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An Offprint from

Rock Art Studies
News of the World IV

Edited by

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and Matthias Strecker

ISBN 9781842174821

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Contents

Preface

Paul G. Bahn, Natalie Franklin and Matthias Strecker

The present volume is the fourth in the series *Rock Art Studies, News of the World* which began in 1996. Its aims are to present a synthesis of the status of rock art research in different regions of the world, provide information about recent projects, publications, prevailing research objectives and methods, and enable rock art researchers to relate their findings in a specific region to mainstream research results.

Most contributions published in the four volumes of the series consider the distribution of sites, chronology, interpretation, new surveys and publications, management and site conservation.

The list below reveals the worldwide coverage though unfortunately not all rock art areas have been dealt with adequately, and for some regions or countries the editors could not achieve continuous reports in all volumes.

Region	***Vol. 1***	***Vol. 2***	***Vol. 3***	***Vol. 4***
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Iberian Peninsula	pp. 29–34, 35–40	pp. 25–35	pp. 37–51	pp. 45–59
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Northern Africa and Sahara	pp. 59–70	pp. 44–58, 59–73	pp. 52–88, 89–96	pp. 65–98
Southern and Tropical Africa	pp. 71–84	pp. 74–81	pp. 97–111	pp. 99–112
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Siberia and Central Asia	pp. 105–125	pp. 88–118	pp. 138–178	pp. 149–63
Mongolia	–	–	–	pp. 164–95
Far East	pp. 127–132	pp. 119–122	pp. 179–184	pp. 207–14
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Australia and New Guinea	pp. 145–162	pp. 133–146	pp. 185–212	pp. 215–34
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Caribbean islands	pp. 207–214	–	–	pp. 310–18
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Bolivia	pp. 221–224	pp. 227–230	pp. 289–293	pp. 349–54
Argentina	pp. 225–229	pp. 242–251	pp. 309–319	pp. 364–85
Chile	–	–	–	pp. 386–98

As pointed out in the Prefaces to the preceding volumes, the articles reflect varied approaches to rock art studies, the authors' different experiences and backgrounds, and a certain difference in the way several years of new research is presented. We believe that it is an advantage rather than a shortcoming that a variety of approaches are included in this collection.

In the present volume, there are inevitably a few gaps in coverage, as usual, but a number of earlier gaps have been filled or refilled as some new and reliable contributors have come on board alongside the stalwarts who have contributed to each volume. Readers will note that, while relatively little has happened in some areas over the five years in question, a great deal has occurred in others. One particularly important piece of new research is presented by Katja Devlet in her chapter on Northern Eurasia and involves her fascinating experiments in developing solid criteria for differentiating the pecking marks made on rock by stone tools and metal tools. Stan Beckensall, in his chapter on Britain and Ireland, highlights the advances owed in this region to new recording techniques, and the presentation of databases on the web. Rock art studies are clearly going through a period of scientific and technological development, which will have an enormous impact on the quality of recording and dissemination such as D-Stretch and other photographic image enhancement techniques. At the same time, many authors are concerned by problems of preservation and vandalism, and underline the crucial importance of educating local people, and the young, about the importance of this fragile and finite heritage. This aspect too will be of increasing importance in years to come.

9. RECENT ROCK ART STUDIES IN NORTHERN EURASIA, 2005–2009

Ekaterina Devlet

In recent years the efforts of the expeditions of the Institute of Archeology of the Russian Academy of Sciences devoted to the study of rock art have concentrated on fieldwork in Chukotka, which has added considerably to the rock art inventory of Northern Asia. While the Chukotka petroglyphs were being studied, doubts began to arise as to whether it would have been possible to peck them using stone tools. This led us to investigate specific techniques and methods of observation, documentation and analysis of the traces left by the tools with which the petroglyphs had been executed. The difference that was revealed between traces of images made with stone or metal tools required further evaluation and improvement at sites in other areas: in Khakasia, the Krasnoyarsk and Khabarovsk regions, etc.

Numerous petroglyphs were created at Asia's northernmost rock art site, on the Kaikuul bluff which stretches along the Pegtymel river some 40–50 km from the coast of the East Siberian Sea. Native peoples living in the tundra and those on the coast were attracted by this place not merely by the annual migrations of wild deer but also by the unique landscape. For many Northern Asian peoples stones and rocks of unusual shapes became objects of veneration: different generations of the aboriginal population would return to the Kaikuul bluff and create petroglyphs on rocky outcrops, marking in this way the sacred essence of the stone. The immovable, unassailable rocks which would store a generation's memory were the antithesis of transitory human life, decline, collapse and the fragility of prosperity. The reality of the sacred essence of stones, impervious to the destructive impact of time, meant that natural landscapes were being transformed into historical-cultural ones.

The main rock art locations are concentrated in the approximately 1 km-long area (geographic coordinates 69° 32' n.l. and 174° 32' e.l.) on the sandstone and aleurolite rock outcrops of the steep right bank of the Pegtymel river, 1 km downstream of the Kaikuul brook estuary (Figs 9.1 and 9.2**)**. This polar site was recorded and published by N. N. Dikov (1971; 1999), and later the pool of data about this site was complemented by other researchers (Kiryak 2001; Golovnev 2000; Slobodzyan 2004; Petroglyphs of Pegtymel 2007).

In 2005–2008 all identified panels were recorded by tracing onto transparent materials or reproduction on a special porous fabric. In addition to obtaining silicon

Fig. 9.1. View of the Kaikuul bluff from the left bank of the Pegtymel river, Chukotka.

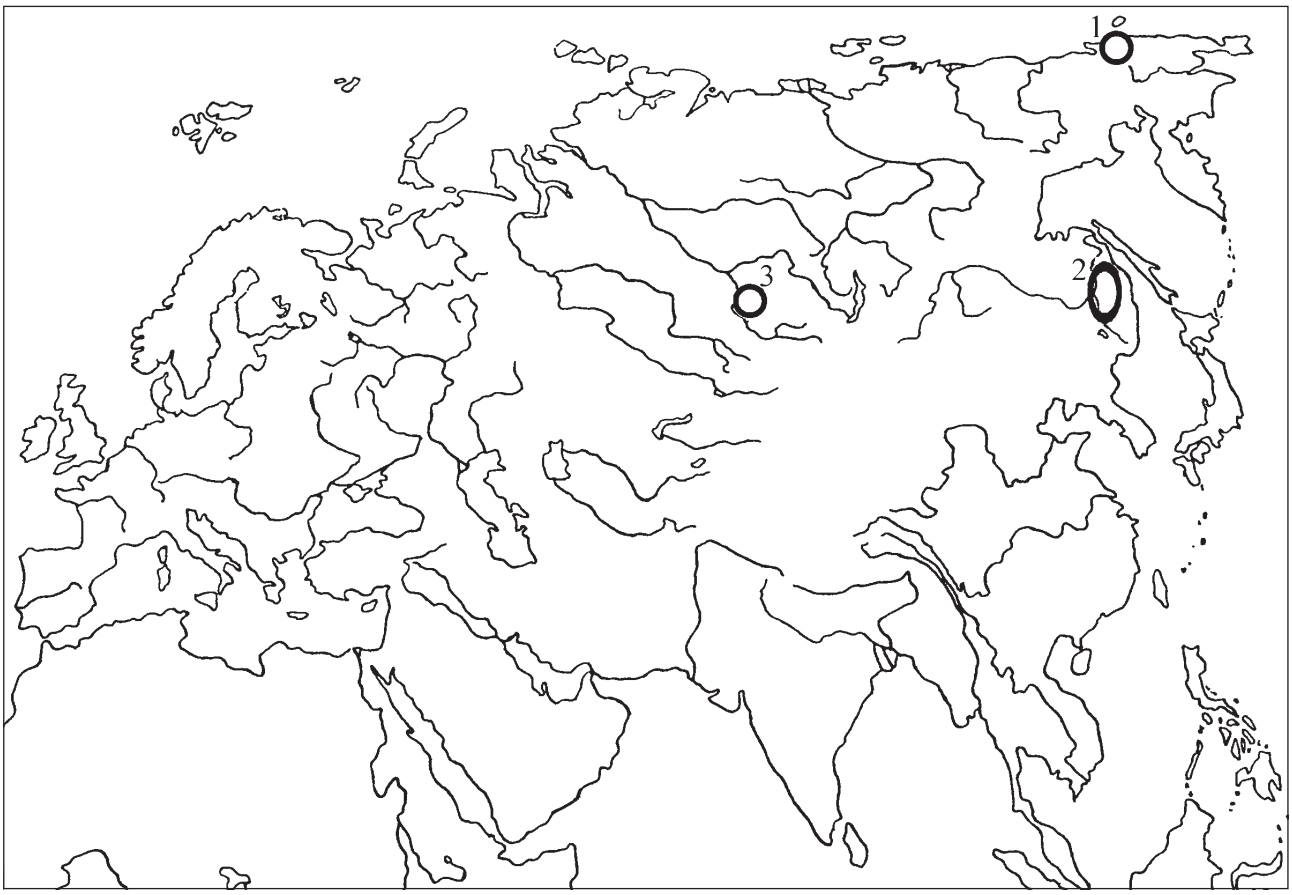

Fig. 9.2. Map of the rock art areas in Northern Asia. 1: Pegtymel river at Chukotka; 2: the Lower Amur and Ussury river region; 3: Middle Yenisei rock art area.

negatives of some rock art panels, photographs with both digital and film cameras and professional video-recordings were taken; various options for conservation were also considered. One innovative aspect of the research was the traceological programme involving the study of the petroglyphs' techniques and the material of the tools used for their pecking.

A significant number of panels with petroglyphs are in very poor condition (Fig. 9.3). There are various factors of natural decay (exfoliation and disintegration of the rock, intensive lichen invasion; bird-nests, animal activity resulting in pollution and destruction of rocks, etc.) and evidence of anthropogenic impact – even this remote location did not escape vandalism by visitors.

It was believed that besides the well-known rock art site on the Kaikuul bluff, as well as the two locations 5 km and 10 km down the Pegtymel river, there could be some new rock art sites. Verification of the reports provided by informers and reconnaissance work did not confirm this hypothesis; however, the study of the Kaikuul bluff locations has quantitatively improved the existing rock art database. As a result, today we have about 350 rock panels and stones grouped in twelve locations in the upper, middle and lower levels of the bluff. A significant increase in quantity resulted from clearing the surfaces of sediments and lichens, while the examination of areas covered by shrub branches also proved fruitful. The revelation of three massive sub-triangular independently-sitting stones should be mentioned. Each of them had images on two adjacent faces, and two of them were apparently found in an upside-down position (Figs 9.4 and 9.5).

Significant results were achieved by removing the lichen, and thus in some locations a new array of information was recorded, and the range of motifs characteristic of the Pegtymel petroglyphs was expanded. Some panels were cleared of lichen with water, using soft brooms and brushes. In view of the intensive lichen invasion, the possible long-term effect of a local biocide application was tested in accordance with the methodology developed in the State Research Institute for Restoration in Moscow; as was demonstrated by the follow-up monitoring, the clearance effect was maintained and no new lichen growth was recorded.

The rock outcrops' destruction has resulted in a change in the position of decorated rock fragments, some of which have shifted down the slope; three stones even ended up

Fig. 9.3. Rock art decay, a panel with petroglyphs from Kaikuul bluff, Pegtymel river, Chukotka.

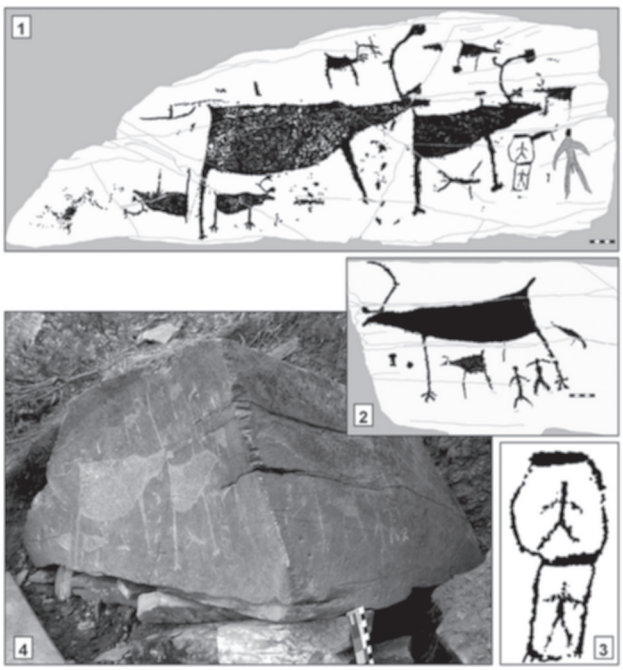

Fig. 9.4. Sub-triangular stone with images on two adjacent faces which were discovered on the slope of the Kaikuul bluff, Pegtymel river, Chukotka.

