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SAFEGUARDING THE CAVE PAINTINGS IN LOFOTEN, NORTHERN NORWAY

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Abstract. Nine deep caves containing paintings have been recorded along the Atlantic coast of central and northern Norway. Probably dating from about 2500–3700 years BP, these cave paintings are considered unique of their kind in northern Europe. This article discusses their characteristics and various problems regarding their conservation. Four painted caves in the Lofoten Archipelago, northern Norway, are used as examples. The individual features and vulnerability of these sites are considered, and since Lofoten is a tentative candidate for the World Heritage List, the article includes a discussion of management problems concerning the anticipated increase of visitors to the caves in the area.

1. Introduction

More than 1100 rock art sites have been recorded in Norway. Most of them consist of petroglyphs. So far, only 46 painted sites are known. Nine of them are deep, dark caves. These form a remarkable group since they are the only recorded examples of their kind in northern Europe. Located in desolate areas along the Atlantic coast, the majority are found on mountainous islands with a rugged shoreline. The paintings inside these caves are supposed to be about 2500–3700 years old. Half of them have been re-discovered during the past 20 years. Systematic surveys will probably lead to new discoveries.

The Norwegian painted caves are dispersed through three parts of the country, distinguishable on the basis of geography and geology (Fig. 1). The two southernmost caves (Nos 1 and 2) are found in a small area in the county of Nord-Trøndelag, central Norway, where there are notable occurrences of serpentinite and mylonitic gneiss. Three caves forming the central group (Nos 3–5) are located in the southern half of the neighbouring county of Nordland, where the bedrock is mainly mica schist. The rest of the caves (Nos 6–9) are found in the northern half of Nordland, more precisely in the Lofoten Archipelago, where they have been eroded in Precambrian gneiss and granite.

The four Lofoten caves are used in this article as examples of the challenges to be met when we are to safeguard the cave paintings in Norway. In fact these challenges are of immediate importance because Lofoten has been proposed as a tentative Mixed Site nominee for the World Heritage List.

Lofoten is a chain of mountainous islands with precipitous bird cliffs, fringed by bouldery shores and a narrow strand. The area has special qualities associated with its marine resources, plant and animal life, cultural heritage monuments and exciting panoramas. It has been the centre of the North Atlantic cod fishery for more than one millennium. During the last generation, it has increasingly become a highly profiled area for tourism.

The four caves in Lofoten containing paintings are called Kollhellaren, Helvete, Sanden Cave and Bukkhammar Cave. Their painted images were re-discovered between 1987 and 2001.

The painted caves in Lofoten have so far been discussed in detail in only one earlier publication (Bjerk 1995). This article, however, was written in Norwegian and draws little attention to conservation issues. It was, moreover, published prior to the most recent investigation of the sites (since 1997). The present article is substantially based upon the results of this investigation, and its purpose is to fill a gap in our knowledge.

2. The Norwegian coastal caves as natural monuments

Geological surveys have revealed that the Norwegian coastal caves were formed by marine erosion of fault zones during the advance and retreat of Late Pleistocene glaciations. This process was caused by frost, pressure released by the waves when striking cavities, and the grinding movement of pebbles. Due to the chemistry and comparatively high resistance of

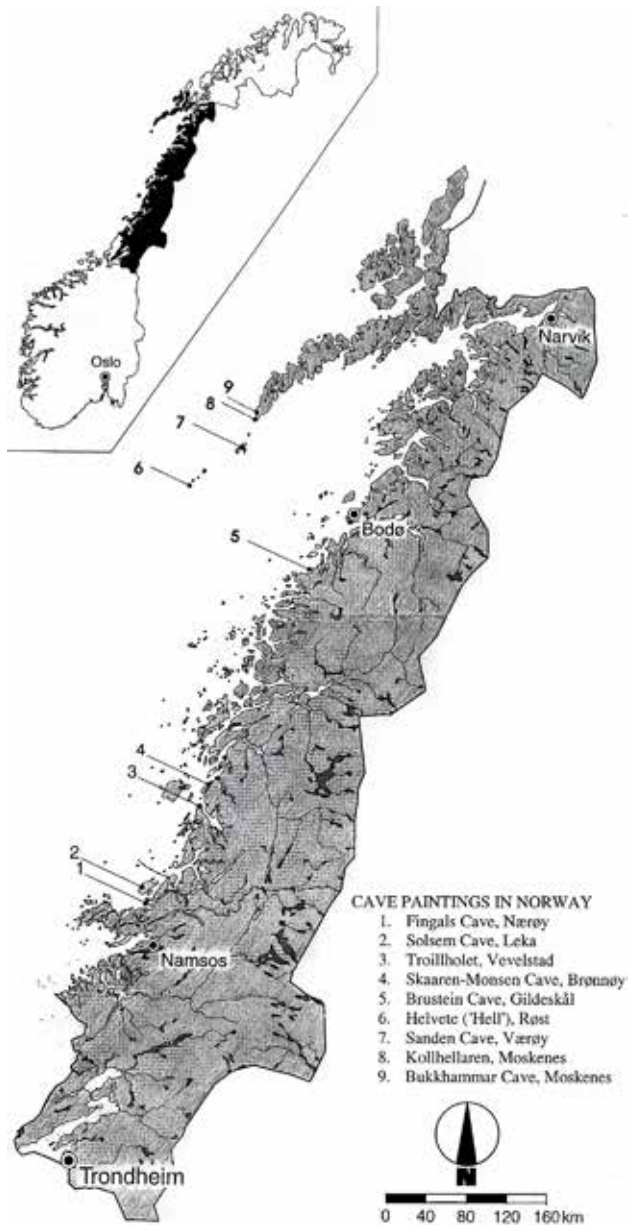


Figure 1. Map showing the nine cave painting sites in Norway. The four caves that are discussed in the second half of this article are numbers 6, 7, 8 and 9.

