographical contexts. How unique or how representative is it, compared with other early deglaciated coastal areas with a mountain hinterland? While the mountains of south-east and central western Norway still remained ice-covered, the rugged inland of north-west Norway was deglaciated almost at the same time as that of south-west Norway (Fig. 5). It is therefore no surprise that sites essentially identical to those of the Fløyrlivatnet/Myrvatnet group have recently been found at *Reinsvatnet* (890 m a.s.l.) – characteristically the ‘Reindeer Lake’ – in the Sunndal mountains, 35 km east of the city

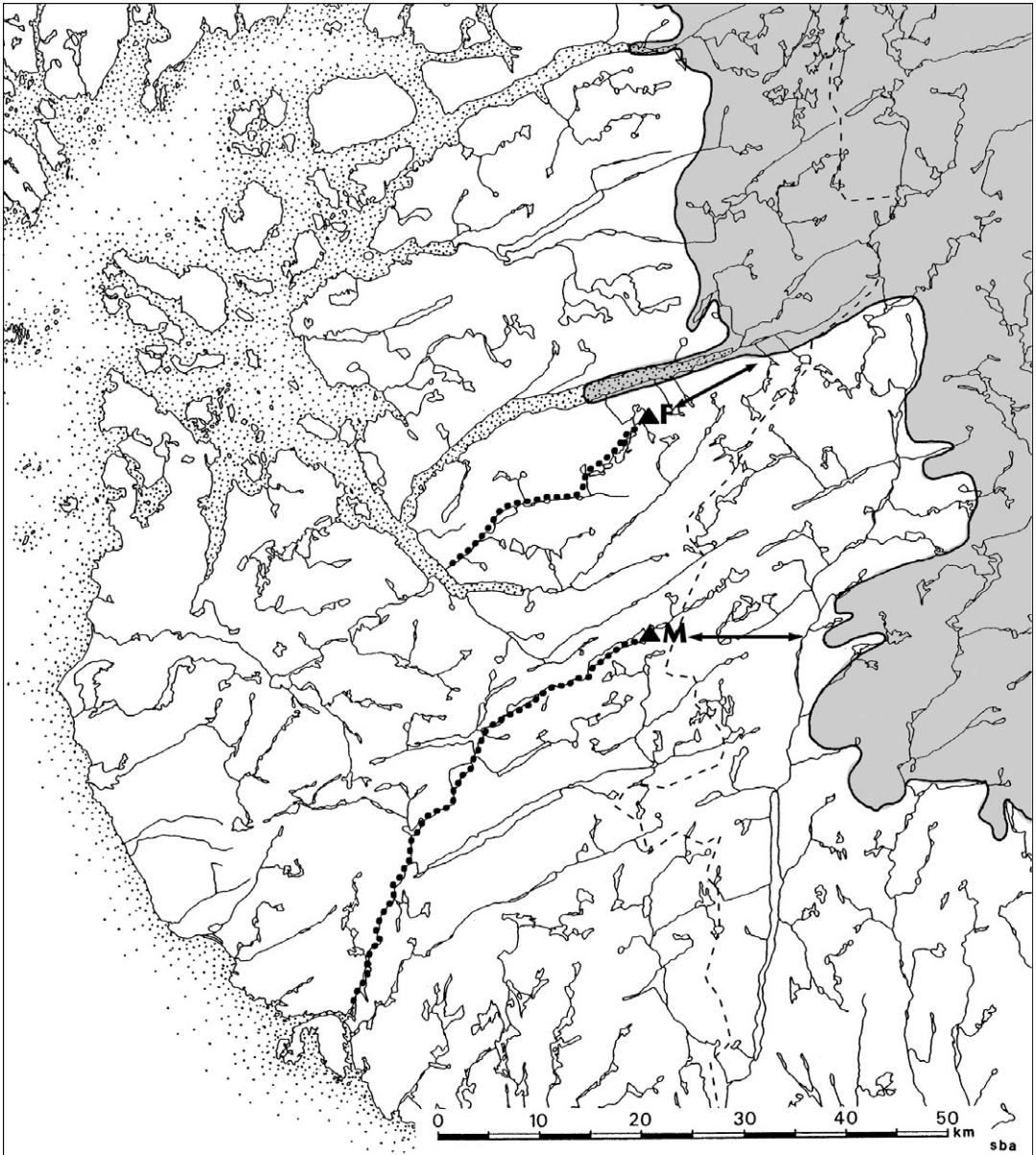


Figure 6

A map showing the location of Store Fløyrlivatnet (F) and Store Myrvatnet (M), the presumed position of the inland ice around 9600 y.BP, and proposed seasonal coast-inland migration routes (dotted lines). Drawn by the author.

of Åndalsnes. The sites here, also reflecting short and pre-determined seasonal visits, are characterized by a flint tool inventory of arrow armatures with tanged points dominating the occurrence of lanceolate microliths, and a few scrapers. Reinsvatnet R1, containing the earliest remains of human activity, has been C14-dated to *c.*9500 y.BP (Callanan 2007; Svendsen 2007).



