Skiing on the Rocks: the Experiential Art of Fisher-Gatherer-Hunters in Prehistoric Northern Russia

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The interpretation of images in relation to their particular setting on rock surfaces has been highlighted in recent studies into the location of depictions in the natural landscape and shamanistic beliefs and practices. The significance of the approach in this article, however, lies in studying the morphology of the rock surface as an integral part of the visual imagery of the rock art, notably how the physical dimensions of the rock surface were used in recreating the physical landscape familiar to the prehistoric artists. We use experiential and cognitive approaches to visual perception to combine an appreciation of artistic endeavour of rock art with an enhanced understanding of the human capacity for creating such images. The results of this approach to rock art contribute to a better understanding of the creative and cognitive aspects of prehistoric fisher-gatherer-hunter art. A detailed example is discussed showing how the physical landscape was re-created in the morphology of the rock surface by using the motion of skiing to illustrate one of the visual narratives at the site of Zalavruga in northern Russia.

In order to understand the visual imagery expressed in the rock art of prehistoric fisher-gatherer-hunters of northern Russia, it is essential to integrate the three-dimensional recording of morphology of the rock surfaces with a cognitive approach to visual arts. The prehistoric artists brought their own experiences to the creation of the visual narrative expressed in the rock art. Combining contemporary knowledge of how the brain works in relation to visual perception will add new interpretive elements, bringing archaeology and rock art research into wider discussions in science and the history of art.

Rock art is usually recorded by archaeologists, first to record the images and second to interpret them. Various techniques are used, including sketching, drawing, rubbing, tracing, photography, photogrammetry, and infrared photography (Whitley 2001, 55–79; Oswald et al. 2005–06). In recent years, the use of laser scanning and photogrammetry has produced high resolution images of the rock surfaces and the images they bear (Helskog 2003), methodological advances which form the basis for the approach set out in this article.

The interpretation of images in relation to their location on rock surfaces has been highlighted by recent studies into the seasonality of depictions, and beliefs and practice, creating the visual narrative of representational art (Arcá 2004; Bradley 2000; Coles 2003; Fossati 2004; Helskog 1999; 2004; Keyser & Poetschat 2004; Lewis-Williams 2002; Taçon & Ouzman 2004; Tilley 2004). Influenced in part by such developments, the significance of the approach presented in this article lies, firstly, in studying the three-dimensional morphology of the rock surfaces as an integral part of the visual imagery of the rock art. We argue that the physical dimensions of the rock surface were used in simulating a physical landscape familiar to the prehistoric artists and that, in such a way, experiential art has been created. Secondly, we also used, for the first time, a cognitive approach to visual perception to combine an appreciation of the artistic endeavour of rock art with an enhanced understanding of the
human capacity for creating such images. Using particular cognitive elements common to us all, an artist increases the evocativeness of the composition; his or her creative abilities are used in making choices which affect the way in which the visual narrative is constructed and the viewer follows it. The results of this approach to rock art contribute to a better understanding of the creative and cognitive aspects of prehistoric fisher-gatherer-hunter art. A detailed example is discussed, showing how the physical landscape was ‘recreated’ in the morphology of the rock by using the motion of skiing to illustrate one of the visual narratives at the site of Zalavruga.

Rock art and the prehistory of the River Vyg

The rock carvings of northern Russia are one of the most prominent examples of visual imagery produced by fisher-gatherer-hunters in Europe (Fig. 1). A remarkable complex of prehistoric petroglyphs extend along the River Vyg, which disgorge into the White Sea. While, at present, these sites can be reached by land, during much of prehistory higher water levels in the River Vyg meant that they were on islands within the river system.

The first rock-art sites to be discovered in the area were found at Besovy Sledki by A.M. Linevski in 1926, since when many hundreds of petroglyphs have been found in the region. From 1926 to 1968, a total of some 2100 carvings were discovered, forming over 100 discrete compositions. Following his initial discoveries, Linevski proceeded to survey the whole area. His discoveries at Yerpin Pudas Island, formally recorded by V.I. Ravdanicas in 1936, along with finds on other islands in the River Vyg, are one of the milestones in the study of prehistoric northeast European art. The current project has focused on one of the compositions, known as Group IV, within the Nova Zalavruga complex. These carvings were first studied by Y.A. Savateev between 1963 and 1968. The Nova ('new') Zalavruga complex is differentiated from the Stara ('old') Zalavruga complex which was discovered by Ravdanicas during the 1936 survey. Access to the carvings at Besovy Sledki is now prevented by the deterioration of the structure constructed to protect it.