the bedrock involved, these coastal caves (also called 'sea caves' or 'marine caves') generally have a simpler topography than those eroded in carbonate rocks. Heavy precipitation and frost working on the loose structure of the fault zones result in frequent rock falls from the cliff face above the opening and from the subterranean vault. Thus the cave entrance area is often characterised by talus cones caused by such rock falls (Fig. 2). The steep inclines of these piles of debris require visitors to clamber up to the opening and down to the cave floor. The interior darkness is to a great extent caused by the rock falls and the presence of Late Pleistocene shoreline terraces. Some entrances, however, have retained their impressive dimensions (Figs 2, 3 and 4). Moreover, moraines may form a ridge in front of the opening if the cave was eroded before



Figure 2. The entrance to Skaaren-Monsen Cave in southern Nordland. This cave is eroded in mica schist and has a characteristic scree at the entrance. (Photograph by Arve Kjersheim 2004.)

it was blocked by the ice sheet (Møller 1985: 56). The total length of the caves varies considerably, being about 195 m at a maximum. In the subterranean area, cobbles, boulders and irregular, sharp-edged blocks, which have fallen from the vault add to the difficulty of moving around. Apart from this debris, the floor mainly consists of gravel deposited by the sea.

These caves constitute a bizarre rocky landscape. On entering them, the light, movements, colour and sounds of the outside world are soon replaced by total darkness, low temperatures, high humidity, silence (except for the sound of dripping water) and the impact of huge masses of dark rock. Since these underground systems favour a minimum of perceptible life processes, they form a complete contrast to our customary experience. Numerous cracks, narrow passages, alcoves and openings between fallen blocks reduce our perception of definable space, and being in total darkness, excluded from any contact with the outside world, our sense of time fades.

The Norwegian caves containing paintings belong to those natural formations which are classified by speleological expertise as 'real caves'. They are defined as such on the basis of their subterranean darkness, caused by their length being many times their width at the entrance (Lauritzen 2009). Hence, rock cavities which are totally illuminated by daylight are not classified as caves, but rather as 'shelters'.

3. The caves as cultural sites

In a world-wide context, deep caves are sensational and distinguished phenomena. Due to their relative rarity, topographic 'differentness' and subterranean darkness, many of them may have been perceived as



Figure 3. The mountainous surroundings of Kollhellaren. (Photograph by Terje Norsted 1998.)



Figure 4. The entrance to Kollhellaren seen from the inside. It is estimated to be about 50 m high. (Photograph by T. Norsted 1998.)

threatening and ambiguous. In some animist societies, caves have belonged to those incongruous landscape elements where spiritual power is concentrated. The recognition of such topographical power places permeated, for example, the pre-Christian religion of the indigenous Sámi living in northern Fennoscandia, i.e. the north-western part of mainland Europe (Manker 1957: 23–28). Accordingly, the Sámi associated these notable landscape elements with the presence of deities or mythical beings. A similar concept of power places has been recorded among various indigenous populations in northern Eurasia nearly up to the present.

Since the ethnicity of the Sámi is recognisable around the year 0 CE (Hansen and Olsen 2004: 36–41) and since the painted caves are outside their traditional settlement areas it is doubtful whether they had any direct connection with the Norwegian cave paintings. The beliefs of the pre-Christian Sámi, however, are interesting from an interpretative aspect since it is assumed that their shamanism, polytheism, magic and sacrificial practices had very old roots (*ibid.*: 352–353). This means that their forefathers may have shared their beliefs with other hunter-gatherer populations in northern Fennoscandia. These populations may have included those who used the Norwegian coastal caves and made the paintings inside them.

Based on the worldview of the indigenous populations of northern Eurasia it is often assumed that

these painted caves were perceived as liminal transition zones leading into a cosmological underworld. In accordance with this view, these sites could have been arenas for spiritual activities that included sacrifice, *rites de passage* and healing. In line with many deep caves elsewhere in the world, the Norwegian ones probably symbolised the unknown and chaotic, thus forming a contrast to the well-known and orderly.

4. The context of the paintings

We have no credible dating for the Norwegian cave paintings. However, in two of the sites (Solsem Cave and the Lofoten cave called Helvete), shells in cultural layers and dispersed animal bones interpreted as remains of sacrifices have been radiocarbon dated (Bjerck 1995: 127; Sognnes 2009: 88). The results indicate that the activities took place between 3700 and 2500 years BP, i.e. during the Early Metal Age. (This term is used in northern Norway instead of Bronze Age.) Whether the cave paintings were made in this period is doubtful, but plausible.

