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THE 'POLISHED' PETROGLYPHS OF NORTH NORWAY: SOME METHODOLOGICAL REMARKS REGARDING LOCATION AND AGE

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Abstract. In central and northern Norway fifteen sites with large-scale zoomorphic petroglyphs are found, some of which were made by grinding or polishing the lines onto the rocks. These sites are found at exceptionally high altitudes and due to Holocene land uplift are claimed to represent the earliest rock art in Scandinavia, having been made shortly after the end of the last Ice Age. The claim that the real dates are identical with these maximum ages is questioned. It is argued for the use of a broader spectrum of methods in the study of this art, among them other possible locational factors such as landscape biography, the shape and quality of the rocks and weathering.

Background

A century ago a special class of petroglyphs was identified in the province of Nordland, northern Norway (Rekstad 1916). The motifs were familiar but the petroglyphs were executed in a different technique, the lines being ground or polished into the rock. They belong to the north Scandinavian hunter-gatherer rock art genre or tradition, which is dominated by images depicting cervids: 'elk', 'red deer' and 'reindeer'. 'Whales', 'aquatic birds' and 'boats' are frequent too. Petroglyphs belonging to this particular Nordland class or 'style' were claimed to differ from other images belonging to this tradition in three ways (Gjessing 1932, 1936, 1945; Hallström 1938; Simonsen 1958, 1974; cf. Hesjedal 1992, 1994). The petroglyphs in question are large, frequently more than life size, and are drawn with naturalistic contours (1); the lines were made by grinding or polishing (2); and the petroglyphs are found on panels that emerged from the sea during the early Holocene (3). The co-variation between high altitudes and style has given this class of petroglyphs a special position in Scandinavian rock art.

These polished petroglyphs are found at the west coast of the Scandinavian Peninsula between c. 64° 45′and 68° 50′ N. Today eight sites are known (Fig. 1), of which five were investigated and described by Gutorm Gjessing (1932), being located at Åmnes (Klubba) and Fykanvatn in the municipality of Meløy, Sagelva in Hamarøy, Leiknes in Tysfjord, and Valle in Ballangen. Later, sites were found at Nes in Lødingen (Bratrein 1968) and Vågan in Bodø (Simonsen 1970). Gustaf Hallström investigated and documented the Åmnes, Fykanvatn, Sagelva and Leiknes sites already around 1920 (Hallström 1938).

Gjessing and Hallström focused on style and dating but execution technique and locations came to override aesthetic arguments. Morphologically similar petroglyphs made by pecking or pounding exist and together these petroglyphs form Hallström's (1938) Nordland style group, which, however, was divided into two subgroups, depending on technique and location. The polished petroglyphs were called the 'confined Nordland group' and the pecked/pounded ones the 'extended Nordland style'. Gjessing (1936, cf. 1932), too, sorted these petroglyphs into two groups, claiming that the polished petroglyphs were the earlier ones. Anders Hagen (1976: 49), however, treated these two groups with large naturalistic images as one entity.

Gjessing (1932, 1936) and Hallström (1938) created a framework for the discourse on Scandinavian hunter-gatherer rock art for decades; their way of thinking was followed by later scholars. Most works during the 20th century focused, however, on new discoveries (e.g. Hagen 1976; Simonsen 1958). Some critiques of these early models were launched, mostly dealing with chronological issues (e.g. Lindqvist 1994; Mikkelsen 1977). The relevance of Gjessing's style sequence for northernmost Norway has been questioned (Helskog 1984, 1988).

The sites with polished petroglyphs form two clusters (Fig. 1): a northern cluster consisting of the Nes,

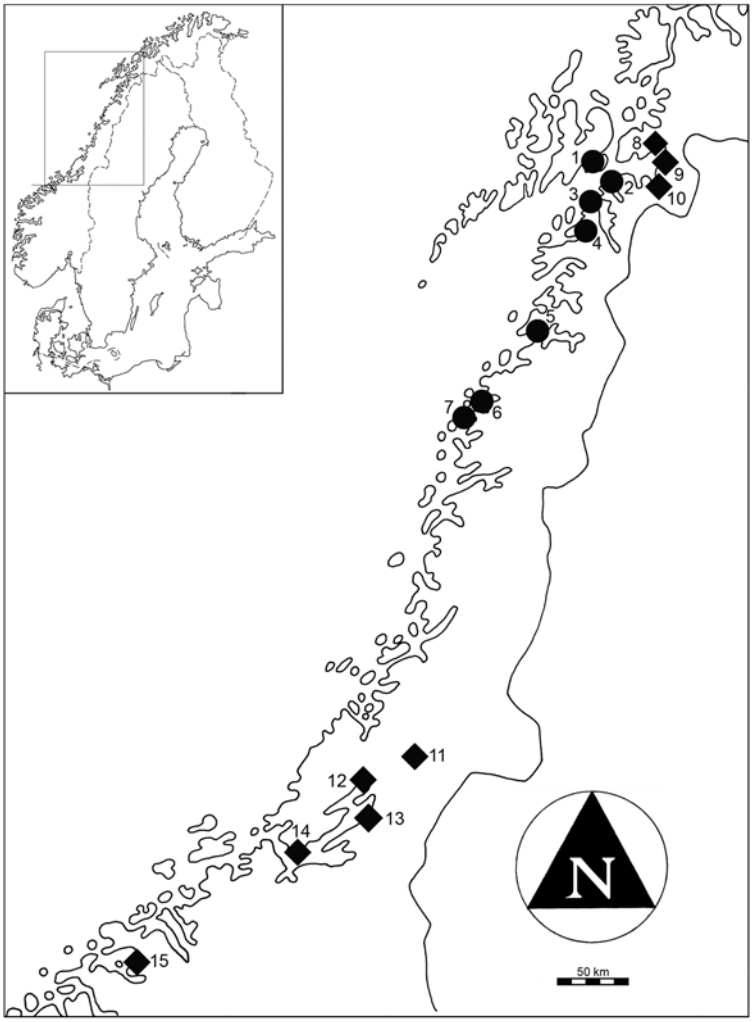

Figure 1. *Geographical distribution of sites with 'naturalistic' petroglyphs in northern and central Norway. Circles = polished petroglyphs, diamonds = pounded/pecked petroglyphs. 1: Nes, 2: Valle; 3: Leiknes; 4: Sagelva; 5: Vågan; 6: Fykanvatn; 7: Åmnes; 8: Slettjord; 9: Brennholtet; 10: Forselv; 11: Bøla: 12: Bardal; 13: Berg; 14: Stykket; 15: Bogge.*