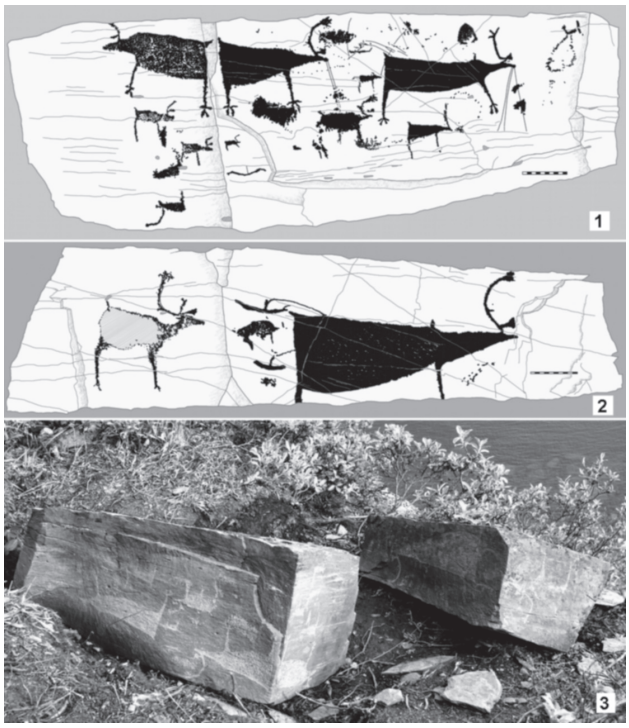

Fig. 9.5. Massive sub-triangular stones with images on two adjacent faces that were covered with lichen and sediment on the slope of the Kaikuul bluff, and in an upside down position. Pegtymel river, Chukotka.

in the water, though during regressions of the river's water level they become accessible for a short period of time.

A group of stones was found which, apparently, initially formed a vertical rock outcrop (subsequently destroyed) with petroglyphs that was formerly located east of the panel with one of the best-known compositions with images of anthropomorphs in a mushroom-shaped headdress, as well as a hunting scene involving sea mammals (Fig. 9.6). It was possible to compile tracings of two fragmented stone surfaces: the preserved fragments of a hoofed animal figure, and the anthropomorph in a mushroom-shaped cup may be associated (Fig. 9.7).

In general the groups of Pegtymel petroglyphs show a lack of diversity in motif because of the specifics of the local environment, subsistence and cultural traditions. Analysis of the motifs demonstrated that the long distance from the coast did not prevent the existence of rock art motifs related to maritime adaptations as well as those linked to the tundra population and its occupations. In the same way as in the local tradition of objects carved from tusk and bone, tundra and sea motifs were closely intertwined in the rock art (Tishkov 2008).

The dominating images in the rock art are silhouette

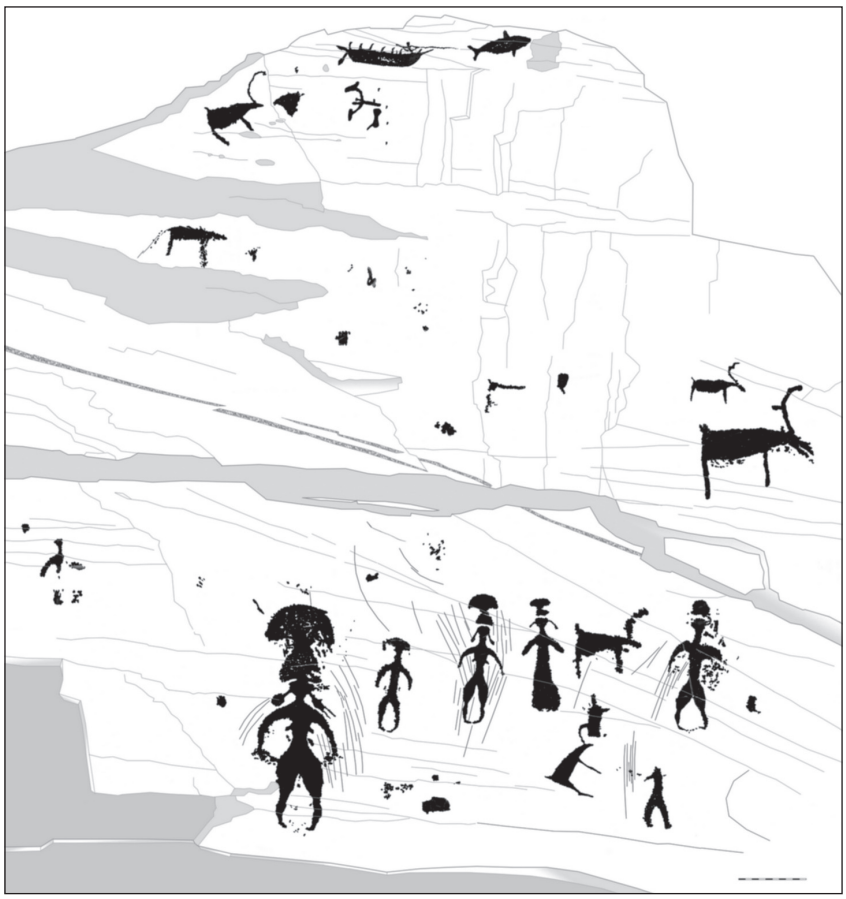

Fig. 9.6. One of the best-known groups, with images of anthropomorphs in mushroom-shaped hats at the bottom and a sea mammal-hunting scene at the top, Pegtymel river, Chukotka.

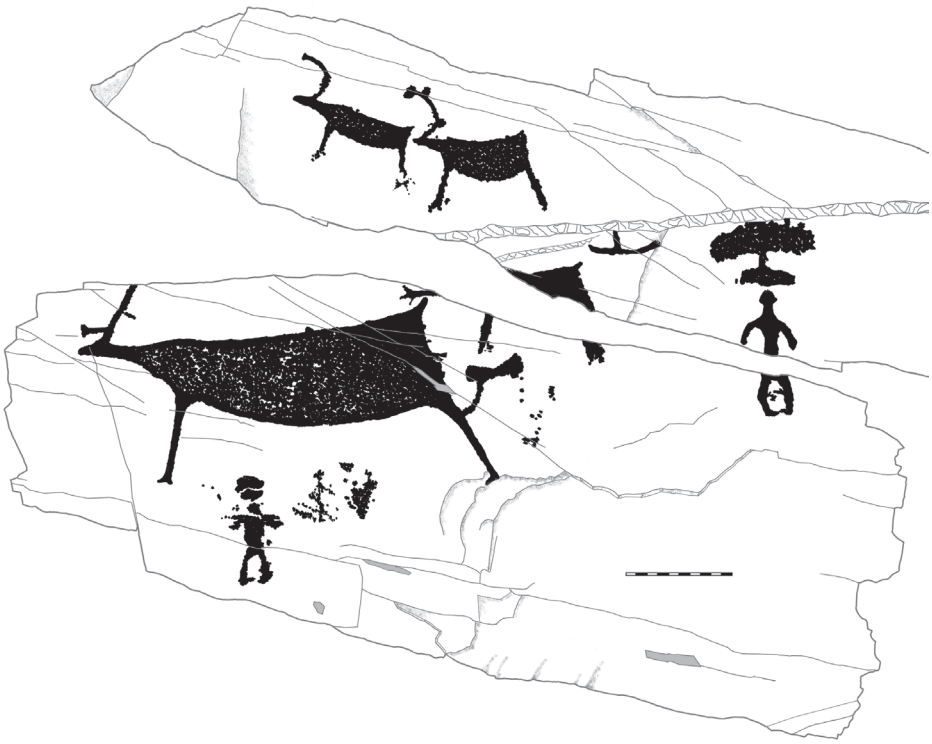

Fig. 9.7. Recording of fragmented petroglyphs. From a group of disintegrated blocks it was possible to compile tracings of two surfaces: the preserved fragments of a hoofed animal figure and the anthropomorph in a mushroom-shaped cup may be associated. Pegtymel river, Chukotka.

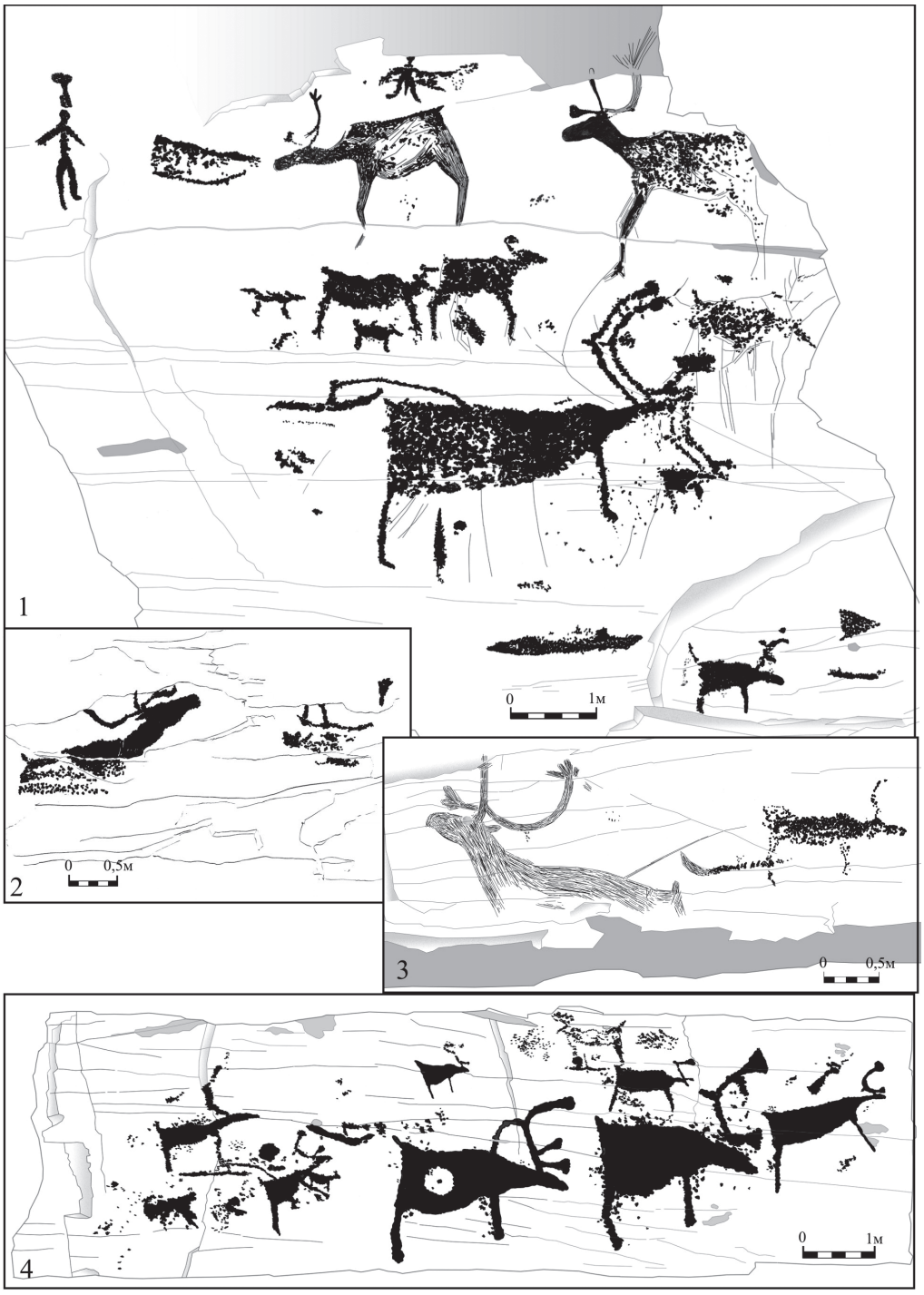

Fig. 9.8. The dominant images in the rock art are silhouette profile figures of reindeer, both single and in a herd. Sometimes only the head and part of the back of an animal may be shown – this was how the deer appeared in a herd when swimming or coming out of the water. Pegtymel river, Chukotka.

profile figures of reindeer, both single and in a herd. While it is impossible to give a detailed description here of all the specific features of the deer images, one should note the great variety of positions (swimming, grazing with heads turned down, in repose with bent legs, with lowered hoofs, etc.) as well as the stylistic diversity. One panel can contain deer figures that are different in style. Sometimes only the head and part of the back of an animal was shown – this was how the deer appeared in a herd while swimming or coming out of the water (Fig. 9.8: 2–3). There are images of hoof prints – a sort of symbolic substitution for the animals. Other hoofed animal images include elks and

Fig. 9.9. An individual boat is essential equipment for the local people. Pegtymel river, Chukotka.