During the Early Metal Age, coastal groups in the region where these cave paintings are found largely used stone (schist) tools. Concurrently, some coastal groups, instead of relying exclusively on hunting, fishing and gathering, became increasingly more dependent on farming activities (Sognnes 1983: 117; Hesjedal 1994: 5).



Figure 5. Two human-like figures in Kollhellaren. Detail of panel 1 (in the eastern gallery). Unlike most of Norwegian cave paintings, these have quite distinct contours. The varying lines seem to indicate the use of a brush-like tool. (Photograph by T. Norsted 1998.)

Cave paintings in Norway have so far been recorded in only two neighbouring counties. Although this dispersal covers a long coastline, it is only a fraction of the total length of the Norwegian coast. If future finds of cave paintings prove to be restricted to this limited region, it is tempting to ascribe them to a particular group of people (Sognnes 2009: 92).

5. The paintings: motifs and techniques

Some of the figures consist of simple animal depictions and 'abstract' combinations of lines, but the great majority are human-like figures. Their height varies between 12 and 90 cm. Most of them are collected in groups and depicted frontally (Figs 5, 6 and 7). Their heads are suggested by a round dot, whereas their body is formed by a single line. Their arms and legs are sprawling. No other figurative

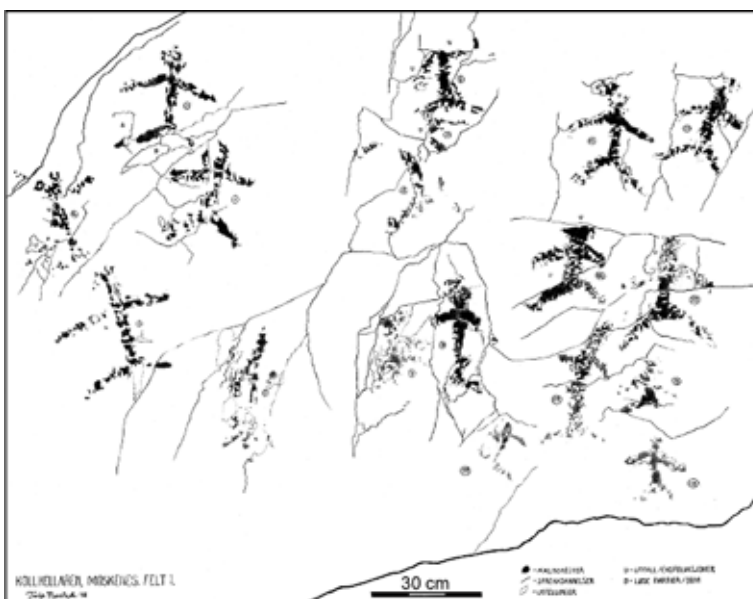


Figure 6. Kollhellaren, panel 1 (in the eastern gallery). (Drawing by T. Norsted 2001.)



Figure 7. Kollhellaren, panel 2A (in the western gallery). The motif may depict a ritual performance. The right hand figure carrying an object seems to be acting as a 'leader'. (Drawing by T. Norsted 2001.)

rock art in Norway shows such a mutual similarity regarding design as these anthropomorphs. A closer look at them, however, may reveal that they are more than just crude 'stick' figures. A few are depicted in side view and characterised as if in motion. Several are apparently phallic. Moreover, when they form a group, their constellation seems to imply a narrative message (Figs 6 and 7). For example, particular figures appear to play a role in relation to the rest of the group. These are often the larger ones or a bit removed from the others (Fig. 7). In some cases, prominent figures wear 'headgear' ('antennas') or carry an oblong object (Fig. 7).

The pigment is invariably iron oxide red. Spills show clearly that the paint was liquid. Possible remains of its preparation have been detected on the flat surface of stones in one of the caves (Fingal's Cave, central Norway; see Marstrand 1965: 159; Norsted 2008: 12–14, 23). Analyses (x-ray diffraction, SEM-EDS) have shown that the paint contains a considerable amount of calcium carbonate. This may be the result of natural processes, but it may also indicate that the pigment was mixed with carbonate-bearing water dripping from the vault. Such use of dripping water may have had a symbolic meaning, based on the notion that it emerged from the underworld (Norsted 2006: 25).

Whether the paint included an organic binder is doubtful. Gas chromatography has been used to identify such a binder, but no plausible result was obtained. The forthcoming use of alternative methods



Figure 8. Detail of the main panel in Helvete after graffiti removal in 2006. The most impressive figure now appears in a legible form. (Photograph by T. Norsted 2006.)

will hopefully lead to more insight into the paint composition.

The comparatively simple design of the smallest figures indicates that a common painting technique consisted of simply using the fingertip. However, a brush-like tool has obviously been frequently used, especially for larger figures (Figs. 5). These are composed of slightly curved and comparatively broad lines with a slightly varying breadth as opposed to the fairly straight and narrower lines (12–15 mm) produced by the finger (*ibid.*). Other methods of application have not been recorded.

Today, this paint has weak cohesion and adhesion, resulting in the pigment tending to spread on the surface when exposed to condensation wetting. This is the main reason for the blurred appearance of a number of cave figures (Fig. 8). Since the paintings are particularly vulnerable when the surface is moist, touching them under these conditions causes the pigment to come off readily.

