Stone objects of Russian Fennoscandia: potential for recreational use

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Abstract. The perspectives for recreational use of attractive stone objects in the natural region of the Russian-owned part of Fennoscandia are considered. Such objects as fjords, canyons, selga, rapids, huge boulders and their clusters, petroglyphs, seitas and labyrinths are very popular among tourists. The article shows new approaches to the interpretation of the primary purpose of the Stone Age objects, based on the priorities of geographical adaptation, rational development of the landscape, space marking and time measurement. The modern problems of preservation of cultural heritage monuments are considered. Special attention is paid to anthropomorphic and zoomorphic rocks and sculptures, the genesis of which is the subject of scientific debate. The use of geographical methods expands the concept of the primary purpose of ancient objects, stone processing technologies, the simplest tools of orientation in space-time and the ancient navigation system. The results of the research allow us to clarify ideas about the evolution of the natural environment in the region, clarify the existing reconstruction of the economic structure and cultural traditions of the indigenous population, optimize the existing and develop new models of rational use of the natural and cultural heritage in the field of tourism and recreation. Prehistoric stone objects are a source of unique information and a valuable resource for the development of recreational activities. The inclusion of these objects in the system of organized tourism contributes to their preservation and economic development of the territory. The article is addressed to researchers and practitioners involved in the development of projects for the development of the Arctic regions.

1. Introduction

Fennoscandia is a physiographic country in the north of Europe with a total area of over 1.5 million km². The territory has received its name from the settlement of Finno-Ugric and Scandinavian peoples that prevail here. The geological structure of the Russian (Eastern) Fennoscandia is characterized by the huge ground egression of the earliest Baltic Shield rocks. The outcrops of granite-gneiss, quartzite and other crystalline rocks create picturesque stone formations [7, 24].

Mantles, including huge boulders (up to several meters in diameter), also result in the abundance of attractive stone objects. It is believed that most of them are of glacial origin; although more valid alternative hypotheses exist: rock dislodged boulders may appear as a result of marine transgression or tectonic activity [27].

The specific geological and geomorphological structure of the area, the abundance of forests, lakes and rivers, as well as the wealth of ancient natural and cultural heritage objects, makes this region very picturesque and attractive for travelers [5].
The research subject is the potential for the rational use and methods of stone objects preservation in the past, present and future [1]. The research goal is to analyze the possibilities for recreational use and protection of stone objects with different origin: natural, man-made and artificial.

2. The area, objects and methods of the research
The objects of this multi-year research are the stone formations of Fennoscandia: fjords, canyons, selga, rapids and waterways, huge boulders and their aggregations, anthropological and zoomorphic rocks and sculptures, seitas, menhirs, petroglyphs and labyrinths.

The distinctiveness of the Baltic Shield structure has resulted in the formation of pictorial natural forms: river valleys with rapids and waterfalls, canyons and fjords, rural landscapes, sheep foreheads, curly rocks, stone ledges, sheer walls, as well as huge stone boulders and stone placers. However, the area is also characterized by the abundance of natural and man-made objects, such as menhirs, seids, petroglyphs and labyrinths (Fig. 1, 2).

3. Results and discussion: features of the distribution and recreational use of stone objects of various genesis

3.1. Artificial stone objects
The era of the Stone Age is 99% of human history. Obviously, stone-based technologies are the basis for the formation of modern culture. However, these objects are poorly distinguishable in the landscape and poorly understood. Many of them are destroyed by natural processes and human activities. It is difficult for researchers to understand how the natural environment has changed, what
problems a person solved and what tools he used [8, 9]. Today, interest with these objects is growing, and the tourism infrastructure is underdeveloped [10, 20, 25, 26]. This situation is a real threat to their existence.

3.1.1. Petroglyphs. Petroglyphs are considered the most ancient of artificial stone objects - their age is about 4-6 thousand years. Large petroglyph clusters of Eastern Fennoscandia are located at the mouth of the Vyg River (the coast of the White Sea) and on the banks of Kanozero (on the Kola Peninsula). The drawings depict a variety of migratory birds, fish, land and marine mammals, hunting scenes and sea fishing. However, there are also images of skiers, archers and winter hunting. Figures of people with rods and staffs, images of snakes, abstract geometric signs constitute a separate group of images.

Archaeologists consider that all the images were embossed for magical actions aimed at commercial success. Nevertheless, many images could pursue some rational purpose. Thus, being oriented in azimuths, they contributed to determining the boundaries of astronomical seasons, birds’ visitation time, commercial fish spawning [18, 21, 23]. Thus, the figure of a man on the rocks of the river Vyg and the object in his hand are oriented to the main geographic directions (Fig. 3), which is convenient for identifying the equinox days [11].