The rock-art panels date from the Neolithic to the Iron Age (approximately 5000 years ago to 3000 years ago). Two techniques of relative dating have been used here. The first is based on the correlation of the rock’s elevation with known sea-level fluctuation. E.I. Devyatova (1976) provides us with the elevation of the rock carvings and settlements, together with the C14 dates (Table 1). These data allow us to correlate the rock surfaces exposed above the water level with the presence of human occupation in the area.

The second dating technique is based on the relationship between the carved surfaces and dated archaeological layers (Keyser 2001). For the panels we are studying, stratigraphic relationships between rock carvings and settlements have either not survived or prehistoric communities did not settle close enough to create such relationships. However, stratigraphic relationships have been used to date similar panels in this region. Layers dated at 2900–2300 cal. bc covered one of the groups at Nova Zalavruga (Savateev 1970, 128). The cultural layer is divided from the carvings by a layer of sand which indicates that the prehistoric settlers did not see the carvings in this particular place, and provides a terminus ante quem.

Russian archaeologists have argued that the relationship between the elevation of settlements and rock carvings suggests that the Nova Zalavruga petroglyphs were visible during the occupation of nearby sites. On the islands of the River Vyg a number of settlements of various archaeological periods have been excavated. The dating of those settlements, from 5700–5150 cal. bc to 2300 cal. bc to 1400 cal. bc, indicates the presence of people on the islands during the period in which the petroglyphs were created. Table 1 lists the available radiocarbon dates for the occupation of the area. The layers of the settlements from which these dates come, however, are stratigraphically above the rock art, providing a terminus post quem for
the rock art: the carvings could not have been created after the dates shown in Table 1. Despite the presence of these settlements in the vicinity of the rock art, it is difficult to infer the role that rock carvings played in the lives of prehistoric fisher-gatherer-hunters and it remains problematic to define if and to what extent the rock art was exposed and visible at different times in prehistory.

Cognition and the perception of vision

The link between the morphology of the rock and the personal experience of prehistoric artists in the creation of particular images can be demonstrated through a cognitive approach to rock art combined with an understanding of what we here term the cognition of vision. The study of the cognition of vision is part of the broader field of visual perception, which begins with our understanding of the cognitive abilities of human beings in contrast to the stylistic or iconographic abilities of particular artists. We follow Lakoff & Johnson in defining cognition as ‘any mental operations and structures that are involved in language, meaning, perception, conceptual systems, and reason’ (Lakoff & Johnson 1999, 12). Our approach to visual perception draws on their concept of embodied perception and especially the notion of ‘embodied realism’, based on the findings of ‘second generation’ cognitive science. These findings reveal the central role of ‘embodied understanding’, which allows human beings to function meaningfully in the world and to make sense of it through the body and imaginative structures (Lakoff & Johnson 1999, 78). This is accomplished, according to Lakoff & Johnson, by the fusion of two parts. The first part is composed of the mind and body as one. The second is that the way human beings experience the world they live in is ‘an inescapable consequence of our biological makeup’ (Lakoff & Johnson 1999, 18). Further, they postulate that the ‘mind is not merely embodied, but embodied in such a way that our conceptual systems draw largely upon the commonalities of our bodies and of the environment we live in’ (Lakoff & Johnson 1999, 6). However, if we live in different environments, our experience will differ despite our shared biological make-up, creating cultural metaphors and categories. Visual perception in such a light is a blend between ‘human being as neural beings’ (Lakoff & Johnson 1999, 18) and the world in which we visually communicate with others by creating images and depictions.

How this knowledge translates into the creation of a physical entity such as a rock carving depends as much on the artist’s physical abilities as on the cultural preferences which constrain those abilities. What we mean by this is that the emphasis on particular physical properties in bringing up children and members of a particular community focuses on some physical aspects rather than others. One of the most striking examples comes from the short account given by Ratey (2002, 78) concerning one of the other physical senses, touch, and its cultural manifestation:

Receptiveness to being touched varies from culture to culture. Americans do not feel as comfortable touching one another as people in other cultures do, whether it be casual touching or affectionate caressing of children by parents. The latter point could be significant, because cross-cultural studies have demonstrated that societies in which parents show more physical affection towards their infants and children tend to have significantly lower rates of adult violence. On a lighter note, one study of adults in social settings such as cafés reported that casual touch, such one friend patting another’s shoulder or hand, occurred about some two hundred times in 30-minute period in France versus twice in 30 minutes in the United States.