6. What do these paintings mean?

The painted caves in Norway have their own individual topography. Their underground landscape may have been a cognitive model that influenced the prescription of how ‘spiritual activities’ should be conducted. Assuming that the figures were linked to such activities, their number and particular location may give us some clues regarding this connection. Thus it is striking that several groups are found at the very beginning of total darkness. This place may have been important for *rites de passage* (Bjerck 1995: 144–146). Other figures are located in the innermost part and in places which are not easily accessible. These paintings may have been produced for a select few (Hesjedal 1994: 13) or for individuals acting on behalf of the group. In one cave (Helvete, Lofoten), a large panel of figures is located in a dimly lit, spacious area close to the entrance, which could accommodate



Figure 9. The island of Trenyken, Røst, has a peculiar shape. Helvete is below the middle peak. (Photograph by T. Norsted 2001.)

a large group of people. No paintings have been recorded on entrance walls.

It has been suggested that several groups of anthropomorphs might be associated with communal rituals headed by a specialist (Norsted 2006: 21). These hypotheses are loosely rooted in ethnographic analogies. The most relevant are the ancient beliefs and spiritual practices of the indigenous peoples of northern Eurasia (Helskog 1999), especially those of the pre-Christian Sámi. In fact, studies of the religious symbolism and practices of the Sámi have increasingly influenced the interpretation of northern Fennoscandian rock art (Lahelma 2008). Although this trend concerns the study of the Norwegian cave paintings, their meaning is still far from understood.

A feasible basis for understanding the activities that took place in the caves is to consider the belief that the spiritual realm interacted with the world of the living and that people could influence this interaction by means of reverence and sacrifice. We know that pre-Historic people in Lofoten sometimes had to cross dangerous waters in small boats to visit ‘their’ cave (Fig. 9). Such a daring deed stresses the importance of this otherworldly connection.

7. Detrimental factors in the environment

The Norwegian caves and their immediate surroundings include a number of unstable factors. Nevertheless, many of the paintings are intelligible thanks to favourable local conditions. Apparently, natural alterations have taken place very slowly, whereas various dramatic changes have been triggered by sudden events in the environment, such as rock falls due to seismic activity or frost, for example. Sudden emergence of water from fissures has also caused abrupt alterations. Other kinds of perceptible changes have been brought about by modern visitors. Observations indicate that man-made damage normally escalates natural disintegration. This process concerns both the paintings and the cave environment.

Two of the Norwegian painted caves have a

narrow entrance. The inside world of these caves may at first give the impression of being a closed, static environment. This is definitely not the case. All the caves are continuously influenced by the outside climate. Closing the entrance to attain subterranean climatic stability would be extremely difficult due to the roughness of the terrain. Apart from being unrealistic, such intervention is undesirable because it would unacceptably alter the character of the sites.

As for the climatic susceptibility of these coastal caves, their geometry is important. In Norway, a vertical, *cul-de-sac* passage of varying width is commonly found in caves. In Lofoten, Sanden Cave is a classical example. 'Branching' caves that include lateral, diverging galleries constitute another group. In Lofoten, Kollhellaren is a typical instance. These caves may also be classified by considering them in the longitudinal section. In Lofoten, Sanden Cave and Helvete may be termed 'inclining' because of the steep slope from the entrance to the lowest floor level. Bukkhammar Cave and Kollhellaren, on the other hand, may be described as 'horizontal' since the slope inside their entrance is rather gentle. In most cases, the vault decreases in height towards the innermost part, while the floor rises.

The amount of air exchange depends mainly upon the size of the opening, its orientation relative to the dominant wind direction, the length of the cave, and the difference in altitude between the entrance and the lowest floor level. Thus, a horizontal cave having a large opening and a comparatively short passage would normally provide the most efficient ventilation. The underground temperature of the air and of the rock is governed by the rate of this exchange. In winter, when the outside air is cold and dense, and the vapour pressure of the water is comparatively low, it can penetrate the subterranean space and displace some of the accumulated air, mainly because this is lighter and warmer and has a higher vapour pressure. Since this exchange will reduce the relative humidity of the internal air, evaporation of moisture and perhaps precipitation of minerals will take place. In summer, however, when the vapour pressure of water in the external air is higher than that in the internal air, the air entering the cave will raise the relative humidity. This causes the air to condense and the rock surfaces may be moistened if their temperature is lower than that of the air. Thus, the differences between the temperature and the vapour pressure of water play a most important role in determining climatic conditions that cause either evaporation or condensation (Brunet and Vouvé 1996). In fact, these factors play an essential part in the decay of cave paintings, especially in Norway, where seasonal contrasts are great.

The decay of the Norwegian cave paintings results from several detrimental factors in the subterranean environment. Water is the essence of these factors. Apart from occurring as air humidity and condensation moisture, it percolates the joints and pores of the

rock as infiltration water. When it reaches the cave surfaces, it may emerge in fissures. Heavy rain and melting snow may cause excessive dripping from the vault and local trickles on the cave walls. This seepage is a major reason why many Norwegian cave paintings are partially erased. Infiltration water within the joint system may also contribute to rock falls. Some moisture inside the rock may be forced out by capillarity, but this has apparently not been a significant threat to the paintings. Finally, freezing and thawing may shatter joints and lead to rock falls, mainly in the outermost part of the caves.