The Sun orientation technologies are of great importance in the Arctic - the region of polar days and white nights. As it is seen from the petroglyphs, the most active economic activity here was carried out on the sea during the summer navigation period. The images with large rooks transferring about 20 people on board, the similarity of the technique for performing images that are thousands of kilometers distant, as well as the location of petroglyphs near waterways, indicate the high mobility of an ancient man.

3.1.2. Stone labyrinths. Stone labyrinths are preserved mainly on the shores of the White Sea (the territory of Karelia, Murmansk and Arkhangelsk regions). The cluster of more than 30 objects is located on the islands of the Solovetsky archipelago, with the largest concentration on the Big Zayatsky island. The age of the most ancient objects is 4-5 thousand years. Archaeologists hypothesize that labyrinths were created for sacral, mystical purposes or as traps for fish in the tide zone. The last version, actually, has not gained ground due to a large remoteness of many objects from the seas. Moreover, a scientific cause of the primary function of stone labyrinths has also been formulated: to serve as the oldest sundial and calendar [11-16]. Such a rational interpretation was confirmed by observations and calculations of the shadow of the vertical gnomon (Fig. 4).

Figure 3. Petroglyphs at the mouth of the r. Vyg. Photo by A. Grigoriev, 2010.

Figure 4. Stone labyrinth on the island of B. Zayatsky; G. Paranina and R. Paranin at a field study. Photo by A. Grigoriev, 2010.
This reasonable interpretation has been confirmed by observations and calculations of the vertical gnomon shadow (Fig. 4). Currently, the most visited are the labyrinths on the Solovetsky Islands, the Oleshin Island (the Kuzov Archipelago) and in the Kandalaksha Bay. Ignoring the technologies of way finding by the Sun and history mystification provoke people to actions resulting in the destruction of heritage objects and surrounding landscapes. Thus, in the twentieth century, the archaeologist A. Bryusov left two deep pits after the excavations in the largest maze, and contemporary tourists trample vegetation trying to get to the center of the mazes, therefore, creating conditions for the development of erosion.

3.2. Natural-man-made stone objects

Such megaliths as menhirs, seitas, and stone sculptures are of great interest among tourists and researchers (Fig. 5, 6). The question of age, origin and purpose is solved for each of them separately, and the specialist opinions often do not coincide.

Of particular interest for recreation and tourism are megaliths with traces of artificial processing. A sharp discussion about their origin takes place between the supporters of the glacial hypothesis who defend their natural (accidental) occurrence, and the experts who refer these objects to the records of a certain Paleolithic culture representatives. Undoubtedly, scientific research of ancient technologies is of an important cognitive significance [1-5].

3.2.1. Seitas. Seitas are stone blocks in an unstable position. Often, these are large blocks lying on three small stones, like a «legged table» (Fig. 5). A difficult issue for the supporters of their glacial origin is the spread of similar forms in regions of Russia and the world, outside the boundaries of the supposed glaciation.

3.2.2. Anthropomorphic and zoomorphic stone sculptures. Anthropomorphic and zoomorphic megaliths are particularly appealing (Fig. 6). Carved into the rocks, they produce the greatest impression on travelers. Stone sculptures and silhouettes are widely spread in different places of the region. Some of them appeared to be well-known to our generation (the Bear in the region of Chupa), but most have a long history and their own legend (Kuyva, Seydozero).

Like seitas, they are considered «the freak of nature». Nevertheless, ancient people could have made their effort to the natural freaks, similar to a contemporary man who draws his attention to unusually shaped roots, stones, collects them and converts them into sculptures. Viewed from different perspectives under various lighting, the stone sculptures can easily be transformed into people’s faces or silhouettes of animals, like those in the Northern Lands (bear, moose, deer), the southern fauna (lion, rhino) or even some fantastic creature (dragon) [3, 4].
3.2.3. Objects of regular geometric shape. Sometimes megaliths of regular geometric shape occur, for instance, a granite rectangular block on the White Sea coast in the National Park «Onega Pomorye» (Fig. 7) and almost perfect granite ball on Vottovar Mountain (Fig. 8). By the way, the latter was recently knocked off a stand and drowned in a lake by the vandals. Stone balls of regular shape can be found on the islands of the Arctic Ocean. Granite and granite-gneiss rectangular blocks can be seen both on the White Sea shore and in the north of the Onega Peninsula.

![Figure 7. Megalith rectangular block in the «Onega Pomorye» National Park. Photo by D. Sevastyanov, 2015.](image1)

![Figure 8. Megalith ball in the Vottovara mountain, Karelia [6].](image2)

In most countries of Europe large stone objects are under state protection. They are included in the territory of geoparks and are popular tourist attractions [28, 29]. Research conducted on the territory of Fennoscandia reveals the abundance in such megalithic formations and the need to protect them.