Valle, Leiknes and Sagelva sites at the inner Vestfjorden basin, and a southern cluster consisting of the Fykanvatn and Åmnes sites in the Helgeland district. The Vågan site lies between these two clusters. Figure 1 also shows two clusters of morphologically similar pecked/pounded petroglyphs; a northern cluster at Ofotfjorden consisting of sites at Slettjord, Brennholtet and Forselv, and a southern cluster in Trøndelag, consisting of the Bøla, Bardal, Berg and Stykket sites. The Bogge site lies isolated farther south-west.

The polished petroglyphs are claimed to be the oldest rock art known in Scandinavia, having been made during the early Holocene shortly after the retreat of the ice cap that covered the Scandinavian Peninsula during the Late Pleistocene. From this follows that the central and northern part of Nordland was the innovation area for Stone Age rock art in Scandinavia (Gjessing 1945: 264; cf. Malmer 1981: 103).

While studying the Nordland polished petroglyphs scholars have emphasised the relationship between this rock art and ancient shorelines. Other relevant factors have in general been ignored. This is partly due to a strong focus on dating during most of the 20th century; dating being a prerequisite for bringing the rock art in line with other Stone Age cultural manifestations, providing contexts for this art.

I will here look into the polished petroglyphs from a multi-factorial perspective, which includes style and shoreline dating, but also landscape biographies as well as the rock panels, including their weathering. These, of course, are not all the relevant perspectives from which this art could be studied. The study is based on personal visits to most of the sites in 2007 and 2009.

Style

Styles identified in the early 20th century (Engelstad 1934; Gjessing 1936; Hallström 1938; Shetelig 1922) have been taken more or less for granted by later scholars, albeit these styles were identified by means of superficial comparison. Knut Helskog (1989) questioned the relevance of terms like 'naturalistic' and 'schematic', which play important roles in the definitions of these styles; however, he still found the style concept useful for his study of the Alta record, in Finnmark (Helskog 1988). Gjessing (1932: 40) admitted that not all polished petroglyphs were of the same quality but claimed that the low quality petroglyphs were made by less skilled artists. In general he used aesthetic arguments in separating his style groups but in this case he ignored differences that he believed had no chronological bearing. Hallström, too, was aware of this problem. The Fykanvatn petroglyphs, he claimed, were among the very best of Scandinavian hunter-gatherer rock art, but at the same time he recognised that some images were less naturalistic (Hallström 1909: 142).

A selection of tracings of contoured 'naturalistic' images from central and northern Norway is presented in Figure 2. Detailed comparisons between these images are difficult because they were documented by different persons in different ways. A–F were traced, B and D on transparent polystyrene, the others on semi-transparent paper. G–I were drawn in reduced scale and these drawings were further reduced manually. Most tracings were reduced manually too, but B and D were reduced photographically. The quality of these images clearly depends on skill and accuracy during recording as well as during later reproduction processes. Pecking or pounding was used for the making of A–D plus F, while E plus G–I were made by polishing. In spite of their morphological

similarities with petroglyphs in central Norway, the Nordland polished petroglyphs are normally treated as an isolated phenomenon (e.g. Gjessing 1945; Hallström 1938; Hesjedal 1994); however, as Figure 3 demonstrates, based on outlines alone one can hardly identify these images collectively.

Gjessing (1932) claimed that the polished petroglyphs were livelier than their pecked/pounded counterparts; some animals were apparently running, while others were looking back. Since then, a backward looking 'elk' image has been found at Stykket in Rissa, Sør-Trøndelag (Fig. 2B) — the only one outside Leiknes. The Stykket discovery increased the number of images drawn like this to a total of five.

Gjessing stated that the polished petroglyphs were stylistically close, showing an advanced naturalism, comparable to the best examples of pecked/pounded petroglyphs in central Norway (Gjessing 1932: 37–38). He further claimed that gradually reduced size combined with reduced naturalism could indicate that they were made during a long time (Gjessing 1932: 51). Hallström, too, described stylistic differences among the polished petroglyphs, seeing the Fykanvatn and Sagelva sites as early examples (Hallström 1909: 142, 1938: 126). He found it, however, premature to try dating these petroglyphs (Hallström 1938: 114).