Ratey argues that cultural preferences affect physical behaviours, including the creation of art objects. Among other examples, Ratey discusses the upbringing of talented musicians. They very often come from musical backgrounds where parents encourage their offspring to play or sing, which in neurological terms equals firing repeated electrical signals which create synapses which in turn enable a great musician to develop. It can be argued in this way that a young person can have a genetic predisposition to be ‘good at music’. Without encouragement in the early years, the predisposition will be lost by the lack of creation of synapses. As we can see, the process of physical

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behaviour and cultural preferences shape the cultural, social and physical aspects (including creative potential) of any particular community or society.

Visual perception and cognition are intricately interwoven in constructing visual images.

Visual perception concerns the acquisition of knowledge. This means that vision is fundamentally a cognitive activity (from the Latin cognoscere, meaning to know or learn), distinct from purely optical processes such as photographic ones (Palmer 1999, 5).

Such acquisition of knowledge is complex and visually led because it allows us to assess and to make sense of the environment around us. To take the examples of skiing and hunting, it is through vision that we assess distance and stimulate our motor function, for instance, how to walk up or down hill. As we will see later on, the prehistoric artists of the River Vyg were able to see and to transform this implicit knowledge into rock art by creating a visual metaphor of the landscape that was based on the bodily experience of skiing. The motor sensory systems build neurological connections through such acts, and allowed the prehistoric artist to draw on them in creating an embodied visual metaphor for movement, landscape, speed, excitement and the hunt.

It is well understood that we ‘see’ as a result of particular stimuli or information entering our brain via the retina, which in turn stimulate various electrical charges within the brain, which are then transformed into visual concepts which are already stored in the brain as a part of memory. The information entering the brain represents only 10 per cent of the light that reaches the eye. Light is filtered by the retina to prevent the brain being overpowered by the information it carries (Ratey 2002). As we will see below, from the viewpoint of visual perception rock-art depictions can be divided into two categories depending on the morphology of the location. The first category of depictions are those which are clearly visible and where the background comprises ‘visual calm’. The second category includes those depictions which are placed in locations where the visual background creates ‘visual noise’. This distinction can perhaps best be explained by reference to a painting hanging on a wall. If the picture is hung on a plain white wall, the background seems to fade, leaving the viewer to focus on the clearly visible picture. If, however, the same picture were placed on a wall decorated with a strong flowery-patterned wallpaper, the viewer would have to concentrate much harder to focus on seeing the picture clearly. We will return below to explore how prehistoric artists successfully manipulated our ability to distinguish between visual noise and visual calm, focusing our attention on particular depictions.

We propose that such an understanding of visual perception contributes to present archaeological research on rock art (Whitley 2001; Chippendale & Taçon 1998), by adding a further dimension to our knowledge of the images. In recent archaeological literature, the role of the rock surface and the images carved into it, as well as the way it has been recorded, has been emphasised (Coles 2000; 2005; Helskog 2004; Keyser & Poetschat 2004; Taçon & Ouzman 2004; Tilley 2004). Keeping this in mind, we set out to explore how the morphology of the rock surface itself contributes to the visual narrative being created by the artist. Using this approach, the rock surface is treated as a three-dimensional entity which has been observed and recorded not only by rubbing, photography and artistic sketches, but also by measuring the morphology of the rock surface. We then related the morphological features of the rock to the compositional aspects and imagery of the rock art.

Adopting a framework of embodied realism goes beyond looking at the study of brain and art. It fuses the brain and body with the experiences which humans have. Our bodies are built in a particular manner. We have two legs and two hands, instead of four legs; our brains, as they work, produce particular images. Our physiology of seeing is different from that of an insect or a bird, and therefore our experience in the world differs from that of other living creatures. Experiences themselves depend on the environment we live in, the material world we relate to and operate within. These elements taken together create a unique way of being human in the world. To make sense of the world is to build embodied metaphors that are related to our brain-bodies and experiences. Lakoff and Johnson’s work relates to language and the way metaphors are constructed in English. In our work we illustrate the way in which visual representation was constructed.

Drawing a parallel between language and rock art has been criticized previously (Janik 1999): the grammar of one language differs from the other and therefore, while language is a universal form of communication, it varies between cultures and peoples. Applying the principles of the English language as an analogy to the way rock art is understood is misleading and counter-productive. Lakoff & Johnson criticize the use of semiotics, arguing that the unique properties of a particular language cannot be transformed into another language since they are not only biological properties of brain and bodies. We communicate through language which reflects our experiences that are captured in metaphors which are culturally spe-
cific. For example, a ‘warm welcome’ translates into Polish as a ‘whole heart welcome’.