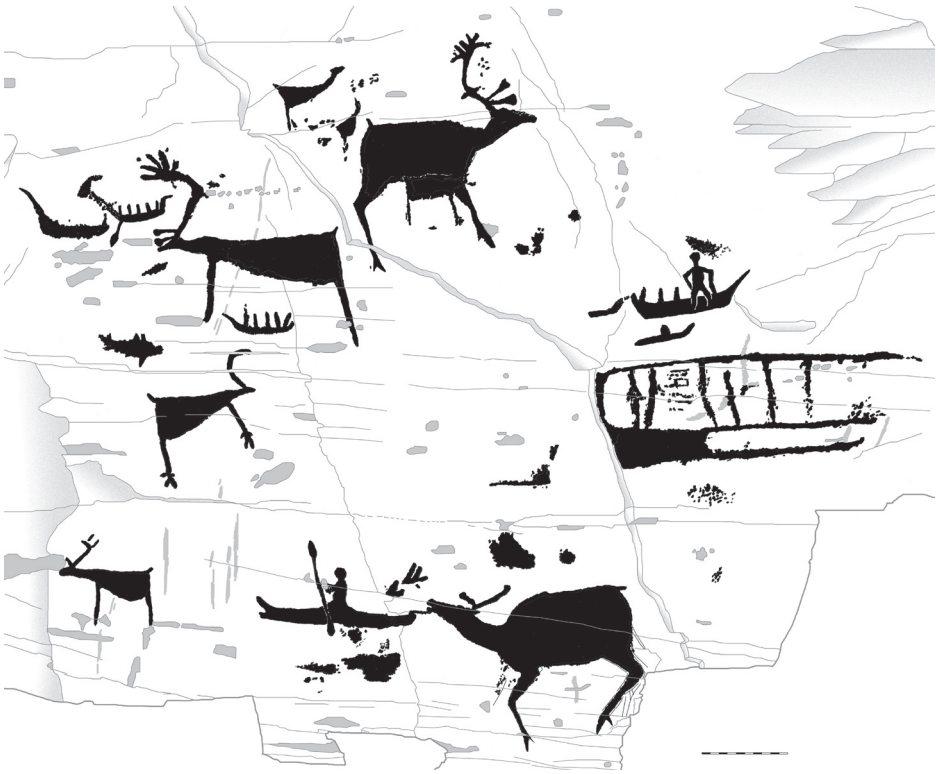

Fig. 9.10. The most recurrent motif is a hunting scene with swimming deer. The game animal was sometimes shown disproportionally big. Pegtymel river, Chukotka.

argali. Scenes of deer being pursued by wolves or dogs can be found in isolation or related to other motifs.

The most recurrent motif is a kayak hunting scene with swimming deer (Figs 9.8 and 9.10). The river crossing which exists near Kaikuul bluff may have been a place for hunting deer in water. In most examples the hunter hits an animal from an individual boat with a harpoon, less often with a long-shafted spear; such scenes can be found independently or as parts of more complicated compositions. Often only the harpoon lanyard was shown, either taut or slack, and a man in a small kayak was often simply indicated by a vertical stroke. However, there were variants where both

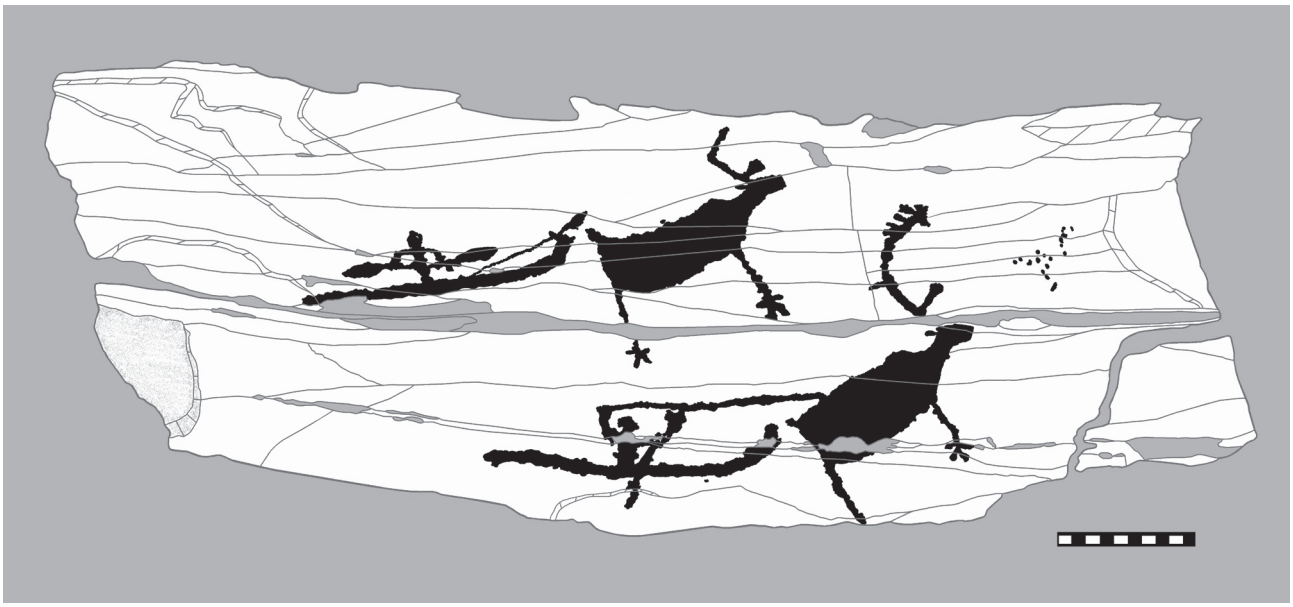

Fig. 9.11. The river crossing existing near Kaikuul bluff may have been a place for hunting deer in water. Petroglyphs from Pegtymel river, Chukotka.

the hunted animal and the man, together with the hunting equipment and the boat, were represented realistically and in greater detail. Many of the harpooned deer figures were pecked with the hind legs drawn lower than the forelegs, as if the animal was swimming in the water. The game animals were sometimes shown disproportionally big.

From ethnographic material it is known that about one hundred years ago wild reindeer were living permanently in the same habitats and moved in large herds from the outskirts of the forest into the tundra. According to ancient Yukagir custom, overland hunting was strictly prohibited, but the deer were ruthlessly slaughtered at a river crossing which happened annually in one and the same place. Later the killing of deer at the river crossing ceased to be solely a Yukagir prerogative, and along the riverbanks other hunters – the Chukchi, the Even (Lamut), and Russianised aborigines – formed ethnic-based hunting teams and set ambushes a little way down the river from the crossing.

> "When the herd comes to the river the dominating male is normally the first to enter the water. During the crossing the herd is taken some distance down the river by the current. When the deer reach the middle of the river, the hunters rush to the boats and try to cut them off from the land. The frightened animals rush upstream, however their strength is normally soon exhausted … Then one or two boats approach the herd in order to cut off ways of retreat and the deer slaughter begins. The deer flock together and swim helplessly in the middle of the river. People in boats come close to the herd and strike the deer with spears with long shafts and small iron tips, which are used only for this type of hunting. Sometimes a double-blade oar may be used for this purpose, in this case one end of the oar is equipped with a small iron spear. This kind of weapon is not very long, but quite convenient. The deer slaughter proceeds with an unbelievable speed, one man can kill up to a hundred animals in one hour… Some hunters, who are particularly skilled rowers get into the middle of the herd and, placing their boats between two large bucks hit all deer within reach with their spears … The old men, women and children catch the spoil down the river …" (Bogoraz 1991, 71–72).

Most of the depicted hunting scenes on water are rather schematic, however, there are some true masterpieces – a dynamic deer hunting scene with two kayaks discovered in 2008 may be one example (Fig. 9.11), while another panel shows the killing of two deer by one hunter. One of the unique motifs represents the transportation of a deer, whose overturned carcass was tied to the kayak and the rower by a lanyard. The motif of an overturned – killed (?) – animal also occurs in other groups (Devlet 2008, fig. 8.4: 1), and certain anthropomorphs were also rendered in a similar way, apparently defeated or prostrate (Fig. 9.4: 1).

The depiction of multi-seat boats in the kayak deer hunting scenes may be explained by the fact that these boats could have been used for collective hunting, going upstream and cutting off the deer at the crossing: however the motif's analysis did not confirm this hypothesis. In addition to multi-seat boats there are many pictures of individual kayaks (Fig. 9.18, below): some variants of these boats were depicted with a forked prow**.** Similar forking is known in ancient small carved objects, and there are

Fig. 9.12. Pursuit of a bear with dogs (photo and tracing), Pegtymel river, Chukotka.

Fig. 9.13. Rock art panel, Pegtymel river, Chukotka.

Fig. 9.14. Marine rock art motifs, Pegtymel river, Chukotka.

also ethnographic analogues in Aleut kayaks (Bronshtein 2009, 232). Where there is a man in a boat, he may be shown with a double-blade oar, a harpoon, or a spear. Through excavation, several related cultures in the late 1st millennium BC–1st millennium AD were revealed, but their main hunting objects were different: for example, the bearers of the Okvik culture hunted seal and fowl; the Drevneberingomorskaya culture walrus and deer; and the Punuk culture whales (Arutyunov and Sergeev 1975; Bronshtein 2009a, 218). A similar diversity of adaptation mechanisms also existed in later periods. It is difficult to say whether the tundra inhabitants in their migrations perceived and reflected the images belonging to other cultures, or whether the important events of the calendar such as festivals brought the inhabitants of the coastal regions to the rocks of the Kaikuul bluff, which remain to this day a unique place of asynchronous "pilgrimage". Most likely the Pegtymel petroglyphs were a result of long-term complex cross-cultural contacts.

The walking hunting scenes with spears, pikes or forks for a bear or an elk are less frequent; dogs may also be represented as participants in scenes of pursuit (Fig. 9.12). One archer figure is unique. There are several images of dogs, wolves, polar and brown bears; gluttons and arctic foxes were also probably depicted, as well as numerous sea mammals – whales, seals, etc. (Fig 9.13–16). There are depictions of different birds represented both in multi-figure compositions and isolated (Fig. 9.18: 6). Some groups consisted exclusively of profile figures of cranes, while some silhouettes of these birds may be included in compositions.

Hunting motifs were related not only to reindeer, but also to sea creatures (Fig. 9.17), and deer figures and scenes of deer pursuit can accompany compositions related to the hunting of sea creatures. In the sea-creature hunting

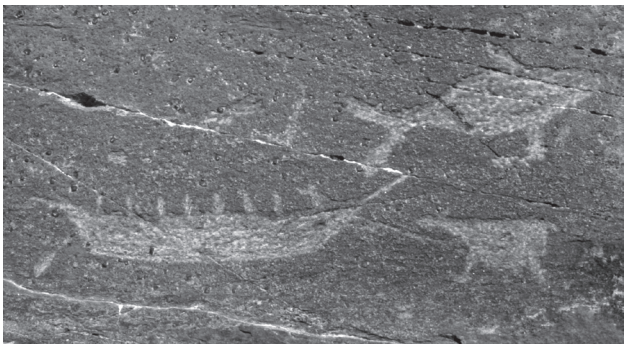

Fig. 9.15. Marine rock art motifs, Pegtymel river, Chukotka.

Fig. 9.16. A deer and wolves, Pegtymel river, Chukotka.