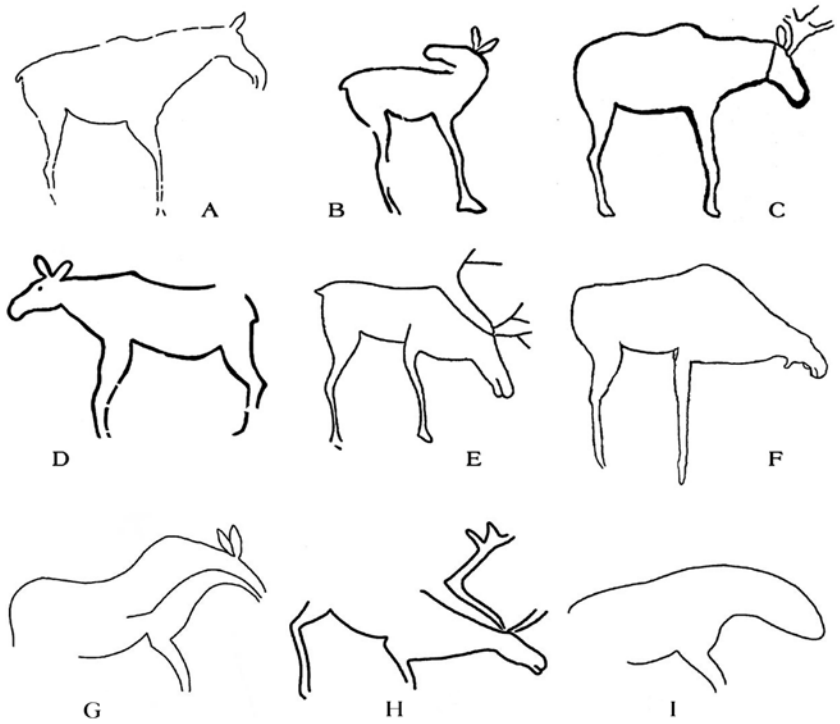

Figure 2. *'Naturalistic' drawings of cervids from northern and central Norway; A: Bardal, Nord-Trøndelag; B: Stykket, Sør-Trøndelag; C: Bogge, Møre og Romsdal; D: Berg, Nord-Trøndelag; E and G: Leiknes, Nordland; F: Forselv, Nordland, H: Sagelva, Nordland; I: Åmnes, Nordland (after Gjessing 1932, 1936; Sognnes 1981), images not on scale.*

Some stylistic variations are shown in Figure 2. Parts of many polished petroglyphs show in fact little resemblance with real animals. This holds true for most of the images at Fykanvatn but also at Åmnes (Gjessing 1932, Pls I–VII), being most evident for the heads, like in Figure 2I. Many of these images can hardly be classified as 'naturalistic'. Figure 2E is not fully contoured; the back line of the front leg ends inside the trunk, creating a distinct break in the contour line. This image also has a single-lined, non-contoured, antler.

Haakon Shetelig (1922: 130–131) suggested a stylistic sequence for images rendering cervids, starting with a full-size 'reindeer' image at Bøla, Nord-Trøndelag. This image he considered to be the best example of 'primitive nature art' in Norway (Shetelig 1925: 14). Gjessing (1932, 1936) further developed this sequence, which fitted the diffusionist paradigm of contemporary archaeology. He sorted the record in central Norway into three style groups, each representing a certain time period. Style I, which consists of the large naturalistic and contoured images, was claimed to be the older group. The morphologically similar but polished petroglyphs from northern Norway he considered, however, to be earlier than this style I.

Shoreline dating

A number of different methods have been used in attempts to date the hunter-gatherer rock art of Scandinavia (Hagen 1976; Mikkelsen 1976). Most popular have been dating by means of style and the post-glacial land uplift (shoreline dating). Gjessing (1932, 1936) used a mixture of styles and shoreline dating, except for style III, where he used style only because panels on which this style is represented are found at higher altitudes than style I panels (cf. Lindqvist 1994).

So far, no attempt has been made to date Norwegian petroglyphs by means of any of the recently proposed direct dating methods (cf. Bednarik 1992, 2001). However, the Bardal site in Steinkjer, Nord-Trøndelag, may turn out to be an eminent subject for testing new methods, for instance microerosion studies. This site contains around four hundred petroglyphs belonging to both major Scandinavian rock art traditions, the main panel containing many superimpositions (Gjessing 1935, 1936; Hallström 1938; Sognnes 2008).

Most rock art sites in Norway are located in areas that were submerged during the early Holocene. The time when a particular rock outcrop emerged from the sea provides a theoretical maximum date for petroglyphs made on this outcrop. The altitudes

of the outcrops containing polished petroglyphs give very early maximum dates. Gjessing (1932: 51) noted, however, that these early maximum dates might antedate the immigration of elk, which is the dominant motif, into this area.

Computer programs exist for calculating the Holocene shoreline displacement of all of Norway (Møller 1987, 1989). These programs are, however, based on a limited number of local curves, which are constructed by means of series of radiocarbon dates. Dates may, however, be lacking for significant parts of these curves, for instance at Frosta, Nord-Trøndelag, where no dates exist for the last four millennia (Kjemperud 1981). Correspondingly the archaeologists' use of the shoreline displacement for dating rock art suffers from methodological weaknesses. In principle rock art may have been made at a certain outcrop at any time after it emerged from the sea. However, some engraved panels appear to have been covered by beach deposits shortly after the rock art was made (Bakka 1975), providing a minimum date that comes fairly close to the maximum date. The methodology of shoreline dating (cf. Sognnes 2003) will not be discussed any further here.

The early date of the ground/polished petroglyphs implies that a temporal gap of around two millennia may exist between these and the pecked/pounded petroglyphs, regardless of the styles of the latter. Anders Hesjedal (1994) noted this but he focused on the polished petroglyphs and did not discuss these other styles any further. One may, however, read his texts as an opposition to Gjessing, except for acceptance of the early date of the polished petroglyphs. In general, the idea of temporally different style phases seems not to be valid for the supposed later styles. This was the conclusion also from the author's study of the hunter-gatherer rock art in central Norway (Sognnes 2003).

Povl Simonsen agreed with Gjessing's relative sequence but did not accept his early dates. Simonsen dated his four styles to the Neolithic (sub-Neolithic in his terminology) and Bronze Age, that is, c. 3000–500 BCE (Simonsen 1974: 142). Compared with the flair of scientific reasoning associated with shoreline dating, Simonsen's dates seem to be based on guessing but the land uplift actually indicates maximum dates for many sites to the Neolithic (Hesjedal 1994; Sognnes 2003). Gjessing's sequence has, however, been accepted by most Norwegian scholars, and shoreline dating of rock art has been used extensively (Bakka 1973; Mikkelsen 1977; Hesjedal 1992; Ramstad 2000).