Incorporating the approach of ‘embodied realism’, cognitive theory, when applied to rock-art research, uniquely explains the relationship between the rock surface and the images which were carved into it and the bodily experience of the carver, bringing us into the realm of experiential rather than representational art.

The topography of the rock surface at Group IV

Back at the River Vyg, the best example of the relationship between artistic expression of the physical landscape, the cognition of vision and the morphology of particular rock surfaces is a fragment of Group IV of the New Zalavruga complex. Prior to discussing the details of the composition, a number of methodological issues need to be mentioned. The intricacies of the three-dimensional surface were captured by surveying (level, total station, GPS), photogrammetry, stereophotography and laser scanning. The location of the Zalavruga rock carvings placed certain limitations on the methodology. The equipment had to be transportable, affordable and applicable at the scales required by the research. In particular, GPS surveying in the Russian Federation is not practical, and many assisted photogrammetry techniques (where a grid or other forms are projected onto the surface) have considerable electrical power requirements which are not available in this part of Karelia (Avern 2001). Although the most accurate technique for examining micro-scale features, extensive laser scanning is expensive at the scales required by most projects. Initial survey by total station, collecting several hundred points, allowed the major surface features to be recorded. Photographs were then rectified, so that they could be draped over the surface using GIS software. As this survey established the importance of the morphology of the rock surface for understanding the rock art, it is proposed to build on this initial work and undertake more detailed survey using a laser scanner in the future.

Despite these limitations, it was possible to create the shapes and elevations of the surfaces at Group IV, allowing the examination of the cognitive aspects of the use of rock surfaces both for the composition as a whole and for particular elements in the composition. The resulting recreation clearly demonstrates the creative incorporation of the morphology of the rock surface into the visual composition by the prehistoric artists (Fig. 2).

During analysis of the recorded surface, it became apparent that the topography of the surface was connected to particular parts of the composition in unexpected ways. The surface appears to be ‘translated’ into a representation of the natural landscape, defined by physical activities such as skiing. It is important at this point to recognize the distinction between something that simply resembled a piece of natural landscape and something that is an accurate representation of the morphological characteristics of a natural landscape. The former has been widely acknowledged in the literature (Arcá 2004; Coles 2003; Fossati 2004; Helskog 1999). At Nova Zalavruga, we can demonstrate the latter. This unexpected result led us to consider the kinds of creative devices used by the prehistoric artist in the composition a whole or only in a particular part of the composition.

Group IV is located on a surface that serves as a platform for all the images. The top part of the rock face is about 50 cm higher than the bottom, creating a raised area of unobstructed display. The composition can be regarded as closed, like a framed picture. The
size of the composition is restricted by the rock surface even though there are no artificial boundaries limiting its dimensions as in ordinary pictures (Fig. 3): Group IV is constrained on all four sides by different natural features creating a coherent, closed composition despite the fact that at first sight, owing to its location on one of the few flat rock surfaces available, the Group looks as if it is unrestricted, almost as if it had been carved in an ad hoc unplanned fashion. In the upper part, the sharp slope and rising rock restricts the surface. On the right, the edge is constituted by a crack followed by the slope. At the bottom, the slope ends by the water. The water level rises and falls depending on the time of year because of differential rainfall, but standing water is always present in the shallow end. Fluctuations in water level mean that the bottom of Group IV is in constant flux, sometimes closer to and sometimes further away from the carved depictions. On the left hand side, the composition remains open, with bare rock undecorated by carvings. Here, the surface forms a gentle slope restricted at the bottom by a sharp incline.

The composition comprises a variety of images suggesting a series of themes, the majority relating to marine and terrestrial hunting. Looking at the rock, two separate blocks can be seen immediately. One is composed of an elk hunting scene, while the second comprises all the other images.

The hunting scene starts from the top of the terrace (Fig. 4: Point A) with carvings of skis and ski poles as if left in the snow. The marks vary from walking to skiing downhill. On the other side of the ski tracks some elk prints are visible, carved as if the elk was walking through the snow towards the hunter. Where the figure of the hunter and elk first appear, only the walking prints are carved (a full description of the scene is presented below). The scene ends with the hunter holding a bow in his hand, the elk still standing but pierced by three arrows. At point B, the first block of the composition connects to the other carvings. The elk almost seems to be taking part in the marine hunting scenes, where three boats are involved in hunting a beluga whale. At point C, a large boat can be seen with an elk head-shaped prow. The sizes of the boats vary as do the number of people on each boat. Each boat is linked to the whale by a harpoon line. Beside the boats a single person takes part in this hunt, behind whom we can see two other people shooting, both with bows in their hands. One is shooting an arrow, the other is not. It is not very clear whether they are shooting at each other although, according to Savateev (1970), that is what they are doing. At point D, a wavy line carves its way between the two people with bows and another probable marine hunting scene, below which we see more of the same.