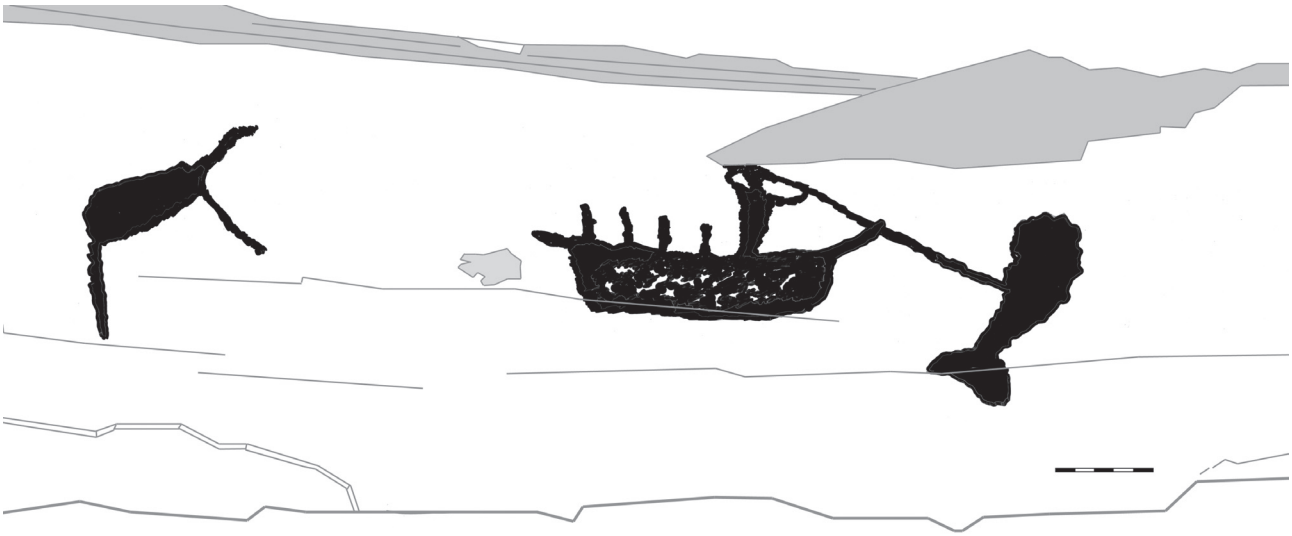

Fig. 9.17. Marine hunting from a multi-seated boat, Pegtymel river, Chukotka.

scenes there are large multi-seat boats whose crew is simply indicated by short vertical or slightly folded lines; less often these are more elaborate anthropomorphs. The multi-seat boats may be equipped with stern oars (Fig. 9.18). In compositions with multi-seat boats a very wide range of images and motifs was found: in addition to the actual animals being hunted from the large boats – whales and other marine fauna – there are deer, scenes of deer hunting from kayaks, bears, various birds, wolves/dogs, male anthropomorphs and anthropomorphous *Amanita muscaria*, double blade oars, footprints and kayaks (Fig. 9.19). Thus it is impossible to distinguish between the motifs related to the tundra and to the sea.

Another unique rock art image is the representation of a structure, which could be interpreted as the outline of a house (Fig. 9.4: 4). Ethnographers have mentioned that in coastal Chukchi and Eskimo villages it was possible to find the ruins of so-called "whale-jaw houses", which probably belonged to a very ancient period. The framework and beams of the houses were made from whale bone fixed in stone foundations. Some of the houses of this kind could have been round – up to 16 bone supports formed a regular circle to which a long underground passage led. In the summer it was filled with water, and in winter it served as a sort of heat insulation structure. Such houses were built with the participation of all neighbours, were passed on from generation to generation, and were eventually abandoned by their inhabitants (Bogoraz 1991, 114–16). More unusual rock art motifs have also been identified, which could tentatively be interpreted as pictures of structures made with whale bones (possibly for drying boats).

A recurrent group of signs includes human footprints varying from single and twin to signs forming a chain of footprints that designate a path, and even fill the whole space of a panel (Fig. 9.20). There is a single panel with a man on skis.

The revealed panels have offered a new view of the place of man in Pegtymel rock art – as a dominant personage, a successful hunter (Fig. 9.21). Despite the schematic graphics the place occupied by the people in the compositions suggests their active role. There are many full-length full-face figures with outstretched arms and legs scarcely detailed. Sometimes elements of clothing are indicated. The context of the images suggests that

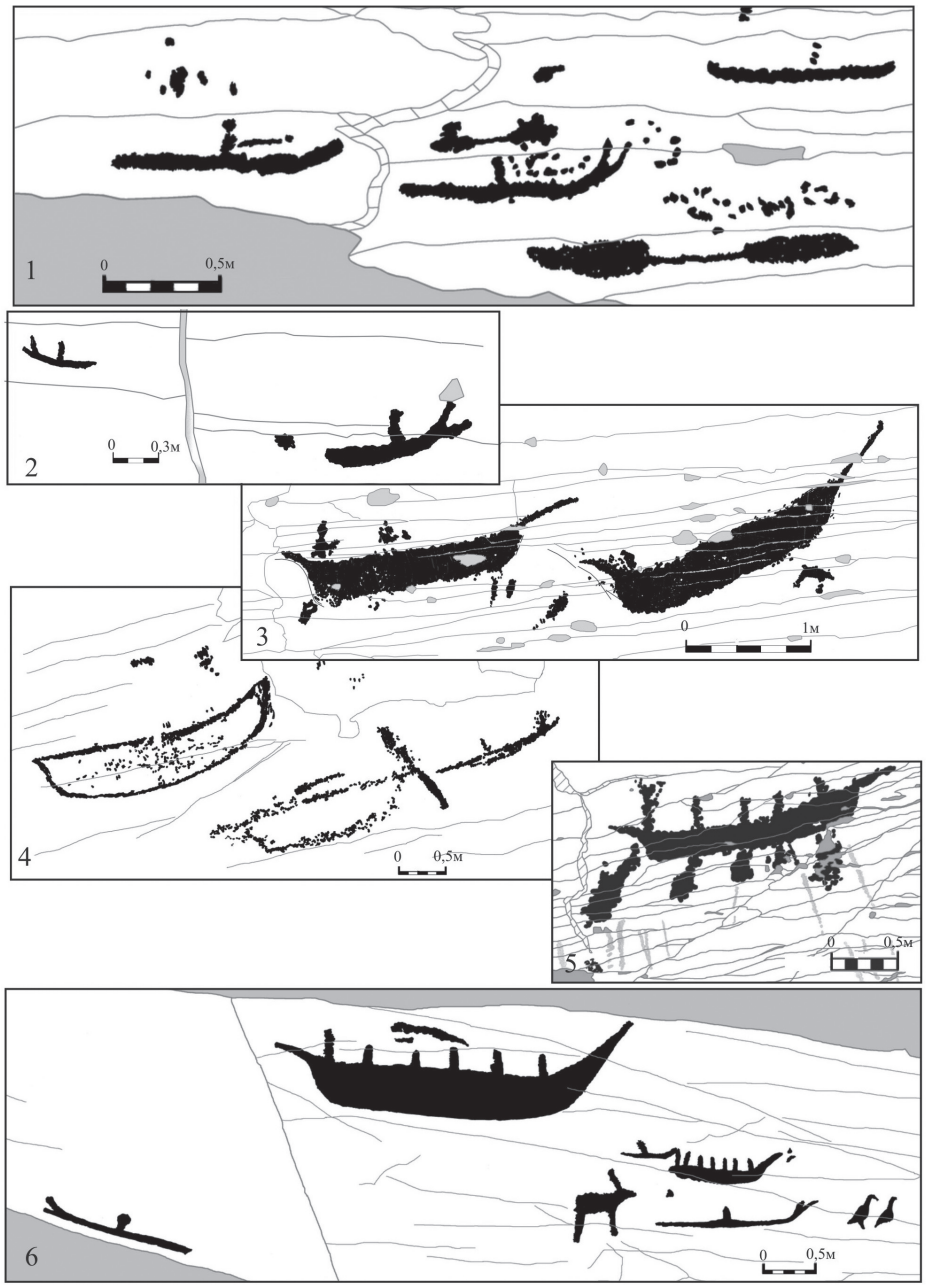

Fig. 9.18. Multi-seated and individual boats in rock art, Pegtymel river, Chukotka.

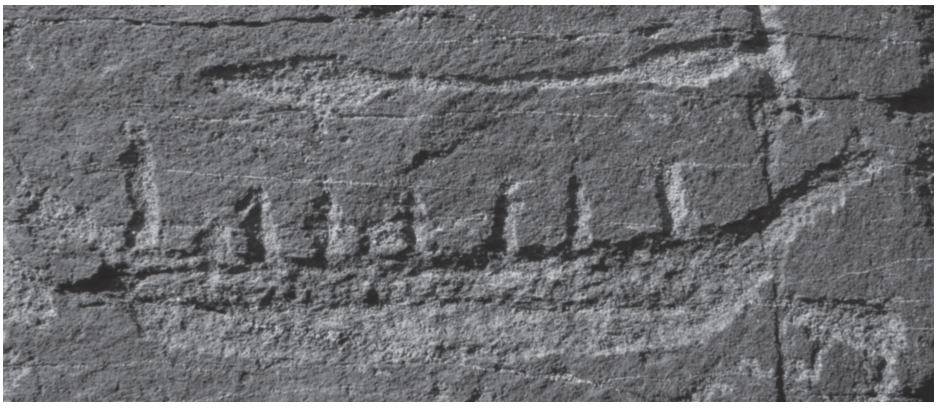

Fig. 9.19. Multi-seated boat and double blade oar in rock art, Pegtymel river, Chukotka.

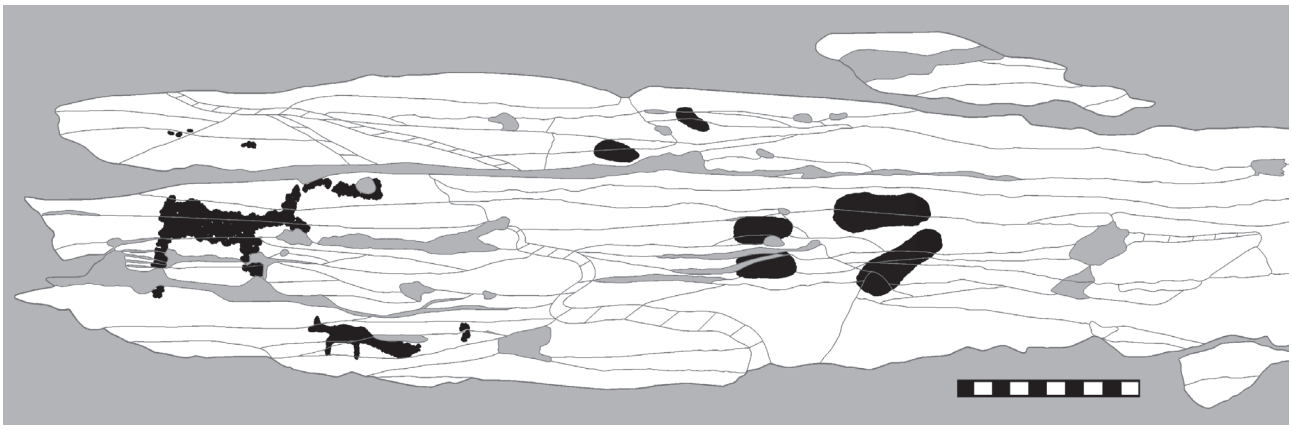

Fig. 9.20. Panel with footprint motif, Pegtymel river, Chukotka.

Fig. 9.21. Anthropomorphs with outstretched arms and legs that are scarcely detailed, and multi-seated boat rock art motifs, Pegtymel river, Chukotka.

they are male personages; they may carry kayaks on their shoulders or head, with the attributes including the oars, as well as weapons (Figs 9.9 and 9.21). The double-blade oars also often occur as an independent symbolic image in compositions with a significant imagery repertoire, which is not surprising since the oars equipped with a small spear point were used as a hunting weapon (Figs 19, 18: 1).