Landscape biographies

A. W. Brøgger (1925: 91, 117) argued against his fellow archaeologists' urge to date rock art by means of the land uplift. This was a consequence of Brøgger's reluctance to divide the Stone Age into short chronological compartments. He claimed that the landscape and the qualities of the decorated rocks should be studied as well. Since the end of the Pleistocene the landscapes of coastal Norway have changed considerably. New land has emerged continuously from the sea. Skerries grew into islets and islets into islands, which merged into larger islands and with the mainland. Submerged marine and glacial deposits became dry land. Immigrating plants followed, as did animals and humans. During the early Holocene major changes were noticeable within the life span of a single human being.

The landscapes surrounding the rock art panels, therefore, should be studied as part of the biographies of the sites. Focusing on altitudes alone may give false impressions of a mono-causal relationship between rock art and sea level, which leads to an emphasis on diachronic perspectives. Alternatively rock art may be studied from a synchronic perspective, according to which sites and styles are seen as (relatively) contemporary. This may give different pictures and understandings of the location of the art (Sognnes 1994).

The land uplift plays a decisive role in the landscape biography of Scandinavia. The epicentre of the Weichselian ice cap was located at the northern Baltic, between present-day Sweden and Finland. This area also has experienced the strongest Holocene land uplift, while the outer south-western coast of Norway has hardly been lifted at all. Contemporary ancient shorelines, therefore, are found at different altitudes today. The oblique uplift of the land makes the shorelines at the outer coast of Norway much older than shorelines at the same altitudes in the inner fjord districts.

Another important geomorphological factor is the lowland coastal rim, often referred to as the *strandflat*, which is found along most of the Norwegian coast, lying between approximately 50 m below and 50 m above the current sea level. The *strandflat*, which was formed by marine abrasion during the Pleistocene and the late Tertiary eras (Sveian and Solli 1997), is cut by sounds and fjords into a myriad of islands but includes parts of the mainland as well. Mountains and hills ascend steeply from the inner end of the *strandflat*, sometimes directly from the sea.

When the first settlers reached the present Nordland province only the outermost parts of the *strandflat* had emerged from the sea; a few isolated islands like Vega (Bjerck 1989, 1990) and Træna (Gjessing 1943) provided subsistence for small migrating bands. The mainland coast was dominated by steep cliffs and headlands exposed to strong winds and rough sea. The *strandflat* gradually emerged during the Mesolithic and Neolithic and, eventually, the inner end was reached.

The question should be raised whether the polished rock art was actually located at contemporary shores or at raised ancient shorelines. In both cases the land uplift may provide maximum dates but in the latter case this date is of no relevance for the actual date of the rock art. The sites at Åmnes (Fig. 3) and Vågan are located slightly above the inner edge of the

strandflat. At Leiknes the *strandflat* is less developed, and the Sagelva and Fykanvatn sites are located in the hinterland.

Location and quality of available rocks clearly were of importance for selecting panels for rock art and particularly for the preservation of this art. At the coast, where virtually all traffic until recently was seaborne, possibilities for safe landings with small boats were also of great importance, as were suitable campsites (Bjerck 1989). It would probably not matter much if it was necessary to walk some distance for finding the right place for locating rock art. If the art was secret or otherwise should be kept secluded, it would be made at rocks that were not easily identifiable by strangers paddling along the shores.

The Åmnes site illustrates this, being located near the east end of the Åmøy Island, at the foot of the Klubba Hill on the northern side of the island. The petroglyphs were ground onto a number of north-facing outcrops (Gjessing 1932: 9). The panels today are located 55–67 m above sea level (Gjessing 1932: 13), which is 20–25 m above the cultivated terrace marking the inner end of the *strandflat* (Fig. 4). At the time of the potential maximum dates for the petroglyphs, the panels sloped directly into the sea. Hallström (1938: 172) identified 24 pre-Historic petroglyphs at Åmnes, while Gjessing (1932: Pls I–IV) identified 20. Motifs depicted are 'elk' and 'reindeer' but also 'whales'. At this site several modern images have been made (Gjessing 1932: 10).

The topography around the Åmnes site is shown in Figure 3. The horizontal distance between the inner end of the terrace and the lowermost panel is less than 50 m. To the west a ridge formed a low promontory that today reaches almost 60 m. At the inner end of this ridge is a plateau at 45–50 m, which would be suitable for temporary dwellings. This promontory was protected from strong winds and waves by a similar but larger promontory 400 m further west. A low islet and an underwater ridge to the north also helped shelter the shore. The beach gradually grew as the land emerged. When the shore reached the 30 m level the present terrace started becoming suitable for landing, gradually for settlement too, the petroglyphs being located near the shore on rocks that were clearly visible from the sea.