The infiltration water is an effective agent of decay. After picking up carbon dioxide in the surface soil, it can form solutions of free ions and become mineralised during its passage through the rock. The level of concentration depends on several factors, including the pressure within the rock and the level of CO₂ saturation. When it emerges on the cave surfaces, the vadose water suddenly reverts to atmospheric conditions (Bednarik 2001: 85). This causes a discharge of the dissolved CO₂ and an adjustment to equilibrium with the cave atmosphere, resulting in the minerals that are in solution being precipitated on the vault and the walls. Calcite (calcium carbonate), which is the most commonly precipitated mineral in Norwegian caves, may occur as thin layers or thicker incrustations with a rough texture. These widespread speleothems may sometimes flake off in pieces, causing figures that were painted on them to be fractured or lost. Minerals, especially calcite, may even precipitate inside the weathering crust of the rock. This internal growth of crystals may cause some of the weathering crust to fall off. Such a peeling is an important reason why many Norwegian cave paintings are in a fragmentary state.

The influence of condensation moisture should also be considered. Initially, this appears as drops that eventually coalesce to form films on incrustation-free surfaces (Brunet, Vidal and Vouvé 1987: 221). Acting on the paintings as a solvent, this moisture may cause pigment particles to spread on the surface. As stated earlier, this blurring of the figures is a widespread feature in the Norwegian caves (Fig. 8). Moreover, condensation moisture picks up CO₂ from the subterranean air to form a corrosive agent. This acts on surface minerals (mainly the calcite) which may be dissolved and subsequently precipitated as 'veils'. Most of these veils dissolve during the next condensation period, whereas some may survive. A number of paintings in the Norwegian caves are subdued by such veils.

Lastly, mention should be made of human influence. In fact, the total number of visitors to the Norwegian caves has not yet been substantial. Consequently, we have not detected any microfloral indications of natural imbalance caused by visitors inside the dark areas. The negative results of accessibility generally show themselves as physical traces.

Since the vulnerability of the sites concerns the

entire cave environment, it is depressing to observe that visitors leave traces that are disturbing and sometimes difficult to remove. Apart from litter (e.g. beer cans, broken bottles, remnants of torches and hearths), the following kinds of traces and damage have been recorded:

- Patches of soot left by fires and torches, and spilt candle wax.
- Loss or smearing of pigment due to deliberate or accidental contact.
- Graffiti (the use of crayons, chalk and pieces of charcoal, and scratching with a sharp object) on or close to the figures.

8. Some remarks on aspects of conservation

The meaning and value of the Norwegian cave paintings has changed radically from a purported ritual function to their current use as, for example, goals for tourism. This change places great demands on how these sites should be safeguarded and presented in present-day reality. To promote understanding and appreciation, our main task is to secure as much as possible of the diversity of information which the sites may give us. Due to the extreme vulnerability of the paintings and the cave sediments, the safeguarding strategy should include decisive elements of risk preparedness.

The painted caves belong to the Norwegian monuments and sites that are older than 1537 CE. These are automatically protected. According to the preamble to the *Norwegian Cultural Heritage Act (1978)*, protected monuments should be conserved 'as scientific source material and as an enduring basis for the experience of present and future generations and for their self-awareness, enjoyment and activities'.

The Directorate for Cultural Heritage is responsible for implementing the *Cultural Heritage Act*. As the national management authority, the Directorate is responsible for ensuring that the interests of the cultural heritage are safeguarded at all levels, and for increasing the awareness of the general public of the value of their heritage. The five University Museums in Norway are licensed to carry out the investigations at pre-Historic archaeological sites, whereas the County Councils are responsible for their maintenance.

According to the preamble to the *Cultural Heritage Act*, we should cater for the interests of both science and the general public. Attaining such a balance is sometimes problematic. There is often a serious risk that valuable source material will be altered or lost if public access is casual. The focus which the *Act* places on future generations, however, helps to draw up boundaries for use relative to sustainability. Thus, a distinction should be drawn between 'use' and 'consumption'.

To ensure that our descendants will have the opportunity to experience the cave paintings in Lofoten, public accessibility should be assessed and strictly controlled. This strategy has been chosen for

selected caves and their pre-Historic imagery in other parts of the world. A similar policy is increasingly relevant for related sites in Norway. This will be discussed in the remainder of this article, which specifically concerns the painted caves in Lofoten.

9. The painted caves in Lofoten

The four caves in the Lofoten Archipelago show a number of individual characteristics, but they have the following features in common:

- They have been investigated and thoroughly documented since 1997 by Tromsø University Museum and the Norwegian Institute for Cultural Heritage Research (NIKU) as part of the National Rock Art Safeguarding Project.
- Their remote locations, the unpredictable weather conditions and the absolute need to use a good, seaworthy boat limit the opportunities for regular inspection and monitoring.
- Lofoten is one of the regions in Norway where tourism is given national priority.
- The caves are located in a region that figures on the Tentative List of candidates for the World Heritage List in the Mixed Site category.

The Lofoten caves and their paintings offer serious challenges as far as conservation and management are concerned. All issues regarding maintenance and public access are the responsibility of the County Council of Nordland.