The most original motif of the Pegtymel petroglyphs is the full-face anthropomorphs (though there is also one unique profile image) in mushroom-shaped hats (Figs 9.22 and 9.23), They can stand alone or as figures in compositions (Devlet 2008, figs 8.2, 8.8). Many of them are shown in a dance-like posture. A mushroom was placed over the head or on the head of an anthropomorph, sometimes it was used as a head substitute, and in some cases hats were represented in several tiers. Feet with soles turned in, or flaring mushroom stipes were also indicated. On the sides of the heads of the best-dressed female figures braids or pendants were shown; some of them were either dressed in fur coveralls or no clothes are indicated. They may be representations of the anthropomorphous *Amanita muscaria*, mentioned in Chukchi mythology and the folklore of some other northern peoples (Bogoraz 1939; Dikov 1971, 1999; Devlet and Devlet 2006, 186–203). Without attempting an analysis of some alternative interpretations of these personages, and based on the recent finds, let us draw focus on the motif's context. The panels with the mythological anthropomorphous *Amanita muscaria* (one standalone figure is also known) can also contain: accompanying anthropomorphs without a mushroom-shaped hat, signs (circles, footprints and chains of them, an open hand with an arm), reindeer and other hoofed animals (including partial

Fig. 9.22. The most original motif of the Pegtymel petroglyphs is the full-face anthropomorphs in mushroom-shaped hats.

Fig. 9.23. Mythological Amanita muscaria images. Braids or pendants were shown on the sides of the heads of the elaborate female figures.

and incomplete figures), wolves/dogs, bears (?), double-blade oars, canoes, whales and other sea mammals, deer and kayak deer-hunting scenes. One interesting detail of some groups of the Pegtymel petroglyphs is the presence of specific scratches on the surfaces with rock art; these sub-vertical or somewhat curved lines occur on the panels with the anthropomorphous *Amanita muscaria* images, but they are also found in groups with other motifs (Devlet 2008, fig. 8.8).

The Pegtymel petroglyphs also raised a question about whether every rock art site in Northern Asia could be perceived as an open air sanctuary, or whether sacred places always implied public access to the images. Field observations demonstrated that some panels with rock art apparently were intentionally made accessible for large groups of people and visible from several important points. A unique scene was depicted on the lateral face of a massive stone of an unusual hourglass shape, lying on the bank of the Pegtymel river. In addition to the numerous deer figures, in the central area a special deer was pecked, marked with a symbolic circle with a point in the centre (Fig. 9.24). This is the only deer figure among the hundreds of Pegtymel reindeer images with a sacred symbol depicted on its body. As is known from ethnographic information, in many northern cultures an unusually coloured deer or an animal with an artificially decorated body was dedicated to the gods. This stone of special form could have served as a kind of natural "altar" (Devlet and Devlet 2006, 272–312).

Other panels seem to be intentionally hidden in crevices. Some groups surprised us by their location: whoever made them, sitting on a tiny ledge high on top of a wall, could do so only out of personal valour. The difficulty of access, the size of the petroglyphs and their potential for public visibility were negligibly small compared to the effort invested. Such scenes were not limited to images of deer-hunting at a river crossing, they may represent wolves, individual boats, sea hunting scenes and other motifs.

Over hundreds and thousands of years different generations of people came back to the Kaikuul bluff, creating petroglyphs on rock outcrops and marking in this way the sacred nature of the stone. In the traditions of many peoples some rocks and stones became ritual objects, particularly those with an unusual shape or covered with rock art or inscriptions. Such objects were perceived as a sort of repository of some added force which made them

Fig. 9.24 (Plate 7). A unique scene was depicted on the lateral face of a massive stone of an unusual hourglass shape, lying on the bank of the Pegtymel river. In addition to numerous deer figures, in the central area a special deer was pecked, marked with a symbolic circle with a point in the centre.

valuable and endowed with a specific meaning. The reality of the sacred nature of stone as immune to the destructive effects of time was strengthened by the rock art images.

There are only petroglyphs at Pegtymel; no painted motifs or pigment traces have been identified there. The vast majority of images were pecked, and there were also figures with elements of polishing and engraving. The completed petroglyphs were made as silhouettes, but the contour of the pecked images was often finished with deepened grooves. The pecking is quite varied in depth and density. On some artistically-made deer figures pecking with tools placed perpendicular to the surface and the elongated traces of working with a tool at an angle could be distinguished, which produced an effect of imitation of the animals' coat. Miniature motifs may have been pecked with a metal tool, possibly a thick needle or an awl.

Some images were made with the use of polishing – in some cases the outline of the animal's body was pecked and the body itself slightly polished. There are examples of a combination of engraving and pecking, but the majority of such images were incomplete figures – a significant number of sketches, rough drafts and unfinished images are another interesting feature of this rock art site. In some petroglyphs the outlines of the future image scratched with fine lines can be clearly seen – this was the author's initial layout, to be filled later by pecking. Some petroglyph groups presented combinations of sketches and finished images.

A series of items illustrate the sequence of the work on a figure (most often a deer). It includes examples with a completely finished contour which was afterwards filled by pecking (Fig. 9.25); there are also variants of alternative sequences – the pecking starting on the back, a leg or antlers of an animal, but the work was interrupted and left unfinished. Quite often such unfinished figures are placed separately. In complicated compositions there may be some deliberately incomplete partial figures – this technique was apparently used for rendering perspective: behind the animal figures placed in the foreground only the backs and the heads of other animals can be seen in the background.

Basing himself on stylistic analysis N. Dikov divided the known deer images into five typological groups, embracing in consecutive order petroglyphs from the realistic to the more schematic ones. The earliest group of deer images and related motifs was dated by him to the 2nd millennium BC. The groups or styles used by Dikov were based on analogies in the rock art of areas some distance apart, and on contemporary ideas in rock art research in which there is a prevalence of stage-focused stylistic trends from realism to schematisation. Since then, more detailed studies of rock art regions have significantly undermined notions of linear trends in rock art. Dikov's typology correctly grouped the pooled data by formal attributes in accordance with the criteria selected by a researcher, but it was rather difficult to determine the chronological limits of the styles.

New rock art data have had a significant influence not

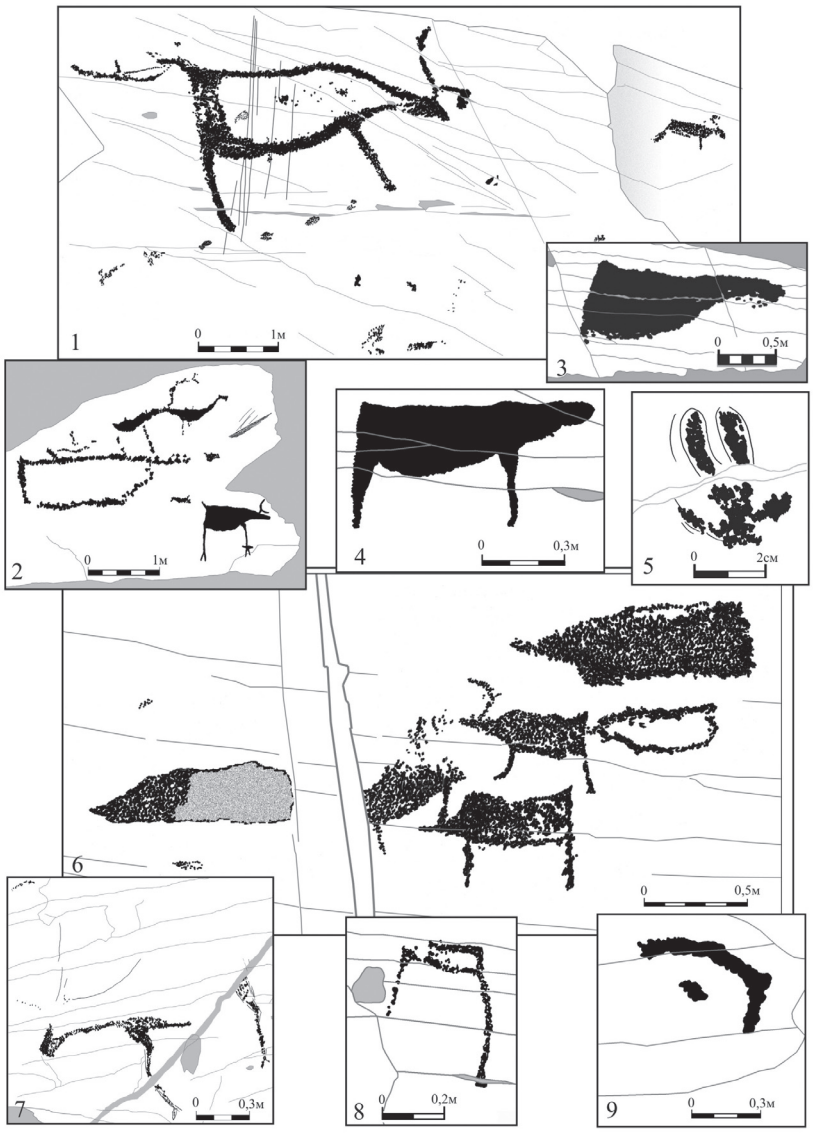

Fig. 9.25. Sketches and unfinished images illustrate the sequence of the work on a figure (most often a deer). There are examples with a completely finished contour which was afterwards filled by pecking and variants of alternative sequences – the pecking started on the back, leg or antlers of an animal, but the work was interrupted and left unfinished.

only on Dikov's data, but even more on his conclusions. For instance, a recorded realistic deer image in a hunting composition (Fig. 9.10) contradicts his assumption that such figures only occurred outside deer-hunting scenes (Dikov 1971, 33). The double-blade oars do not necessarily accompany deer figures (Fig. 9.18: 1, Fig. 9.19), as was dictated by his group 5 (deer+oar according to Dikov), presuming their mandatory combination. The reference point for building the Pegtymel petroglyphs' chronology based on local material culture was an image interpreted as a rotary harpoon. The element of the group interpreted by him as an image of a harpoon balancer was in fact a deer antler: the line of the antlers of a reindeer image was superimposed by a silhouette of a multi-seat boat depicting, probably, the pursuit of a whale (Fig. 9.26: 1).

Analysis of the rock art demonstrated that the Pegtymel petroglyphs have a complicated chronology. Besides their stylistic peculiarities, this is supported by traceological and experimental studies which made some of the Pegtymel petroglyphs much younger. Since there is a very limited number of motif variations in the rock art of Chukotka, and the groups, or "graphic canons" defined by Dikov may well have no chronological sequence, in current research significant attention has been given to the study of the techniques and the materials of the tools which could have been used for pecking the petroglyphs.

The objective of adapting existing approaches of traceological analysis to Chukotka rock art studies was to be solved by Dr E. Girya, a researcher from the experimental traceological laboratory, Institute of the

Fig. 9.26. The element of the group interpreted by N. Dikov as an image of a well-dated rotary harpoon balancer was in fact a deer antler: the line of the antlers of a reindeer image was superimposed by the silhouette of a multi-seat boat depicting, probably, the pursuit of a whale. Pecking with a metal tool (1). These were, as a rule, some non-figurative parts of compositions, as well as some quite roughly-made (stylistically) petroglyphs made with a stone tool (2).

History of Material Culture of the Russian Academy of Sciences in St Petersburg.

The outcrops of local quartz which are clearly visible on the Kaikuul bluff were presumed by Dikov to be the most likely material for the tools used for making the Pegtymel petroglyphs. For verification of his hypothesis, this material was used for experimental pecking (Fig. 9.27). A series of experimental peckings on the surfaces of blocks of the local sandstone were made, and the changes in the quartz tool itself caused by direct and indirect pecking were recorded. The end of the quartz tool started changing practically immediately; the geometry of the pecked pits was non-uniform, and the sharpened tool continued wearing out with the same intensity. Lots of quartz fragments were left in the experimental area. A striking tool for which local pebbles were used also acquired traces of usage with a stone punch – the characteristic working traces appeared. A similar tool, which it would have been tempting to relate

Fig. 9.27. Work with experimental stone tools, Pegtymel river, Chukotka.

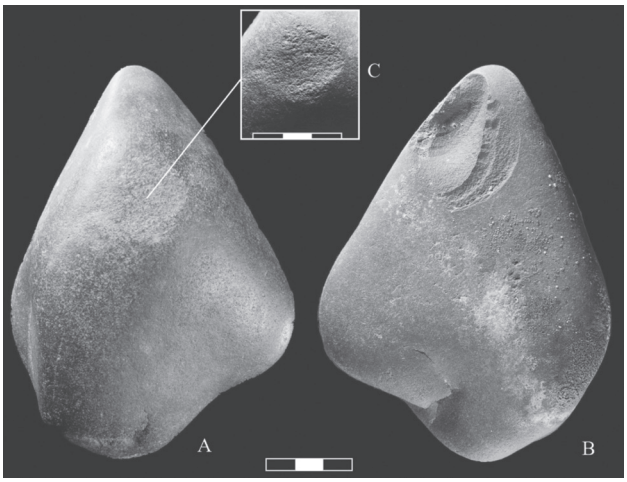

Fig. 9.28. A sub-triangular shaped pebble was found at Kaikuul bluff, which had traces identical to those obtained from use as a striking tool with a stone punch.