The composition was originally more complicated than this, and some of the depictions, for example those at point (E), can no longer be clearly distinguished. Previous interpretations suggested that they are schematic depictions of humans (Savateev 1970, 199–221) but we suggest that they might be other boats. Single boats of different sizes, a young elk and a male with a bow, can be seen close to the scenes described above (Fig. 4: below C). There are also further carved figures whose shape cannot be determined.

In the lower part of the composition, complex marine activities involving numbers of boats are absent, and the most prominent visual place is taken by terrestrial hunting scenes. At point F, we can distinguish two men with bows, shooting in a seated position. Once again, we do not know for certain if they are shooting at each other or at the object of indeterminate shape visible between them which has been struck by two arrows from opposite sides. Below the larger man, on the left, there is another man with a bow. Behind the smaller man, footsteps at point G have been carved leading to another male with a bow and arrow, and an elk. To the right of the footprints, at point H, we can see two boats next to each other, almost creating a mirror image,
although one is smaller. Their prows are crowned by elk heads. The lower part of the larger boat is linked by a number of arrows that have hit an unknown animal sitting on top of a tree. We consider that the hunter visible next to the tree (I) is responsible for the arrows, even though they are physically linked to the boat. The scene is taking place in winter since there are ski prints carved behind the hunter. However, the hunter himself is undressed, as indicated by his visible penis. To the left of the tree we can see depictions of indeterminate shapes as well as a swan hit by arrows (J).

The most arresting image in this part of the composition is the depiction of another male hunter with a bow and arrow, followed by bear prints (K). An arrow can be easily distinguished wedged in the hunter’s back. In front of him, we see a much smaller male who appears to be holding a bear above his head on his spear. The spear in the bear’s back makes

Figure 4. Drawing of Group IV. (After Savateev 1970.)
him look upside down, and an arrow has pierced its throat. To the right of the bear prints is a carving of a boat with an elk head prow, drawing the eye towards another boat, occupied by a single individual, linked to the beluga whale by a harpoon line (L). We can also see in the vicinity a number of scenes with various unknown shapes, and a very small boat and young elk. Slightly higher on the right of the boat is a depiction of a single male on skis (M) with a pole, and above him on the right there is another male carved without skis or pole.

On the far right side of the composition are two hunting scenes. The first (N) is composed of a single male, possibly with a spear in his hand which is holding up the figure of a bear. The bear has an arrow sticking out of its back. Behind the hunter, bear prints can be distinguished. The second scene, engraved above this terrestrial one, is composed of a large boat containing many people (O) and a beluga whale. An empty, smaller, boat, upside down as if a reflection, is located above the big boat. There are also a number of indeterminate shapes and two possible carvings of whales (P).

Noise and calm

Although not as obvious as in a colour painting on a white wall, it is possible to distinguish between visual noise and visual calm in the panels at Zalavruga even though the grey of the granite is less uniform than the white of the walls of a gallery, and the carvings are the same shades as the rock into which they are carved. The creation of ‘noise’ and ‘calm’ allowed prehistoric carvers to focus the viewer’s attention on a particular part of the composition, for instance the skiing scene. In this way, the viewer is led to concentrate, at first on particular aspects of the composition through the interplay between carved and uncarved parts of the rock surface.

The smoothness of the rock surface can be seen as calm despite veins of crystal. These intrusions do not disrupt the calm because of the way they are incorporated into the rock surface. The veins run in parallel lines from the top to the bottom of the composition, following the level of the platform, dropping from the top to the base. The colours of the crystal veins do not interrupt the colour scheme of the rock surface despite appearing as yellow against grey. This can be explained by looking at pastel colours in contrast to primary pigments (Livingston 2002, 36–45): pastel colours do not clash when placed together but if we add any primary colours we can see the contrast very clearly. Thus the impression of calm is achieved mainly by three components: texture — smoothness of the surface; colour contrast — similar tones of the grey rock surface and the yellow crystal inclusions; and the verticality of the rock surface — the lines of crystal veins as well as cracks in the rock surface which run from the top to the base of the rock surface. The rock surface of Group IV has not been eroded by lichen, as indicated by the smoothness of the surface; indeed Savateev (pers. comm.) noted that, after the soil was removed from the carving, the rock face was not in any sense damaged.