Figure 7

Lanceolate microlith and tanged point, probably produced from the same flint nodule, from 'Myrvatnet Loc. D', a palimpsest used between *c.*9600 and 9400 y.BP. Photo: Terje Tveit, Museum of Archaeology, University of Stavanger.



Figure 8

A typical low-alpine landscape 900 m a.s.l. bordering the southern margin of the Folgefonna glacier in south-west Norway. Between 10,000–9500 y.BP the mountain areas probably appeared more white-washed and barren, but in other respects comparable. Photograph by the author.

Taking into account the plateau of constant radiocarbon ages covering as many as 370 calendar years, which existed between 9650 and 9550 uncal BP (e.g. Becker and Kromer 1991), the first activity in the Sunndal mountains theoretically may have occurred as early as that in the Lysefjord mountains.

In clear contrast to the rapid development described above, human exploitation of higher-lying western Norwegian mountains, situated closer to the ice-front and ice divide, started considerably later. The earliest settlement sites, from the Oppland highlands and the Hardangervidda plateau, have been C14-dated to c.8800 and 8300 y.BP respectively (Gustafson 1988; Indrelid 1994). South-east of the retreating inland ice cap, elk may have been a more common prey for the pioneer hunters than reindeer, as its first appearance here has now been adjusted c.600 years backwards to 9100 y.BP (Grøndahl *et al.* 2010).

CONCLUSIONS

At a general level, the human adaptive strategies in Early Postglacial north-west Europe can be formulated in four basic principles: (1) a high degree of mobility and portability, (2) a flexible hunting strategy, (3) dependence on a broad range of resources, and as a matter of necessity (4) a developed storage technology. Adhering to these principles will enable pioneer groups to maximize their chances of long-term survival in ever-changing and unpredictable environments, eventually by extending the geographical range of their subsistence activities.

Considering the colonization of Norway, two cultural-historical main stages may be distinguished.

Stage 1: Around 10,000 y.BP the western Norwegian coastlines and outer fjord basins, which had existed but were not exploited for at least 3000 years, were explored and populated. The cultural background and actual character of this process remain insufficiently understood owing to the partial nature of the archaeological source material. A rapid influx of people from western Sweden via the recently deglaciated coasts of south-east Norway is, however, considered as the most plausible scenario.

Stage 2: In south-west and north-west Norway the pioneer phase was soon succeeded by a monitoring and seasonal utilization of inland areas, including high mountains, carried out linearly from the coast inland along fjords and main watercourses. The time lag between *coastal colonization* and pioneer *inland penetration* seems to be within a range of 100 and 300 radiocarbon years, which is noticeably fast compared with the local landscape history and the long delay before the coast was occupied.

Two factors make the coastlines of southern, western and northern Norway, with associated fjord and mountain areas, almost ideal for future studies of the process of pioneer utilization of former glaciated landscapes, on both a macro and a micro scale. A primary reason is their marginal geographical position and pristine state compared with the early recolonized continental areas in Europe; the second is the multi-faceted and resource-rich environment prevailing since the Holocene/Pleistocene transition. Whilst the archaeological record in the mountains of south-west Norway is generally well preserved, recently investigated and precisely dated, extended evidence permitting far higher time resolution and more penetrating analyses is badly needed from all main parts of the coast. This may hopefully change for the better in the near future, with increased research efforts and cooperation which is now being organized on a national level between the five Norwegian archaeological university museums, as well as between archaeology and natural science.

Colonization – wherever or whenever it happened – is by no means automatic; it required a knowledge of landscape and climate, as well as the appropriate technology and skills, and a strong motivation for challenges and change. Whereas the Early Preboreal hunter-gatherer groups were themselves part of the environment which they exploited, the study of prehistoric human behaviour seems to be almost as important to landscape history as the palaeo-environmental results are to archaeological research.

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