Fig. 9.29. On some artistically-made deer figures pecking with metal tools placed perpendicular to the surface and the elongated traces of working with a tool at an angle could be distinguished, which produced an effect of imitation of the animals' coat. This type of standardised pecking could only be produced by metal tools.

to petroglyph-making, was found between locations I and II at Kaikuul bluff. A sub-triangular shaped pebble had traces identical to those obtained from the use as a striking tool with a stone punch (Girya and Devlet 2008) (Fig. 9.28).

Evidently the use of stone tools in the pecking of petroglyphs must have produced a significant amount of fragments and flakes, which potentially could be preserved in front of the rock art panels if these debris were not moved through the effects of natural factors. Taking this into account, an area in front of the vertical panel with numerous anthropomorphous *Amanita muscaria* and the sea mammal hunting scene was selected for study (Fig. 9.6: 1). As a result of the water-screening of sediment from a 4 m^2 test pit, numerous quartz fragments were obtained, the microscopic study of which did not reveal any traces of anthropogenic flaking or other use. Further research produced convincing evidence that the composition on this panel was made with metal tools.

Comparison of the experimental stone-tool reference materials with the rock art demonstrated that only a small part of the petroglyphs had comparable pecking. These were, as a rule, some non-figurative parts of compositions, as well as some quite roughly-made (stylistically) petroglyphs, the existence of which may be explained rather by the poor skills of an individual person attempting the pecking of a particular image, especially since many of them were left unfinished, than by the relative chronology of the petroglyphs (Fig. 9.26: 2).

The majority of pecked petroglyphs looked quite different, and according to the experimental data this type of standardised pecking could only be produced by metal tools (Figs 9.29 and 9.30). Experimental rock art pecking demonstrated the unsuitability of 7% tin bronze – such tools became deformed after the very first pecking. Iron tools produced reference traces which were practically identical to those recorded on the pecked petroglyphs of

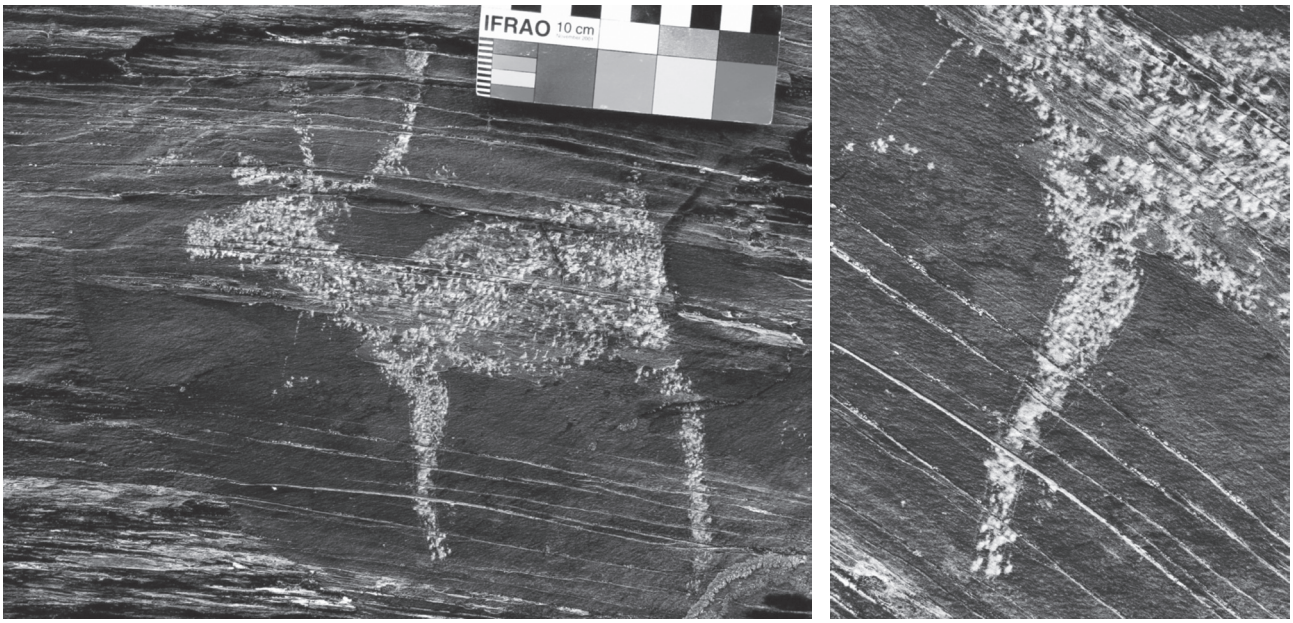

Fig. 9.30. The outlines of the future image scratched with fine lines can be clearly seen – this was the author's initial layout, to be filled later by pecking with a metal tool.

the Kaikuul bluff. As was to be expected no traces were left on the striking tool used with a metal tool.

As a result of the Pegtymel experiments, the main diagnostic feature distinguishing pecking pits left by a stone punch tool from the traces of an iron tool was the quick change in the work area of a stone tool; the pecked traces showed a dynamic transformation from sub-rounded or sub-quadrangular pits to linear elongated ones. Another important feature of the use of stone tools was the wide entrance hole and the lack of sharp drops between the peaks and depressions. There were also significant differences on the striking tools which were used with stone or metal tools; there were clear wear traces (concentration of micro-pits and scratches) exclusively on those striking tools, which were used with the stone punch (Fig. 9.31). In work with metal intermediaries or stone adzes with antler mounts no visible traces appeared (Girya and Devlet 2010).

Thus in addition to traditional observation and description, various other materials were employed for the study of the petroglyph-making technique, such as water-screening of sediment from a test pit for the identification of tools or their fragments; and specific techniques and methodologies for observation, recording and analysis of petroglyph technology have been developed. As a result of focused experimental technological research on the Kaikuul bluff, techniques for stable oblique lighting were tested, which was necessary for the accurate revelation of the contours and the specifics of images located on vertical rock surfaces, as well as traces of tools used for making the rock art. Contact silicon negatives of pecking, preceded by protection of the rock surface by a special washable solution, made it possible to obtain material for further magnification-analysis of tool traces. Unfortunately it was completely impossible to use modern devices for the scanning of stone surfaces because of transportation problems. The silicon negatives were used for making positive casts from very hard plaster suitable for laboratory studies of the artificial modification of stone relief. Rock art reliefs were recorded and studied in the plane and from the side with the use of a linear shadow technique. As a result macrographs of the artificial stone reliefs were obtained and the differences between the traces made by stone and metal tools were described (Fig. 9.32).

As a result of the programme of technological analyses involving the study of the techniques and the material of the tools used for the pecking of petroglyphs, it was concluded that the vast majority of the images under consideration was made with metal tools, though some rock art was pecked with stone tools (Girya and Devlet 2008). The outcome of the study was a methodology for documenting the traces of tools used for petroglyph-pecking, which has been tested in the project and may be applied to rock art studies at other sites (Girya and Devlet 2010).

The criteria selected for establishing the differences between traces of pecking with stone tools and metal tools required further evaluation at sites in other areas, and attention also turned to materials available in museums. Materials from Khakasia, and the Krasnoyarsk and Khabarovsk regions are now becoming part of the reference collection for traces of tools used (Fig. 9.33).

Fieldwork at sites in these regions has made it possible to survey in a focused, purposeful way a wide range of petroglyphs, to resolve a number of technological issues,

identify new groups of depictions and determine significant details in what has been previously recorded. Hence, in the Khabarovsk region our fieldwork at the Sheremetievo rock art site on the Ussury river brought to light new details and images in the local rock art (Fig. 9.34). The results obtained have made it possible to amend certain aspects of established ideas with regard to the absolute and relative chronology of these objects of study, and they underline the considerable potential of research into the techniques used for creating petroglyphs.

In the summer of 2009 several petroglyphs were investigated at the Shalabolino rock art site on the north bank of the Tuba river, a tributary of the Yenisei in the Krasnoyarsk region, where in recent years a significant number of new images have been identified (Pyatkin and Martinov 1985; Zaika *et al.* 2005; 2006). The aim of this

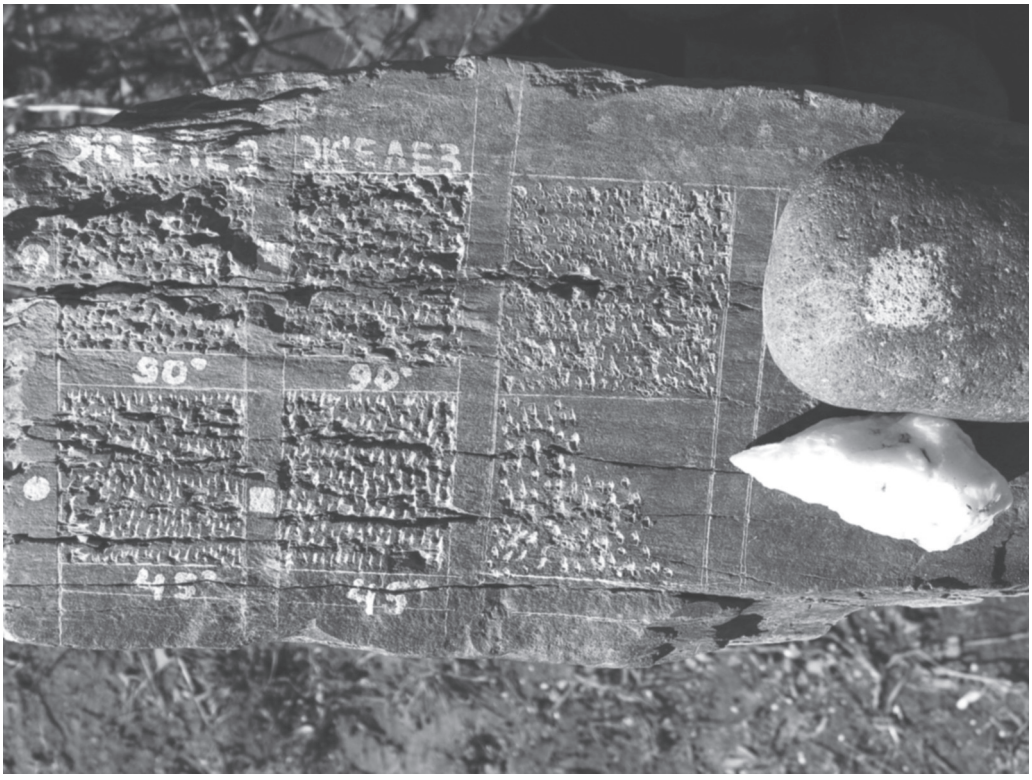

Fig. 9.31. Comparison of the experimental stone-tool reference materials with the rock art demonstrated that only a small part of the petroglyphs had comparable pecking. The majority of pecked petroglyphs looked quite different, and according to the experimental data this type of standardised pecking could only be produced by metal tools. There were also significant differences in the striking tools which were used with stone or metal tools; there were clear wear traces (concentration of micro-pits and scratches) exclusively on those striking tools which were used with the stone punch.

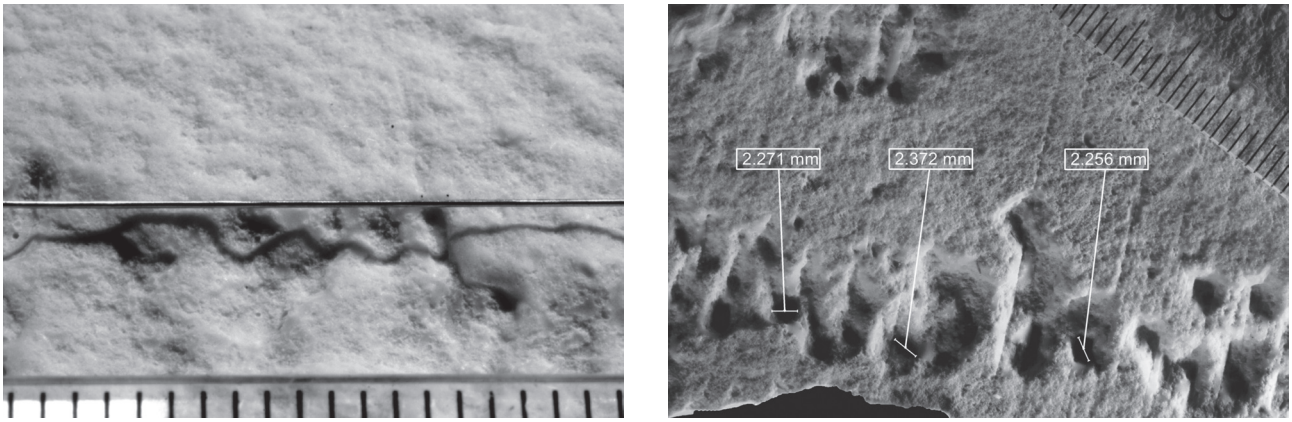

Fig. 9.32. Shadow profile of a surface pecked with a stone tool (1); view in plan of pecking traces made with a metal tool (2) (taken from a cast).