To create a sense of visual ‘noise’, the prehistoric artists had to optically contradict these three elements to attract the viewer’s attention. This was achieved in a variety of ways. In the first instance, the calm of the smooth rock surface, polished by the weather, was subverted by the visual noise of the carvings pecked into the rock, creating a rough, matt surface. In this case, rather than pigment, it is texture that breaks light into different wavelengths, allowing the eye to distinguish between calm and noise. The contrast between the colour tones of the rock surface and the carvings is greater than that between the rock surface and the crystal intrusions. In addition, the reflection of light from the edges of images carved into the rock surface will always produce a darker image of the depiction even if they are the same colour as the surface itself (Palmer 1999, 128). This contrast between tones further increases the visual noise. The optical verticality of the viewing platform is counterbalanced by the way images are visually conceptualized in the composition. In the majority of cases, the images are composed in a horizontal plane, for example the boats and elks. Furthermore, the traces of curved skis and footprints elaborate the horizontality of the visual composition. The artists who carved the images created noise visually recognizable to the viewer, allowing them to distinguish the depictions from the background surface. This use of visual noise provided the artists at Zalavruga with a device which led the gaze towards a particular location in the composition, namely the skiers and elks.

Seeing an elk hunted on skis

One of the most prominent places in the composition of Group IV is occupied by representations of ski tracks and elk footprints in the snow, and depictions of skiers and elks. We argue that the prominence given to these images in visual terms is due to the relationship between the blank or calm surfaces and those with carved images, which create visual noise. The surface surrounding the images was left uncarved in
order to enhance the artistic impression. This was achieved by shifting the viewer’s attention to the elements of the composition located above and to the right side, as in a coloured picture hung on a white background. We deduce that, in this instance, the shape and the natural features of the rock surface were taken into account in composing Group IV (Fig. 5).

The scene of an elk being pursued by hunters on skis provides the clearest demonstration that the morphology of the rock surface was being consciously engaged with by the people who created the carvings. The physicality of skiing through the landscape was translated into the physicality of the artistic expression of the scene, which explicitly incorporated the three-dimensionality of the surface. We use our approach to cognitive and visual perception to gain an unprecedented insight into the creative capacities of the prehistoric fisher-gatherers-hunters who produced the rock art along the River Vyg. In conceptualizing their imagery, the artists had to reach beyond the direct relationship of looking at the subject of their representation and engraving it. As suggested by Ratey and discussed above, images had to be generated from memories. Ratey (2002, 107) says

**PET scans show that when a subject, seated in a room, imagines they are at their front door and starts to walk either to the left or the right, activation begins in the visual association cortex, the parietal cortex, and the prefrontal cortex — all higher cognitive processing centres of the brain.**

The creation of these representations involved not only imagining skiing as a winter activity but also recreation of a specific skiing event in a particular landscape. This point is amplified by two kinds of representations of skiing. The first is an oil painting of a skier skiing down a slope. The viewer, and indeed perhaps the artist, does not know where or when this event occurred, but this is not important as it is the idea of skiing which is represented, and all of the exhilaration that that activity evokes in the viewer. The second is a photograph of skiing. This representation of a specific act evokes particular associations and triggers memories of the type: ‘Here I am skiing down the slope at Klosters during my winter holiday in December 2006’, recalling the physical exhilaration, the properties of the slope, where to turn, where to slow down, the location of humps, bumps and bends where I had to be careful not to fall. In the creation of the former, the artist has called upon generic memories of the experience of skiing and of the typical landscapes within which skiing takes place. In the latter, the photograph captured memories of a particular landscape and a specific trip. It is the latter which is analogous to the way in which the granite rock surface was used at Nova Zalavruga. The artist was able to imagine skiing on the rock surface itself — his (and it does seem to be a he since a penis is visible in the carving of the third hunter) memory of skiing allowing him to make a realistic representation of the physical activity of skiing across this landscape.

The creation of Group IV, in particular the elk hunting scene, can be also understood as engaging with the brain’s higher cognitive processing centres (Ratey 2002, 107). In existing publications (Savateev 1970), the illustration of the skier is flat and two-dimensional, and suggests in some way ‘just skiing’, as if the rock face was flat, ignoring the critical importance of the structure of the rock surface in the construction of the visual composition (see Fig. 4).

Establishing the relationship between the art and the rock surface, the significance of the three-dimensionality of the rock face became apparent. As part of the current study, photographs were taken from various angles which allowed the reconstruction of the trajectory of skiing.

Using the model of the rock surface, it is possible to analyse the relationship between the skier and the surface over which he is moving. The skier is sometimes walking through deep snow and sometimes skiing in pursuit of an elk. The trajectory of the skier was digitized from the rectified photography to provide a
set of points from which to generate a profile across the surface. The skier starts at point A. At point B the tracks split into two lines, B–C and B–D (Fig. 6). This profile shows a clear relationship between the movement of the skier, walking or skiing, and the shape of the rock surface (Fig. 7).