9.1. Kollhellaren

The paintings in Kollhellaren, in the borough of Moskenes, were the first of their kind to be discovered in Lofoten. This took place in 1987 (Hauglid et al. 1991). The cave is situated in a spectacular, mountainous landscape (Fig. 3), and the boat trip to reach the site involves crossing the world's strongest maelstrom. The cave entrance is about 25 m above present sea level and is easily seen from the sea because of its dramatic shape and huge dimensions (Fig. 4). Its height is estimated to be about 50 m, whereas its maximum width is 12 m. Since it faces north, a large part of the cave is illuminated by the midnight sun in midsummer. Strange as it may seem, the ground plan forms a cross. The entire gallery system is about 195 m long. The meeting point of the galleries, or the origo, is located about 60 m from the entrance. From being 12 m wide at the origo, the main gallery becomes increasingly narrow. The innermost 10 m are inaccessible. At the beginning of this inaccessible part, the walls are red due to extensive precipitation of iron oxide. A few paintings in a fragmentary state have been recorded in the main gallery, 96 m from the opening.

The main panels of paintings are found in the side galleries. At the beginning of the eastern gallery is a group of 18 anthropomorphs, 15 to 42 cm high (Figs 5 and 6). Most of them are in comparatively good condition. They have been painted on small,



Figure 10. The outermost part of Helvete is comparative wide and has a smooth floor. The main panel of paintings, which is on the wall to the right, is not visible on the picture. (Photograph by T. Norsted 2001.)

protruding parts of the wall. One of them is apparently depicted in side view. Being faintly illuminated during the midnight sun period, the panel is slightly greenish due to growth of algae. It is 1.95 m high and 1.25 m wide.

A group of eight human-like figures is seen at the beginning of the western gallery (Fig. 7). Their height is between 20 and 60 cm. Some of the figures are awkwardly positioned on protruding surfaces. The largest figure, to the far right, is apparently depicted in side view, perhaps holding an object. This group of anthropomorphs provides the best evidence in the Norwegian caves of a ritual performance being depicted. A few isolated human-like figures are also seen in the western gallery.

Other kinds of archaeological remains were not observed during the investigation of the cave. Since the paintings are vulnerable all the year, none of them should be touched.

9.2. Helvete

The next paintings to be re-discovered in Lofoten were reported in 1992. They are found in a cave on the island of Trenyken in the borough of Røst, which is an archipelago located far out to sea. Trenyken is remarkable since it consists of three peaks rising from the sea in a line (Fig. 9). This may have made

a strong impression on the pre-Historic population, the remains of whose settlements from the Late Stone Age and subsequent periods have been found on other islands. A special asset of Trenyken is the vast numbers of seabirds breeding there. The cave is situated below the middle peak and carries the suggestive name of Helvete, meaning 'Hell'. Its large opening faces north and is almost hidden behind a broad moraine which towers 42 m above present sea level. The descent to the lowest floor level is difficult because the very steep slope is covered by greasy earth. The entire length of the cave is less than 100 m (Fig. 10). It is widest in the outermost part, where there is a flat gravel floor. Here, on the dark western wall, is a nearly 20-m-long panel of painted figures, including anthropomorphs of various sizes and a long, horizontal line which stretches between the human-like figures. The most remarkable anthropomorphs are two 90-cm-tall figures with 'antennas' on their heads (Fig. 8). They have bent arms and hands showing all the fingers, and their bent legs have distinct feet. One of these figures has been substantially obliterated by water seepage over a long period. However, until they were removed in 2006, the most disturbing elements were graffiti made prior to the recognition of the paintings. This defacement covered large parts of the panel and included names and dates scratched on the surface or written with pieces of charcoal originating from hearths.

In the innermost part of Helvete is a pothole niche near which faint, fragmentary paintings of human figures and an imprint of three fingertips are seen. The paintings have been partly executed on a large precipitate of calcite mixed with guano. This is a strange, multicoloured element. The floor in front of the niche consists of gravel. The remains of seal skeletons are partly hidden beneath two nearby boulders. A number of the bones show marks that indicate quartering. Radiocarbon dating of a cervical vertebra has given an age of about 3598–3396 years BP (Bjerck 1995: 127). Whether the paintings, or at least some of them, were created during this period is doubtful, but plausible.

The paintings and the skeletal remains combine to make this site particularly vulnerable.

9.3. Sanden Cave

In 1994, paintings were reported in Sanden Cave on the island of Værøy, in the borough of Værøy. The southward-facing cave entrance is at the top of a broad talus cone, 53 m above present sea level. It is situated in a bay with a white, sandy beach called Sanden. The opening is narrow, but just inside the cave widens dramatically. The slope down to the lowest floor level (24 m above sea level) is quite steep. The cave is probably nearly 150 m long. About 70 m from the entrance, the cave narrows significantly and takes the form of a corridor. Daylight fades just at the beginning of this narrow part. The paintings are located on

both walls in this transition zone. The figures on the eastern wall include three distinct anthropomorphs, 45–47 cm high, and one imprint of three finger tips, exactly like that in Helvete. There are seven human-like figures on the western wall. These are between 32 and 62 cm high. Most of them are badly disintegrated because precipitations of calcite and vermiculite (a clay mineral) partly surround the pigment, and partly raise it from the substrate. This delicate structure cannot withstand being blown on, far less touched. The group of figures on the western wall are certainly among the most vulnerable pre-Historic remains in Norway.

Other kinds of archaeological remains were not observed during the investigation of the cave.