Fig. 9.33. Silicon negative from Sikachi-Alian, Lower Amur rock art area in the Khabarovsk region.

Fig. 9.34. A unique rock art motif from the Sheremetievo rock art site, Ussury river, Far East.

Fig. 9.35. Experimental pecking on sandstone with a stone tool. Shalabolino.

work was to determine the material of the tools used for making petroglyphs. Since the local sandstones are similar in their mechanical properties and texture, it proved possible to use the results obtained from the Pegtymel field experiments for comparative observations at Shalabolino. Additional experimental work on the local red sandstone has only been partially carried out (Fig. 9.35). The results of the research are being prepared for publication in the forthcoming volume for the rock art conference in Kemerovo in summer 2011 (Girya, E. Y., Drozdov, N. I., Devlet, E. G. and Makulov, V. I. On the traceological analysis of petroglyphs from Shalabolino).

The above-mentioned diagnostic characteristics distinguishing traces of blows left by a stone punch tool from those left by an iron tool were confirmed by the investigations of the Shalabolino petroglyphs (Fig. 9.36). Some petroglyphs from the lower level were examined: it was established that the rock art images had been made with both stone and metal tools. The conclusions arrived at on the basis of traceological examination coincided for the most part with the date accepted for these petroglyphs by their style, but some contradictions were also noted.

Several zoomorphic figures, the image of a boat and one incomplete image in the sample of Shalabolino petroglyphs can be examined as an example of stone tool use. A depiction of an elk was identified as having been worked with a stone tool (Fig. 9.37). Silicon impressions were taken from three parts of the figure: on all of them the same transformation of the stone tool's working-edge shape as a result of use was found. The pecking traces, which had been made to fashion the head of the animal, varied in shape. The traces of blows on the elk's face are roughly square or round in shape, but in the area of the antlers the shape of the traces of blows are elongated, crescent-shaped or consist of irregular lines. In profile the pecking traces were sloping and there were no abrupt transitions between peaks and depressions. A similar progression in the changing shapes of the traces left by tools can be discerned in the fragments incorporating the elk's legs, which were examined: the roughly round pecking traces (in the area near the elk's belly) gave way to elongated or linear ones the further away they were from the body, and

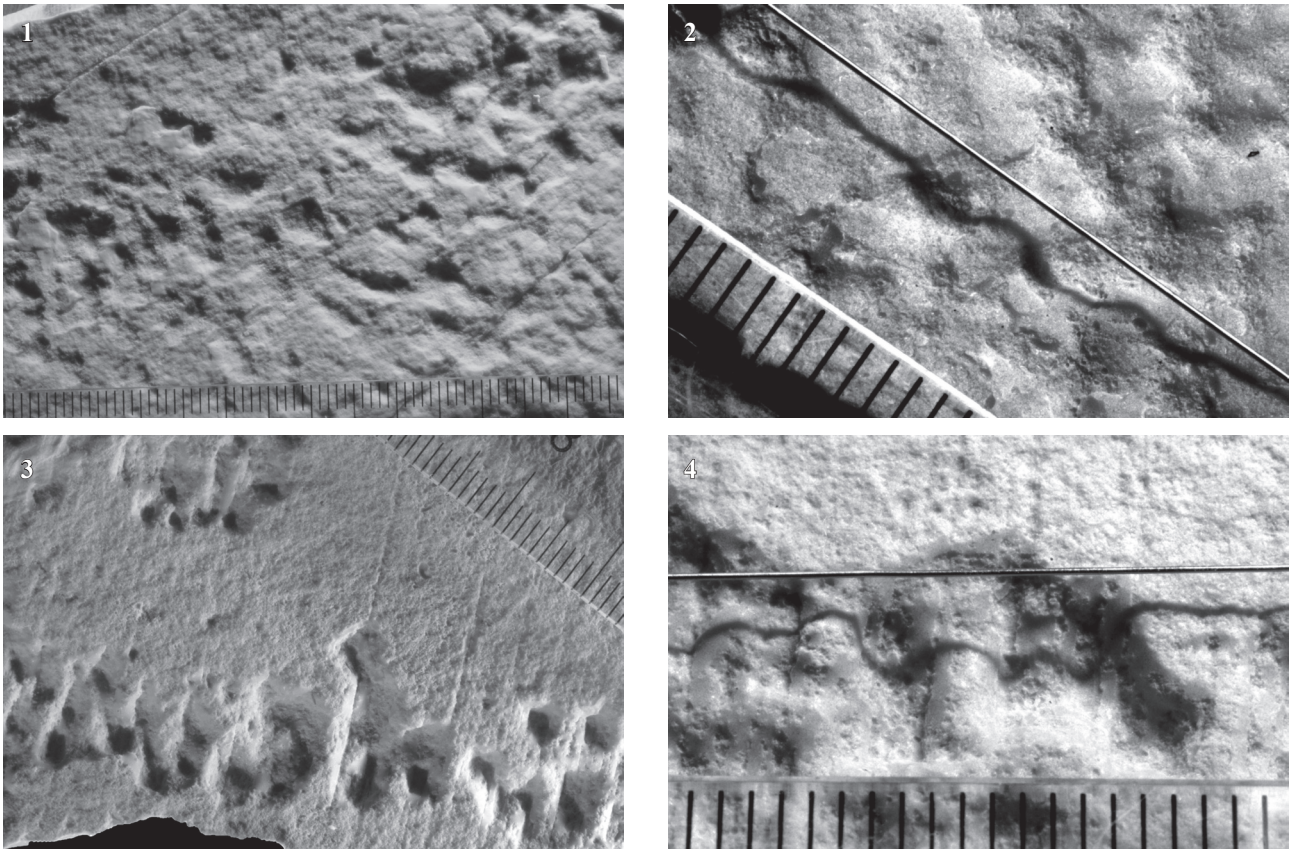

Fig. 9.36. Fragments of petroglyphs made with stone punch tools (1–2) and metal tools (3–4). Shalabolino, Krasnoyarsk region: (1) view in plan of pecking traces made with a stone tool; (2) shadow profile of a surface pecked with a stone tool; (3) view in plan of pecking traces made with a metal tool; (4) shadow profile of a surface pecked with a metal tool (taken from a cast).

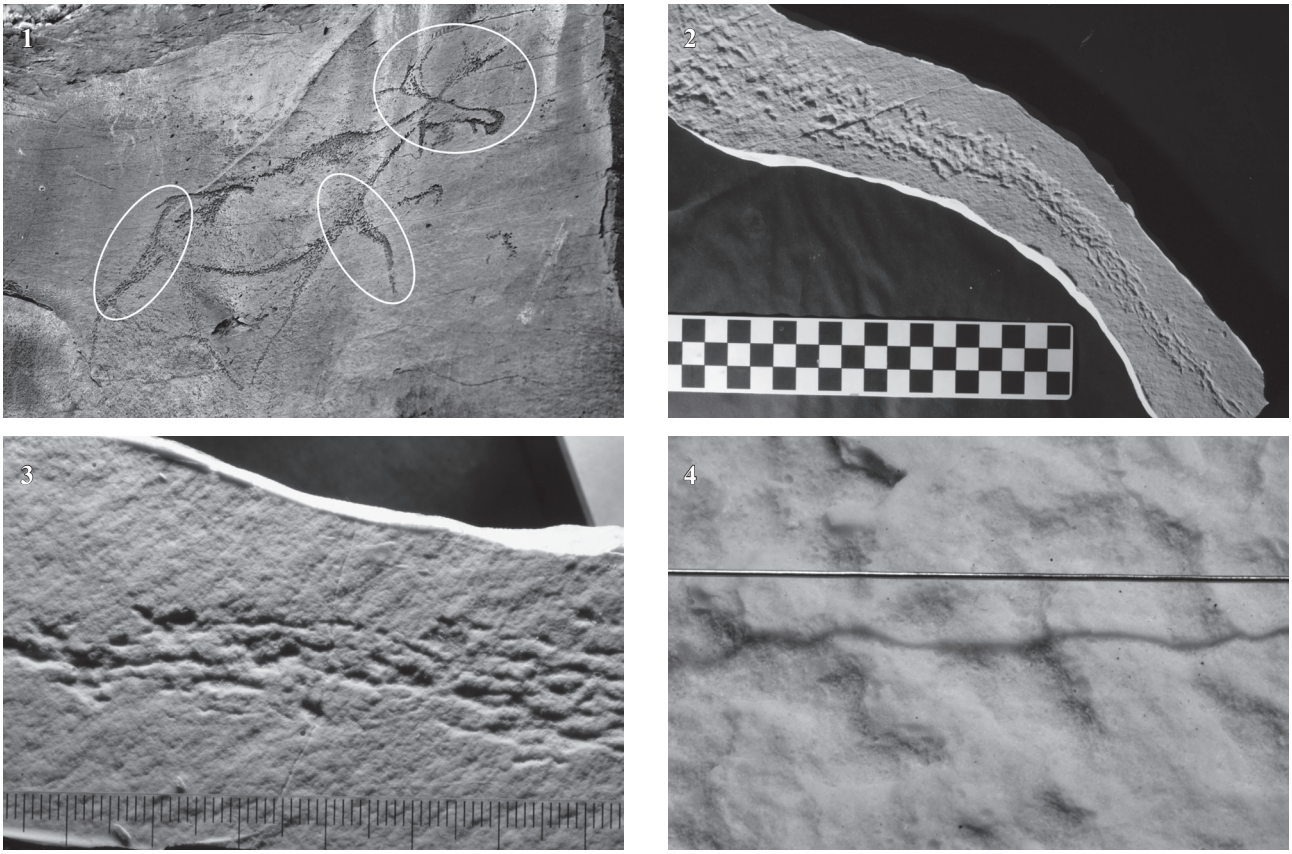

Fig. 9.37. Image of an elk made using a stone punch tool (1). Shalabolino, Krasnoyarsk region; (2–3) view in plan of pecking traces made with a stone tool; (4) shadow profile of a surface pecked with a stone tool (taken from a cast).

Fig. 9.38. Depiction of a bull worked in outline using a stone punch tool. The filling-in of the silhouette was started with another tool.

Fig. 9.39. Fragment of an image of a boat with figures sitting in it executed with a stone tool (a cast).

in the places where the hoofs of the depicted animal would have been they were definitely linear.

Such changes in the shape of pecking traces are the characteristic feature of work with stone punch tools, made of hard isotropic stone. A specially prepared pointed working end would quickly crumble while it was being used: the tool would become chisel-like (*pièce esquillée*). In our experiments aimed at modelling pecking using quartz direct-impact pecking stones and quartz punch tools, similar changes had been noted on the Pegtymel material regarding the shape of the working-edge of the tools and, as was to be expected, a similar pace of change in the outlines of certain traces of blows. Did the artist of yore adjust his tool several times or did he, as the working-edge became damaged, substitute another tool for it? It is now impossible to resolve this question.

A depiction of a bull with its head turned to the right was examined. The partial figure had been worked in outline. Then the head was shown in partial silhouette worked by another tool. In order to make the outline, a stone punch tool had been used with a chisel-like working end (Fig. 9.38). The traces of blows were mainly straight, large and up to 10 mm in width, and their predominant shape was like that of a sickle. A small ground line leading from the outline of the face to the eyes was noted. Another tool had been used for the pecking outside the outline, possibly designed to delineate the head in silhouette – a technique most common for depicting animal figures in the local rock art tradition.