Integral to our approach to this reconstruction is an appreciation of the artistic expression which so effectively captured the physicality of skiing in the carvings of the skiers and the elk they were hunting. Were we to take the depictions of skiers at face value, as we see them in this and other rock art compositions (Fig. 8), we would conclude that prehistoric fisher-gatherer-hunters went skiing with just one pole. This represents a cultural choice in the way in which certain subjects are depicted, and requires us to accept that the fashion or the way artists do things are not necessarily determined by common human cognitive abilities. It shows how these abilities are manipulated in any culture at a specific time and place, and that this affects the way subjects are depicted.

The images in Composition IV are always presented as though seen from the side in silhouette. The simplest way to visualize this is to think about the shadow produced if a spotlight is shone on us from one side: we can see a reflection of our profile, in a similar way to how the images in Composition IV were visually presented. What is interesting is the way the skiers’ profiles are shown. When the skiers are walking, they are shown with two legs, but when they are actually skiing only one leg (and indeed one ski and one pole) is shown. However, the representations of ski tracks, with the marks left by poles on either side, indicate that skiing did involve two poles as today. The prehistoric canon of the representation of skiers, while effectively capturing the physicality of skiing, may therefore, at first glance, appear misleading to a modern viewer. Only through the combination of the reconstruction of the landscape and a contextual understanding of the mode of expression captured in the carved rocks can we begin to deal with this issue.

Through close study of these images and by comparing them with depictions in skiing manuals it was possible to reconstruct the movement of the skier down the slope. The technique employed in this depiction belongs to what is now known as the classic Nordic tradition of cross-country skiing. The technique used by the hunter is recognizable as ‘poling’, probably ‘with glide steps’, a method which leaves continuous parallel lines in the snow, achieved by keeping both skis constantly in the snow, with the marks of poles used to push the skier forward on their sides (Jacques 1950, 29–44; Crawford-Currie 1982, 64). The second way hunters moved on the snow was by walking along uneven terrain. In a landscape that has rolling gentle slopes and deep and fresh snow, opportunities to ski down slopes are restricted. The use of poles is very important here in preventing the skier from sliding backwards while tracking the elk.

The form of pole marks varies during the pursuit of the elk, depending on the shape of terrain, in accordance with the actions particular hunters had to undertake during the chase. In part of the elk-hunt-
Skiing scene, the pole marks repeat a pattern of three, although there is only one ski track represented.

Two possible interpretations can be put forward for this. The first is linked with the process of skiing, the second with the representation of skiing. It could be argued that, skiing cross-country, the skiers followed in each others’ tracks instead of producing their own tracks. Thus they left behind them just one track, and the holes left by the poles depend on the strength or the size of the particular skier. The second interpretation relates to the representation of the visual information in this part of the composition, which might be considered to indicate three hunters rather than a single one. This is significant if we consider that the elk tracks point to the presence of one elk rather than three. We have to bear in mind that this is a symbolic representation of a hunting scene, the strongest reminder of which comes in the visual representation of the hunters themselves. At least one of them is undressed, a situation which in real life in the cold northern climate of the Subboreal would lead to frost-bite, hyperthermia and death. The Subboreal, during which the Group IV carvings were created, saw the maximum of spruce, hazel and deciduous trees within the mixed coniferous-deciduous forest. We still consider this to be the representation of an actual landscape, even though it is difficult to point out exactly where the particular skiing visualized in Group IV took place, due to alterations in the morphology of the environment related to a variety of factors including geostatic rises, the creation of bogs and islands in the upper part of the river, and changes in water level over the millennia since the images were carved.

The skiing depicted on the natural landscape or rock surface can be divided into five sections. Walking on the slope, as seen in the first, is continued through the other scenes. The snow is probably soft, fluffy and relatively deep, allowing the hunters to walk rather than slide. The marks left by the skis indicate possible ‘alternative walking’ or ‘two beat diagonal stride’ steps: right leg, left stick (Jacques 1950; Crawford-Currie 1982, 62–3; Fig. 9). Representation of ski marks and ski poles on the snow comprise lines (the tracks left by skis) and dots (the impressions left by poles during the alternative walking or two beat diagonal stride steps).