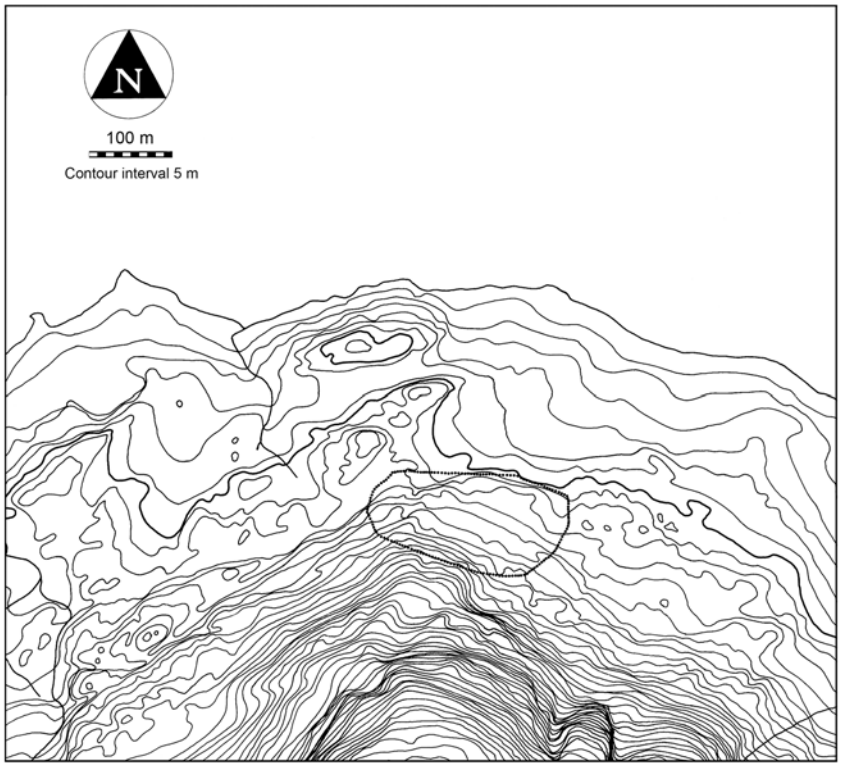

Figure 3. *Topographic map of the area surrounding the Åmnes site. The +35 m curve is emphasised and the legally protected rock art area encircled.*

The situation at Vågan is analogous to Åmnes, the site being located slightly above the inner edge of the *strandflat*, which for a long time provided good landing and suitable shore for settlement. The Vågan panel contains one large 'elk' image only (Fig. 4), which is located at the upper part of the panel (Simonsen 1970). Centrally on the panel is a distinct light-coloured intrusion on the rock surface, resembling an animal leg. The back leg of the 'elk' image starts immediately above this intrusion, c. 48 m above sea level. In this

Figure 4. *The Vågan site consists of one large 'elk' image only (author photo).*

Figure 5. *The Fykanvatn isthmus photographed from the east; the rock art panels are in the foreground (author's photograph).*

area the inner edge of the *strandflat* reaches 35–40 m above sea level.

Like Åmnes and Vågan, the Leiknes site faces the sea. A Holocene terrace, where the Leiknes farmsteads are located, reaches 15–20 m above sea level. The petroglyphs are found at three panels, of which the lower parts of the two uppermost panels are located at 45–46 m (Gjessing 1932: 24), the third panel at 32.5–33m (Simonsen 1958: 62). Hallström (1938: 87–107) identified 55 images at Leiknes, Gjessing c. 40 (Gjessing 1932: Pls VIII–IX). The number of animal species purportedly depicted is larger than at the other sites; comprising 'elk' and 'reindeer', 'bear', 'hare' (?), 'whales' and 'birds' (cf. Fig. 11). The distance from the terrace below is longer than at Åmnes and Vågan but the gently sloping hillside is easy to walk. From the upper panels there is a splendid view over the outer Tysfjord basin.

The Fykanvatn site is of particular interest from this perspective. Gjessing (1932: 14–18) identified 23 and Hallström (1938: 138–152) 28 images at this site. Animals depicted mostly are 'elk' and 'reindeer' but also 'fish'. Lake Fykanvatn is separated from the sea by a narrow isthmus (Fig. 5) but during early Holocene it formed the inner part of the Glomfjord. The vertical distance between the sea and the lake today is around one hundred metres.

The isthmus is narrow but extremely steep towards the west, which it has been all the time since Fykanvatn became isolated from the sea almost ten thousand years ago. Except for the continuously increasing difference in altitude between the lake and the sea, the local topography has changed very little. Gjessing (1932) and Hallström (1938) believed that the petroglyphs were made when the lake was still part of the fjord. During most of the Holocene they have, however, been located by the lake and this factor therefore should be looked into further. Fykanvatn is the lowermost in a series of lakes between the fjord and the high mountains, on the top of which thrones the Svartisen Glacier. After the steep climb from the inner end of the fjord a large hunting ground lies available.

The Fykanvatn petroglyphs are treated as one entity but are actually found at ten panels within a distance of several hundred metres, of which four panels are clustered together. The dispersion of the images is emphasised by the panels' heights above sea level, which vary between 98 m and 140 m (Gjessing 1932: 18). This gives exceptionally high maximum ages, the emergence of the lowermost panel being dated to c. 9800 BP (Hesjedal 1992: 31).

The Fykanvatn area also is a highly spectacular landscape, but a landscape where the sea plays a modest role. Today the fjord can hardly be seen from the panels, which are facing the lake and the mountains behind it. The landscape is rugged and barren with steep-sided mountain slopes dominated by a glacially shaped geomorphology. Hallström (1938: 132) considered Glomfjord as 'one of the most inhospitable and forbidding minor fjords in this section of the Norwegian coast' and that the 'inner and longer portion of the fjord is particularly wild and dreary'. The local topography is dominated by rock outcrops forming sloping parallel ridges. The seaward side of the isthmus provides no good landing, but base camps could probably be established further out along the fjord at the present township of Glomfjord. The steep climb along the river and the barren landscape around Lake Fykanvatn indicate that this was a

land for hunting expeditions, not for settling.

Today Sagelva is a river site, being located near the outlet of Lake Rotvatn at the upper end of a series of rapids, which continue all the way down to the inner end of the Sagfjord one kilometre downstream (Hallström 1938: 123). The petroglyphs are located on a steep cliff above the uppermost rapids. Two images depicting reindeer (Figs 6–7) are found at the upper part of the steep cliff, which slopes 45°–60° four metres above the river (Gjessing 1932: 46).