One other petroglyph had been worked using a pointed stone punch tool with a slightly blunted end – a depiction of a boat with people sitting in it, shown as vertical lines. Most of the pecking traces have an unbroken perpendicular surface, the width of the wide shallow hollows is up to 5 mm (Fig. 9.39).

A significant proportion of the Shalabolino petroglyphs are dated to the Iron Age. Many of the figures and scenes also demonstrate, from the technological point of view, clear features associated with the use of metal tools. Examples of this include a single armed figure, and a scene incorporating two armed male figures worked with the indirect and oblique blows of a sharp metal tool (Figs 9.40 and 9.41). Figures in this style are typical for the region and belong to the Tagar period of the Iron Age (Sovetova 2005). The pecking traces are all of the same size, rounded in shape and deep. The width of an entrance aperture is similar in size to the depth of the tool's penetration. Traces of this kind testify to the use of metal tools.

An example of pecking with a metal tool can be provided by the depiction of a fish in silhouette (Fig. 9.42). The whole image is covered by a continuous field of hollows up to 6 mm in width and, as far as their proportions are concerned, narrow and of moderate depth. While straight blows predominate, some have, however, been made at an oblique angle. It can be assumed that a metal punch tool with a rounded working end was used.

One other group of petroglyphs investigated included a superimposition (Fig. 9.43). Parts of the front leg of the animal depicted to the left were examined – a line leading to its face and also parts of the head of the zoomorphic figure to the right. Deep narrow traces up to 2.5 mm deep had been left from diagonal blows: the lines were uninterrupted and the shape of the individual blows remained regular and rounded. All the constituent elements of this group were the result of work with a metal punch tool with a rounded working end.

Two types of traces were examined on two zoomorphic figures arranged diametrically opposite each other (Fig. 9.44): the pecking traces used to create the outline depiction on the right and the sharpening traces cutting across the back and belly of the animal on the left. The pecking consisted of straight and oblique impacts forming a single dense line, they are rounded and up to 3.5 mm in width, narrow and deep as far as their proportions are concerned. This depiction had been worked using a metal punch tool with a rounded working end. Sharpening traces executed by a metal tool that was thin and with curved edges in

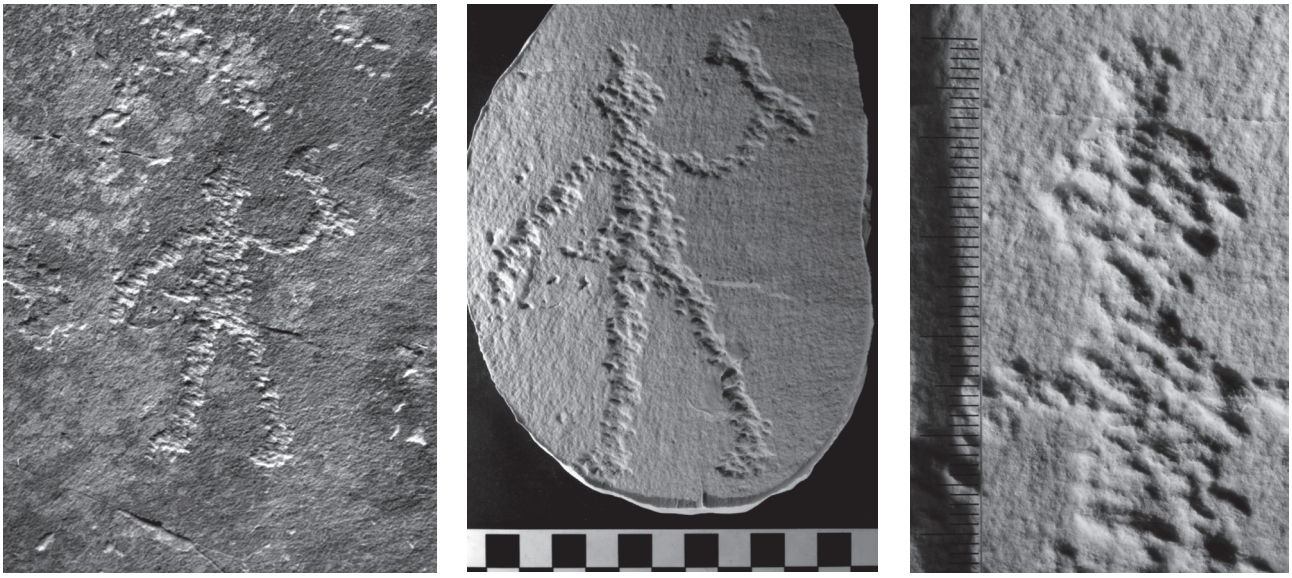

Fig. 9.40. Depiction from the Scythian period executed with straight and oblique blows from a sharp metal tool. Shalabolino, Krasnoyarsk region.

Fig. 9.41. Depiction from the Scythian period made by a metal tool. Shalabolino, Krasnoyarsk region.

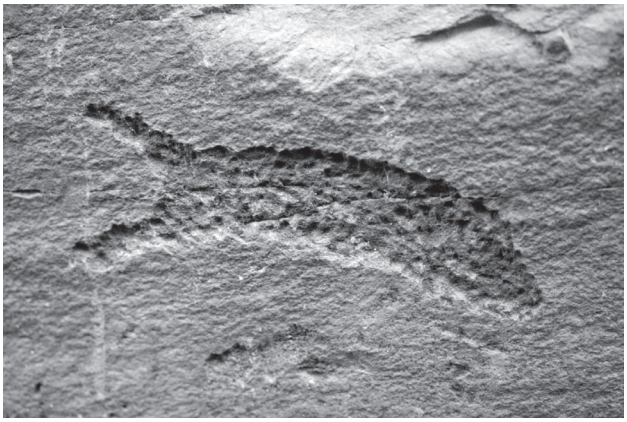

Fig. 9.42. Image of a fish pecked with a metal tool. Shalabolino, Krasnoyarsk region.

Fig. 9.43. Superimposition pecked using a metal tool. Shalabolino, Krasnoyarsk region.

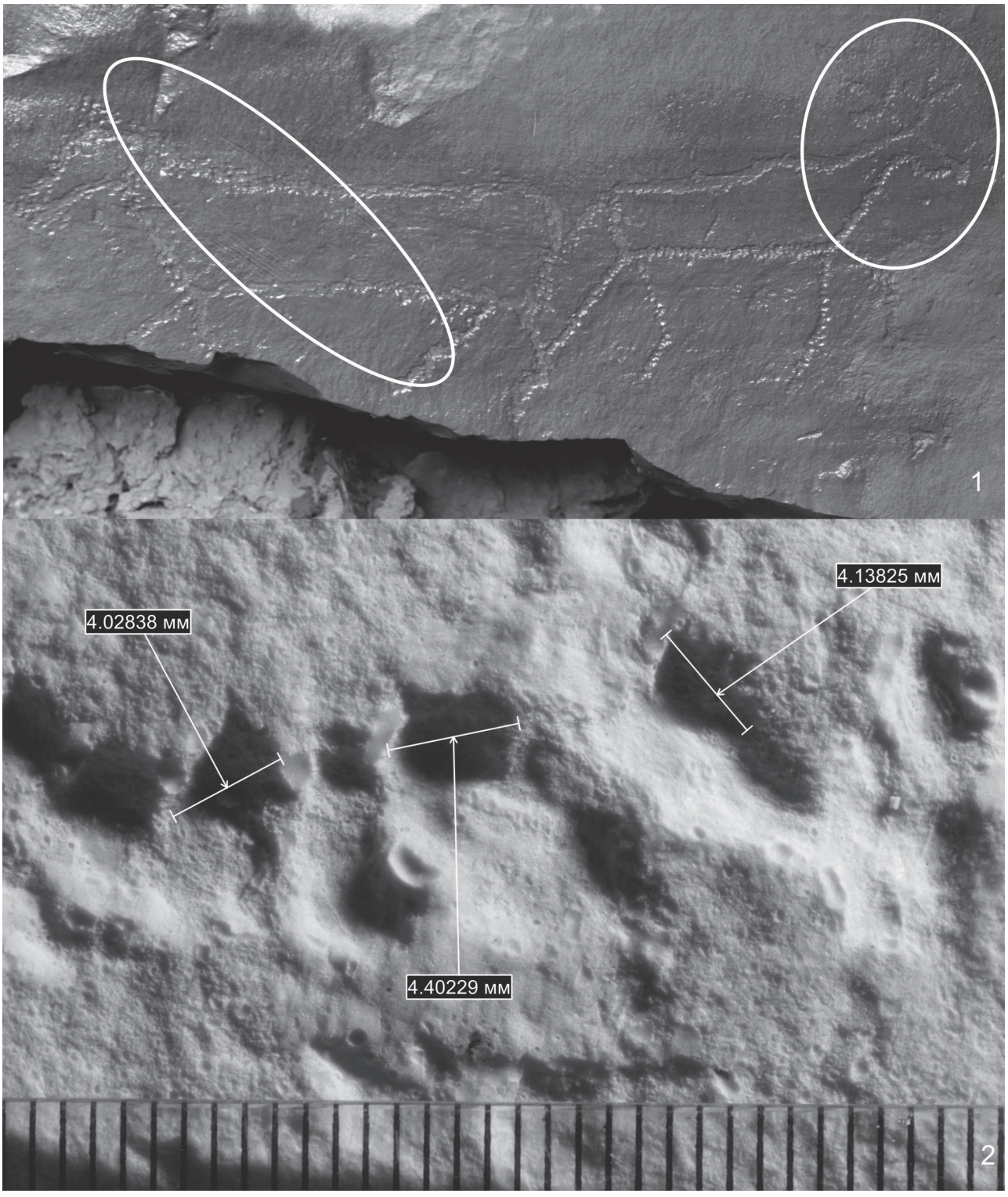

Fig. 9.44. Zoomorphic figures executed with a metal tool and sharpening traces from a metal tool. Shalabolino, Krasnoyarsk region.

section can be discerned on the figure positioned to the left. The lines in question are straight with smooth bends in some parts and they vary in length. They are narrow and all have an identical U-shaped profile.

The results obtained in the course of experimental traceological studies – both in the field and in the laboratory regarding the Shalabolino rock art – are making it possible to piece together a comprehensive idea of the site's chronology. They have demonstrated the appropriateness of the method for analysis currently being developed.

Fig. 9.45. Rock art cast from Chukotka at the Exhibition in the Museum of Anthropology in the Moscow State University.

Rock art is a unique historical source. The images made on rock – the most lasting natural material – left in their natural context became permanent personages in the decorations changing from season to season. As a material manifestation of the spiritual life of the people, a sort of "frozen myth", they bring to us also the realities of everyday life; the pulse of life which was felt in the hunting scenes, the desires and ambitions of the inhabitants of this severe land remained relatively stable – evidence of this was offered by the hunting scenes created in different periods and going through the ages as the one leading motif.

The study of rock art, an integral part of global culture, has opened a window into the world of the past, the art creating a bridge between cultures and millennia. In addition to the academic studies, another task of the project was the enhanced popularisation of the petroglyphs using modern restoration techniques (Kochanovich and Devlet 2006, 47–50). This formed the basis of an exhibition introducing the rock art of Chukotka and other areas that has already had an extensive history: starting in 2006 it has been exhibited in several places. The exhibition materials have also been donated to the Museum in Anadyr and Pevek, to the Museum of Anthropology of the Moscow State University on the occasion of its 125th anniversary (Fig. 9.45). The moulds were also used in The State Historical Museum project addressing the needs of poor-sighted children – the natural relief so well reproduced by the casts gave the children an opportunity to feel the images' contours. As part of the United Nations-supported International Polar Year in March 2008 the exhibition was presented in the UN Information Centre in Moscow. It is to be hoped that the world of rock art images will not only contribute to the academic knowledge pool, but also form an important part of the global historical and cultural heritage.

Acknowledgements

I should especially mention participants in the expeditions and express my deepest respect for their work. I am very grateful to my colleagues and those rock art amateurs whose support and help made it possible to organise rock art research projects in remote areas, and whose input of rock art documentation has been invaluable to the production of this chapter: Leonid Bove, Nikolay Drozdov, Igor Georgievskii, Eugenii Girya, Alexsey Kochnovich, Artur Laskin, Vladimir Makulov, Elena Miklashevich, Anna Mukhareva, Mikhail Slovodzian, Nastia Sorotokina.

The research project is supported by the programme "Traditions and Innovations in History and Culture" of the Russian Academy of Sciences.

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