In the first part of the scene, the alternative steps are missing some pole marks, indicating deep snow into which the skis cut deeply: the skiers’ feet would have been lifted high to clear the snow (Fig. 9, A-a). These alternate steps are illustrated by the matching movement of a particular leg with that of a particular hand, the hand always being in front of the walker. The second part of the scene shows the tracks made by sliding down the slope. It looks here as though the skiers have stopped walking. They have aligned their skis and, pushing strongly on their poles, probably whilst leaning forward and without lifting their legs from the ground, they slide down (Fig. 9, A-b). In the third part of the scene, the slope rises slightly and the skiers revert to walking, using the alternative step technique (Fig. 9, A-c). In the fourth part, the skiers are represented skiing up and down the slopes.

Figure 7. Trajectory of skiing (A–C on Fig. 6). A: a) skier walking on almost flat surface, b) skier sliding down the slope, c) skier walking up and down the slight slope, d) skier is sliding up and down the slope. In sections C and D skier is walking.

Figure 8. Three skiers from the Scatter Composition of Stara Zalavruga (wax rubbing by L. Janik).
by ‘poling’, probably ‘with glide steps’ (Fig. 9, A-d). It appears as if the skiers are now able to build up sufficient speed, coming down the slope, to continue skiing up the other side without reverting to walking. At the start of the descent, there are only pole marks on the right side of the tracks, perhaps indicating that at this point the hunters adjusted their bows or harpoons. They slide up and down the slopes, without lifting their feet and use poles to propel themselves. The sequence ends with one of the hunters crouched as he finishes sliding down the slope, ready to release the arrow from his or her bow. The elk is shown already struck by two arrows.

The fifth section is broken into two separate sections depicting a split in the traces of tracks carved on the rock surface (Fig. 9, B). The first few marks show departure of a skier in pursuit of an elk. Shortly thereafter the track splits into two. What unites these two sections is the theme representing the final hunting scene, when the hunters pursue the elks on foot. The first hunter in this fifth section (the second if the entire hunting scene is taken into account) climbs a small slope supporting himself using the alternate step technique (Fig. 9, D). The hunter finishes tracking the elk he is hunting by striking with his harpoon or spear. The last hunter pursues the elk up and down the slope using an alternative step technique (Fig. 9, C). He is shown standing, penis visible, the bow in his hands empty, and the elk he was pursuing struck by three arrows.

The prehistoric carver captured and reconstructed with astonishing precision the relationship between the rock surface, the natural landscape and the movement of the skiers through this landscape. The effectiveness of the depiction of the various postures assumed by the skiers, depending on their position on the slopes, which allows us to recognize the various techniques illustrated in modern skiing guides, is testimony to the visual perception of the artists and demonstrates the cognitive aspects of the process of composition and execution of the carvings.

The artists drew on memories of personal experiences in the creative process of engraving the rock surfaces. The relationship between bodily movements, such as the way they were using their legs and hands, reflected in variations in the ski tracks and pole marks carved into the rock surface, and the three-dimensional morphology of the rock surface mirror the artists’ own experiences of skiing in a particular landscape. These experiences informed the carvings, taking the image beyond the representational into experiential art.

**Conclusion**

We have demonstrated the significance of the morphology of the rock surfaces in the depiction of a range of activities in the physical landscape by the prehistoric rock carvers in the valley of the River Vyg. We have shown how an understanding of the cognition of vision and visual perception is important for interpreting the art and for reconstructing what lies behind the artistic expression of the physical landscape. We have further shown that depicting the different modes of travel depends upon a prehistoric artistic canon which draws on careful observation of how the body moves according to the mode of travel, and we have shown the relationship between variation in the depiction of ski tracks with variations in the landscape as expressed through the morphology of the rock surface. These observations in turn draw on an appreciation of how visual perception depends on memory of the actions involved in moving through the terrain. We have also shown how all of this is interwoven with the narrative of the elk hunt. Using the approach adopted, we have moved towards a fuller understanding of the relationship between the creative capacities of the artists and the norms and canon within which they created these striking carvings of experiential art. Thus we have contributed to the development of a cognitive approach to the prehistoric...
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fisher-gatherer-hunter art of northern Europe, and have drawn closer to an understanding of the visual narratives they express.

Acknowledgements

Firstly, we would like to thank the Research Grant Committees of the McDonald Institute for Archaeological Research and the British Academy for their financial support in conducting this research, which could not have been undertaken without our Russian colleagues, especially Dr N. Lubanova, and the encouragement and support of Professor R. Bradley and Professor G. Bailey. We also would like to thank the editorial team of the Cambridge Archaeological Journal for their patience and suggestions about how to improve the paper. We owe particular gratitude to Dr S. Kaner for his critical reading and improvement of this paper. We also thank the anonymous referees for their constructive comments.

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