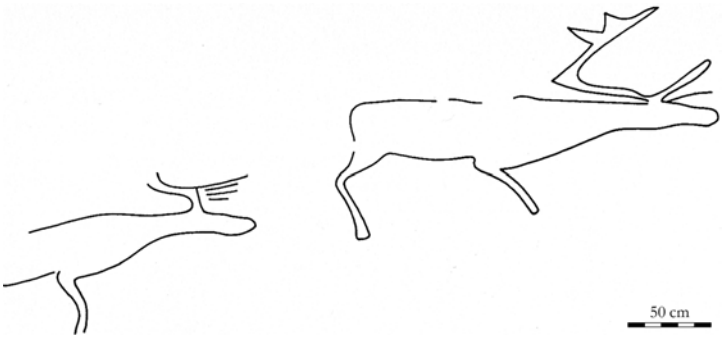

Figure 6. *Drawing of 'reindeer' images at Sagelva in Hamarøy (after Gjessing 1932).*

For Gjessing this site was particularly important. He claimed that the cliff was too steep for humans to stand on while making the images; they had to stand in a boat or on ice. Since the river does not freeze, the petroglyphs could only have been made when Rotvatn still was part of the Sagfjord (Gjessing 1932: 47), which gives a maximum date of c. 8700 BP (cf. Hesjedal 1992: 31). Hallström (1938: 129–130) argued against Gjessing, partly because according to his model the petroglyphs would have been located on an islet in the middle of the narrow fjord and at that time no other rock art site was known to have such a location. Hunter-gatherer petroglyphs, however, were frequently located at riverbanks near rapids. The boats floating on the sea, Hallström argued, would not be calm enough for an artist to be able to make such large and high-quality petroglyphs, which therefore must have been made after the river channel had emerged from the sea.

Gjessing's argument is an underrating of Stone Age artists' ingenuity and capability to overcome difficult tasks. In his reasoning Gjessing (1932: 45, cf. 1936: 177) found support for his opinion in a frieze with bird images at Hammer in Steinkjer, Nord-Trøndelag, which were placed on a steep cliff 3 m above the present ground and were believed to have been made by artists standing or sitting in boats at higher sea level, albeit there is hardly any differences in technique used between these bird images and a lower frieze with boat and horse images from Early Iron Age (Hougen and Engelstad 1923). The topographic situation is, however, similar at Ystines, Nord-Trøndelag, where an upper frieze cannot be reached from the ground in front of the panel, but here both friezes are from the Bronze Age, their altitudes corresponding to Mesolithic sea levels.

Gjessing's evaluation of the Sagelva site is a paradox, since high-quality boats were a prerequisite for the Stone Age settling of the Norwegian coast. Making ladders or scaffolds should be no difficult task for experienced boat builders. At the shallow water in front of the panel, scaffolds or ladders, however, could also be raised when Rotvatn was still a part of the Sagfjord.

The Sagelva petroglyphs can be reached also from above by using ropes. Examples of rock art being located at places where ladders or scaffolding must have been used or dangerous climbing was necessary are found at many places around the world (e.g. Chazine 2009; Rohn 1989; Schaafsma 1980; Tan and Chia 2010). My conclusion is that the Sagelva petroglyphs (with some difficulties) could have been made from boats, which is the case for sites with

Figure 7. *The Sagelva petroglyphs are located at the upper part of a steep cliff (author's photograph).*

Figure 8. Glacial marks at Åmnes; lines forming a zoomorph surrounded by scythe-shaped lines (author's photograph).

rock paintings at some north Swedish lakes, but we should not take this for granted. An important reason for making the Sagelva images may have been their appearance at an 'impossible' place, demonstrating the inherent potency of this par-ticular site and rock. The existence of these images becomes unexplainable and supernatural, being awed by contemporary and future generations of humans. Even today, millennia later, people speculate in front of these petroglyphs.

The co-variation between altitude and technique is not a causal explanation that automatically dates the rock art in question. Rock art being located at steep cliffs falling directly into the sea can be viewed from boats and rafts only. Locating this art near structural geological levels like the *strandflat* and raised shorelines has the advantage that people may come together in front of and around the panels, viewing them and taking part in rites and ceremonies being performed. The purpose of making the rock art must have influenced the choice of the place where to make it. Most of the sites in one way or another are or were associated with water. The petroglyphs were made on rocks that emerged from the sea or from lakes that once were part of the sea, or they were located at rivers and lakes. This is the case also for hunter-gatherer rock art in southern parts of Norway as well as in northern Sweden (Engelstad 1934; Hallström 1938).

On a macro scale we may find that the rock art was located along major migration routes followed by Stone Age hunter-gatherers for millennia, as exemplified by sites at the major Trondheimsfjord basins in central Norway (Sognnes 1994). This was probably also the case for the polished petroglyphs.

Rock art at lakes is very rare in Norway. This is, however, common in northern Sweden, where sites are also located at rapids and waterfalls, sometimes at outlets from the lakes (Hallström 1938; Lindgren 2004). The Bøla site in Nord-Trøndelag is located at lake Snåsavatnet (Gjessing 1936), which became isolated from the Trondheimsfjord around 4000 BP. At Lake Gjølgavatn in Bjugn, Sør-Trøndelag (Gjessing 1936) two sites with rock paintings are found at cliffs that emerged from the sea around 8200 BCE. However, shortly after, the present lake was formed and, since then, the local topography has remained virtually unchanged. For these sites we may easily discard the sea as a locational factor. For Bøla the fact that this site has been located at a waterfall for around four thousand years (Sognnes 2007) should be taken into consideration.