9.4. Bukkhammar Cave

The fourth occurrence of paintings was re-discovered in 2001 in Bukkhammar Cave in the borough of Moskenes. It is situated north of Kollhellaren, on the same stretch of coast. The location, however, is remote, and since the opening faces south-west (the orientation of the dominant wind), the site is exposed to stormy weather. The cave can only be reached by boat, and landing can easily become extremely hazardous. The cave opening is very large, 21 m wide and 34 m high (Fig. 11). The entire length of the cave system has been estimated at about 95 m. The wide, outermost part is oriented towards northeast. Its floor consists of gravel and silt in which the footprints of visitors are clearly seen. At a distance of 48 m from the entrance, the orientation changes to east-northeast. The innermost part is dark and consists of a narrow, straight passage. The paintings are on the northern wall of this passage, 78 m from the opening. Two panels consisting of sixteen more or less fragmentary figures have been recorded. Since erosion due to water seepage has been very active, some of the figures are merely represented by weak spots. Only half of them can be identified as remains of anthropomorphs. They are 17–50 cm high.

Other categories of archaeological remains have not been observed in the cave.

10. Accessibility versus conservation

Plenty of evidence suggests that visitors are entering the Lofoten caves without any control. These visitors are mainly local boat owners and their guests. The rough terrain would make it difficult to set up some acceptable kind of physical barrier to limit this casual access. Such contrivances would certainly give the impression of being alien elements due to the inextricable ties between the sites and the coastal landscape. Thus, a strategy that keeps the sites pristine would undoubtedly evoke a more positive response from the public at large.

The current trend in conservation is to maintain heritage resources in a condition that makes them available for study and appreciation by specialists and the general public alike (Pye 2001: 23–24). However, it



Figure 11. The entrance to Bukkhammar Cave. (Photograph by T. Norsted 2005.)

is first and foremost vital to consider *preventive measures* when we are to conserve the cave paintings in Lofoten. Since it is difficult to predict and control the natural processes that cause changes and disintegration, the conservation should mainly take the form of careful measures aimed at preventing signs of improper use and damaging behaviour.

11. The Lofoten caves as attractions for tourism

The prospect of safeguarding the Lofoten caves is currently worrying, but closing all of them to visitors would undoubtedly arouse a negative public attitude, at least if they fall within a World Heritage Site. Due to their vulnerability it is important that access is preceded by a professional survey, which helps to determine visitor limitations. Such a survey has been part of the latest investigation.

At the outset of this discussion we may ask whether *all* these caves are really suitable for tourism. If the answer is 'no', the next step would be to make a critical selection. Such a choice should preferably be based upon:

1. The vulnerability of the sites, which should not only include the paintings, but also the sediments and any archaeological material remaining in the caves.
2. The location of the caves, which concerns the distance from the nearest fishing village and how to get to the site in a safe and organised way.

3. The public appeal, which includes the scenic representativeness of the cave and the surrounding landscape as well as the legibility of the paintings.
4. The on-site situation, which mainly refers to the avoidance of physical facilities for visitors that would be disturbing and undesirable.
5. The manageability of the cave, meaning how easily can the County Council carry out regular inspections and make any necessary changes in the management of the caves.

The following requirements should be added:

6. What kind of visitors would be attracted to these sites? What would they expect to see? Would they be satisfied with a visit to only one of the caves? If so, is it important to choose the one that has the impressive quality that gives visitors full satisfaction?
7. The tour operator must adhere to the rules laid down by the County Council and use an authorised guide.

Let us now examine all the sites and suggest a choice.

Bukkhammar Cave (Fig. 11). The cave itself is impressive, but the paintings, which are in a dark, narrow passage, will probably be considered disappointing because they are so poorly preserved. In addition, it is very difficult to land at the site and hazardous when the weather is not optimal. It is simply irresponsible to take visitors to this place. Hence, Bukkhammar Cave is not a suitable goal for tourism.

Sanden Cave. The paintings on the western wall are unbelievably vulnerable. It is currently considered best to allow natural changes to take place undisturbed and limit visits by restraining mention of the existence of the paintings. A sign giving information about their state and calling for great care should be put up inside the cave entrance as a precautionary measure. In any case, Sanden Cave is not suitable as a tourist attraction.

Helvete. Because of the valuable bird life, visits to this cave (Figs 8, 9 and 10) must take place before or after the protective period, which is 15 April to 1 August. A local boat owner organises excursions for tourists, but these tours do not include the cave unless some passengers explicitly wish to see it. The extensive graffiti on the main panel was a very depressing sight and seriously diminished the legibility of the figures. They were therefore removed a few years ago, partly to discourage additional graffiti. Since the paintings and the skeletal remains make the cave extremely vulnerable, the County Council considers Helvete as inappropriate for inclusion in tourist excursions.

Kollhellaren. This is the only cave in Lofoten which is now used as a tourist attraction. The site is situated in dramatic scenery, and the form, dimensions and purported sacred character of the cave are impressive

(Figs 3 and 4). Although the County Council has banned visitors, exemption is given to small groups accompanied by an authorised guide who must adhere to instructions laid down by the Council. Since these organised trips have taken place every summer for ten years, a great deal of experience has been gained. As a rule, the groups are taken from the nearest fishing village to a well-protected landing place a couple of kilometres north of the cave. The walk to the destination is part of the adventure. At the entrance, the guide informs the group about the cave and what they will see before taking them on a fixed route to the panel in the eastern gallery (Figs 5 and 6). Most of these figures are distinct and easy to understand. No one is allowed to go further into the cave, but the visitors are able to see most of the paintings in the western gallery from its entrance.

12. The Lofoten caves as parts of a future World Heritage Site

In a World Heritage context, the painted caves in Lofoten might be assessed as sites in danger because of the growing tourism in the region and because they have no physical protection. As stated earlier, closing off their entrances is likely to be perceived as an alien action affecting the natural context of the sites. It may be risky not to physically prevent access, but this would hopefully stimulate the understanding of the caves as extraordinary sites and guide the behaviour of visitors.

In the previous section, Kollhellaren was deemed a suitable site for organised visits. This would probably also apply if Lofoten becomes a World Heritage Site. Since Kollhellaren is also a particular attraction for the local inhabitants, they would probably still visit the cave despite a County Council ban. To avoid disturbing impacts from these casual visits, it might be helpful to prepare instructive signs and up-to-date information (printed and digital) to enhance public understanding of the value and vulnerability of the site.

Profiling Kollhellaren as the main cave to visit is a strategy that aims at reducing the pressure of tourism on the other caves. However, these caves are not likely to be forgotten. Unfortunately, Helvete seems to be attaining increasing importance as a goal for tourism. Hence, in the future, pressure may be put on the County Council to open the cave for strictly controlled visits. The Council, however, maintains that this is undesirable because of the vulnerability of the cave and its archaeological remains. Moreover, if facilities for visitors had to include physical installations, the pristine character of the site would be unacceptably disturbed. A legal protection of the surroundings of Kollhellaren and Helvete would help to control the visitors.

13. Concluding remarks

Like all the other painted caves in Norway, the

four Lofoten caves were shaped by marine erosion. They form monumental elements in a dramatic coastal landscape. Archaeological evidence indicates the possibility that their subterranean spaces were predominantly used as ritual arenas. Being located in the darkest parts of these sites, the paintings were probably connected with cultic activities. Since the underground landscape of the caves is extremely rough and contrasts with our customary experience, the paintings must have been made under trying circumstances. Most of them consist of human-like images and their shape is generally simple. However, as messages from a distant past, they are stirring in a particular way, and contribute to the remarkable character of the sites.

The paintings and their subterranean environment are extremely vulnerable. Since visitors represent a possible threat to their survival, a primary aim is to gain control of public access. Lofoten has increasingly become a highly profiled area for tourism, and the caves are looked upon as outstanding attractions. Kollhellaren was selected ten years ago as a suitable cave for organised tourism.

Lofoten was proposed as a World Heritage Mixed Site in 2002. In line with the majority of World Heritage Sites, Lofoten is likely to attain a more distinguished profile as a tourist attraction. Consequently, an increase in the number of visitors to the caves should be anticipated (ICOMOS 1993), and preventive measures should be implemented to avoid negative effects.

The process leading to the nomination of Lofoten for the World Heritage List has so far taken eight years. This appears to be a comparatively long time, but seems to be quite common as far as Mixed Site nominations are concerned. One reason for the lengthy process is divided opinions about the proposal.

The local authorities have gradually supported the proposal, but a number of local politicians now assert that a future status as a World Heritage Site would probably hamper future drilling for oil and gas off the Lofoten coast. It might be doubtful whether such a development and its effects would be consistent with the World Heritage status. The nomination documents have been completed, but they will hardly be submitted until the political situation is sufficiently clarified. At the time being (February 2010), the liberal fraction of the Norwegian Parliament is critical of the nomination process and refers to the economic importance of petroleum exploitation in Lofoten, whereas the opposing fraction advocates a restrictive line that would aid conservation.

Regardless of future developments, the role of Lofoten as a tourist magnet is likely to be nurtured. Hence, the painted caves in the region will very likely continue to arouse fascination and attract increasing numbers of visitors.

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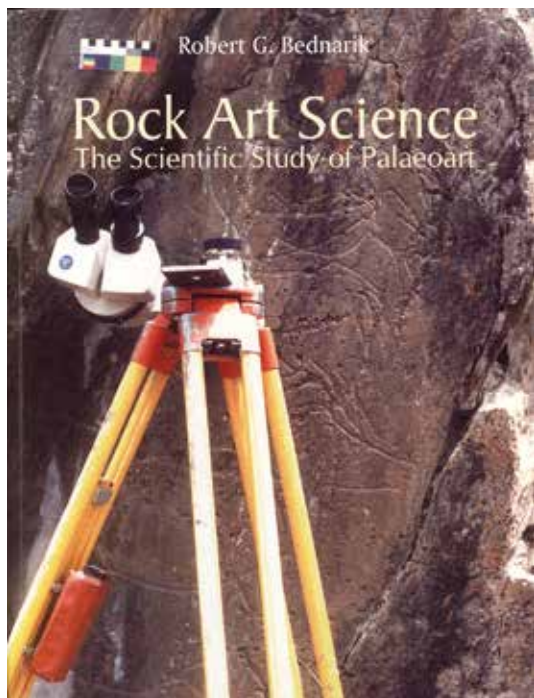
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