The rocks

The rocks chosen for imagery making should be thoroughly studied too, as should the ways we approach, view and experience these rocks. We should also turn our backs to the panels and study what can be seen from them — which, however, is strongly influenced by the dynamics of the landscape.

Helskog (1999) convincingly argued for why rock art would be located at the tidal zone, which represents the liminality between different worlds. At beach sites like the ones in Alta these arguments seem highly relevant but, still, the dates depend on a pre-understanding of location–age relationship. As demonstrated above, other locational factors may be relevant, if not at Alta, then at least in different topographic settings. One such factor may be natural features with anthropomorphous or zoomorphic appearances, frequently heads, which may be referred to as 'hyperimages' (Helvenston and Hodgson 2010; cf. Lahelma 2008; Slinning 2005 for Finnish and Norwegian examples respectively). 'Hyperimages' are quite common and might play important roles for animistic beliefs in ancient societies.

The natural leg-like intrusion in the rock below the Vågan petroglyph points in this direction, giving reason to look at the panels in another way. Did natural features and marks on the rocks influence the choice of panel? Glacially polished rocks are marked by parallel striations but frequently contain other glacier-made marks as well, in particular crescent-shaped or scythe-shaped cracks oriented perpendicular to the striation (glacial clastic stress marks; Bednarik 2001: 25). Marks like these are numerous on the upper Åmnes panels, at one of which we find some more irregular patterns too. Figure 8 shows some scythe-shaped cracks in the upper part and among the more irregular cracks in the central part we can recognise lines apparently forming the neck and front of an animal's head and ear together with an eye. Thus, nature itself created the very first zoomorphic image at this site. At Åmnes, therefore, humans may have copied nature. Scythe-shaped marks are common and can be ordered in rows, which is the situation at Leiknes, where two rows with such cracks indicate the way towards the

main panel, a drawing of which is shown as Figure 9.

This panel contains a row of large zoomorphic petroglyphs depicting land mammals like 'elk', 'reindeer' and 'bear', but also possibly a hare. A c. 7.5-m-long 'whale' image is located in the upper part of the panel. These petroglyphs are partly superimposed and occur in certain combinations, such as a 'bear' together with a cervid looking back. Hesjedal (1992: 41; cf. Gjessing 1932) emphasised the fact that many ground petroglyphs are unfinished or drawn wrongly, which he believed was done consciously in order to contrast the complete images. These images may, however, also be 'complete', representing animals that could move between two different worlds, the world of the living and the underworld within the rock, the rock surface representing a membrane between these two worlds (cf. Lewis-Williams 1987). The fact that these petroglyphs are incomplete, then, could indicate that the artists have drawn only the parts of the animal that was visible outside of the rock.

At Sagelva we find another geological feature that makes this site stand out in the surrounding landscape. Behind the decorated panel are a series of low undulating ridges separated by partly water-filled depressions, which give this site an appearance of 'petrified' rolling waves. The situation is similar at Valle (Gjessing 1932: Pls LII–LIV), and at Fykanvatn and Åmnes we find similar undulating rock within a more steeply sloping topography.

Figure 9. *Drawing of the petroglyph panel at Leiknes (after Gjessing 1932).*

More than a century ago Knut Lossius (1897; cf. Gjessing 1936: 171) noticed the great differences in weathering between different kinds of petroglyphs at Bardal in Steinkjer, Nord-Trøndelag, between petroglyphs of supposed Stone Age origin as compared with Bronze Age petroglyphs. Weathering has, however, not been brought into the discussion of the age of the polished petroglyphs. Visually, the polished lines can be discerned from the surrounding rock by their light colours and

Figure 10. *Surface weathering at Leiknes. Late Pleistocene glacial striation is still clearly visible on most of the panel (author's photograph).*

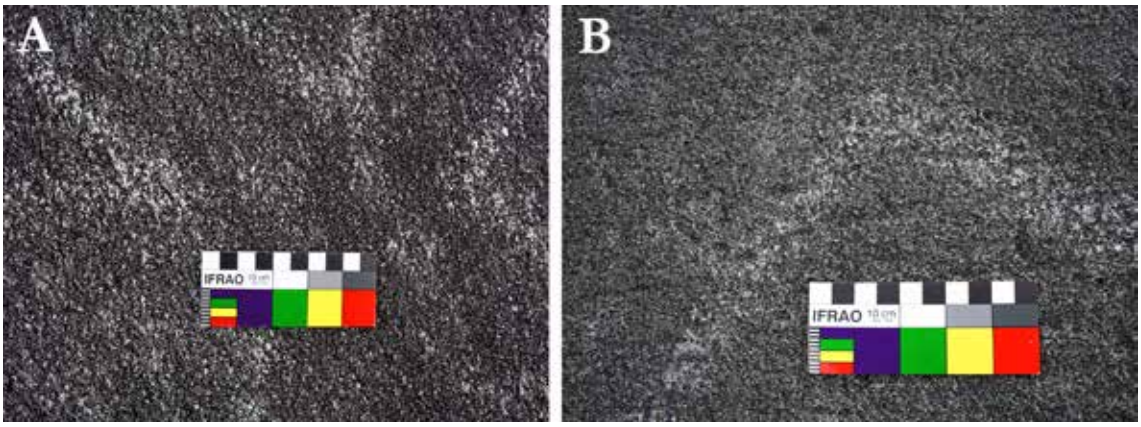

Figure 11. *Details of polished lines;* A *from Vågan;* B *from Åmnes (author's photographs).*

they are tactile by the smooth surfaces (Gjessing (1932: 6). Hardly any vegetation grows on the polished lines. Today these lines are discontinuous, mostly due to the porosity of the rock surfaces. The pores gradually become wider and deeper, eventually coming in contact with each other and forming wider weathered patches, which can be seen in the lower right-hand corner on Figure 10.

Except for the weathered pores, the surfaces are — as demonstrated by the still existing glacial striation — surprisingly well preserved. The man-made lines are so shallow that they will be destroyed by expanding weathering patches. This may explain apparent missing parts of some images. If, however, glacial striation is still preserved on rocks where animal parts are not present, these images cannot originally have been complete.

The fact that the glacial striation still exists on these panels demonstrates the weathering resistance of the rocks in question. At Vågan, for instance, the rock surfaces in general are strongly weathered. In this area the rocks are classified as mica schists (Gustavson and Blystad 1995), the large 'elk' image, however, being located on an outcrop containing harder rocks. The other sites discussed here are located in areas with rocks classified as granite and granitic gneiss (Gustavson 2003; Gustavson and Skauli 2003). The existence of the Vågan petroglyph may be the result of the artist's fortunate choice of panel but I find it more likely that the panel was chosen because its special qualities were already known, which indicates that the post-glacial weathering must have started a long time before this petroglyph was made.

Figure 11 shows close-up photographs of polished lines at Vågan and Åmnes. Macroscopically, the difference between the weathered pores inside and outside these lines seems insignificant, which indicates that the weathering of the pores must have started before the polishing was done. Otherwise the weathering within the lines should be different from the general weathering of the rock; the polished lines should be less affected by the weathering. I therefore find it unlikely that these petroglyphs were made 8000 to 10 000 years ago. Perhaps datable organic matter may be found in the bottom of the pores or microerosion studies (Bednarik 1992, 2001) may answer this question.

Conclusions

The Nordland polished petroglyphs are found far away from contemporary early Mesolithic settlements, which are known from some islands at the outer coast. Not until much later did the inner part of the *strandflat* emerge from the sea. This art is found at higher altitudes than other classes of hunter-gatherer rock art, and maximum dates obtained from Holocene land uplift data are c. 9800–8500 BP, while the maximum dates for panels with pounded/pecked petroglyphs in the same region are c. 6600–4300 BP (Hesjedal 1992: 31–33). This temporal gap is interpreted as evidence for discontinuity in the making of rock art in Norway; the making of petroglyphs was introduced in the early Mesolithic, being forgotten after a little more than a millennium, and re-invented some two millennia later.

The clustering of the glacier-made marks on many outcrops are so remarkable that pre-Historic man must have noticed them and recognised their addition to the general quality of the rocks; their existence may have been one of the reasons why petroglyphs were made at these particular panels.

The polished petroglyphs constitute a separate geographical group, as do incised petroglyphs, which are known from Nord-Trøndelag and the adjacent Swedish province of Jämtland (Sognnes 1999). Cave art, too, is known from a restricted area, which is virtually the same as the area with large naturalistic images (Sognnes 2009). Further, a group of small stylised petroglyphs (Gjessing's style III) is confined to a few sites in central Norway only. These petroglyphs are drawn in a manner that differs significantly from other zoomorphic petroglyphs in central and north Norway (Sognnes 2010).

Christian Lindqvist (1994: 163–164) studied all hunter-gatherer rock art sites in coastal Scandinavia and dated the sites based on their heights above sea

level. He found that the style III petroglyphs potentially might be older than any other petroglyphs in central Norway. If we combine Hesjedal's and Lindqvist's conclusions we get a chronological sequence consisting of four phases: (1) large naturalistic, contoured zoomorphs in northern Norway made by grinding/polishing; (2) small, highly stylised zoomorphs in central Norway; (3) naturalistic, large and contoured zoomorphs in central and northern Norway made by pounding/pecking; and (4) semi-naturalistic, contoured zoomorphs, sometimes with internal line patterns.

Taking rock paintings into consideration, this sequence becomes further complicated. In central Norway paintings are found at altitudes higher than petroglyphs, corresponding to sea levels from c. 8700 BP at Mølnargården in Bjugn, Sør-Trøndelag based on our current knowledge of the local land uplift (Sognnes 2003: 199). This would imply that rock art production in northern and central Norway was invented and re-invented three to four times. The group 2 petroglyphs (Gjessing's style III) are so different from the petroglyphs belonging to the phases before and after that it is difficult to believe that this sequence has any root in reality. Either Hesjedal or Lindqvist is wrong, but they may also both be wrong. If so, the error must lie in the use of the Holocene land uplift for dating the hunter-gatherer rock art in Norway.

The methodology of Holocene land-uplift dating has seldom been discussed. In a previous paper (Sognnes 2003) I raised some basic questions from a theoretical perspective. The current paper focuses on alternative and supplementary locational factors; in particular I argue for the importance of studying landscape biographies for the sites in question. This does not mean that I reject the idea of shoreline dating of rock art. In former submerged landscapes altitudes provide knowledge about maximum ages and occasionally we find panels that have been partly or wholly covered by beach deposits (e.g. Bakka 1975), which provides information about minimum ages too.

The fact that the panels with ground/polished petroglyphs are found at such high altitudes makes the conclusion that they are therefore older than other rock art plausible. However, this also raises questions (Gjessing 1932, 1936). Were these petroglyphs actually located at the shoreline or where they located at already raised shorelines along hunting trails leading from the fjords to the mountainous hinterland? Some of the sites of later millennia have been, and still are, located at rivers, often at waterfalls or rapids, as in interior northern Sweden where the rock art panels were not submerged. In south-eastern Norway, too, hunter-gatherer petroglyphs are located at waterfalls (Engelstad 1934). The fact that some of these waterfalls had once been submerged raised no question in the 1930s, however, interpreting these sites as having been located at the shores makes them potentially much older and stylistically 'late' petroglyphs temporally are moved back into the Mesolithic (Mikkelsen 1977, 1983). It is interesting, however, to observe that the petroglyphs at Kløftefoss in Buskerud may still be treated as a river site (Paasche 2000).

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