3.3. Natural stone objects
The territory of Fennoscandia is experiencing a tectonic uplift. Crystalline rocks lie on the surface and weakly erode. For this reason, there are many elevations, and the rivers have a mountainous character: many rapids, steep slopes. Contrasts of heights, panoramic views of landscapes, exits to the surface of ornamental and semi-precious stones are attractive for tourists. Many objects have already received the protection status of reserves, reserves, national parks. For example, the site of the amethyst coast of the White Sea is a natural monument «Cape Ship». Phenomena such as the northern lights, polar days and nights give a special flavor to traveling in the region.

3.3.1. Erosion residues and weathering rocks. Stone outcrops are forms of nature sculpture. If they are located along the road, they can serve as landmarks. Its monumental beauty remnants attract tourists. For local peoples, such objects have their own legend and protected status. An example is the rocky outcrops of the Two Brothers (Fig. 9), located on the shores of the Arctic Ocean (Middle Peninsula, Murmansk region). The legends of the Noads (the mighty Kievits and the treacherous Kipperi) explain the appearance of this ancient Sami shrine in different ways. According to one of the versions, outliers are Kiiperi-Ukko and Kipperi-Akka (a married couple). In 2018, V. Volkov, a tourist from St. Petersburg, measured the azimuth, which connects two figures. It turned out that the shadow can be used to determine the equinoxes. In the days of the spring and autumn equinoxes at all latitudes, the Sun rises exactly in the east, and sets in the west. These days at the dawn the shadow of objects falls on the line of geographical parallel and covers all objects located on this line. In the prehistoric past, calendars of this type were very popular. They are especially important in areas of extreme climate (mountainous, continental and polar regions), where winter and summer are very contrasting in temperature.
3.3.2. River rapids. A unique attraction of Karelia is the waterfall Kivach on the r. Suna Near the waterfall there used to be a place rich in fish. The river and the waterfall had their own legend. The history of recreational use of this place has been going on for almost 200 years. In Karelian, kivi means «stone». The height of the Kivach waterfall from the top to the bottom of the water mirror in our time is 10.7 m. It is a giant staircase of several steps (Fig. 10). The height of the main staircase is 6 m. The length of the waterfall is 170 m. Before the construction of the hydroelectric power station (Girvas), the waterfall was the second most powerful on the plains of Europe. In 1931, one of the first reserves in Russia was opened here. Today, the reserve carries out a variety of scientific activities and receives a large flow of tourists.

In the sparsely populated areas of Russian Fennoscandia there are a significant number of stone objects of different genesis, which have been included in human activity since ancient times. Many of them can perform information (navigation) functions: they are located at the nodal points of ancient waterway routes, can be space markers (stand out in the landscape and are remembered due to beauty or an unusual form) and time determination tools.

4. Problems of protection of objects of natural and cultural heritage

The Arctic regions, including Russian Fennoscandia, are characterized by the vulnerability of nature (low biomass, cryogenesis, thermokarst) and its sensitivity to global processes. The current increase in global temperatures will cause the most noticeable changes here: the acceleration of natural processes, the restructuring of indigenous landscapes, the increase in anthropogenic pressures. All this represents a serious threat to the timely identification and preservation of objects of prehistoric heritage.

It is important not only the rational use of heritage sites, but also the protection and ongoing monitoring. A large number of objects in Russia remain little-known and are protected only by local residents. Unorganized tourism carries elements of risk associated with the religious intolerance of some city dwellers to monumental prehistoric monuments of folk culture.

Unfortunately, representatives of management structures do not show interest in the preservation of these objects. For example, there are no prehistoric monuments in the project for the development of tourism in the North-West Federal District for 2011-2018. However, these objects need protection and infrastructure, ensuring their safety and availability for inspection by tourists.

For example, a protective pavilion for the complex of petroglyphs of the White Sea was erected in 1968. In 1999, it was closed due to an emergency condition. The pavilion reconstruction project was prepared back in 2014. By the end of 2018 it was planned to complete the work. However, this work has not been done, and the implementation dates have been postponed to 2020 [10, 20, 22]. In such a situation, the risk of destruction of objects rises and the sphere of tourism develops extremely slowly.
5. Conclusions

First of all, it is necessary to emphasize that the northern polar territories of the Russian Federation have so far been weakly involved in the sphere of tourist use. Just some small areas of the Kola Peninsula have been developed by extreme tourists for mountain tundra trips, whitewater rafting and fishing. While in winter, mountain ski resorts in Kirovsk and Apatity are mainly exploited. The construction of the «Khibiny» national park is part of the area development plan, yet it has not been implemented for many years. Moreover, the tourist and recreational potential of this region is relatively unknown and underachieved, not to mention the fact that the Russian part of Fennoscandia is exceptionally rich in stone monuments, both natural and cultural, as well as amazing megalithic objects that we call natural man-made.

Similar stone objects (menhirs, seitas, trilites, etc.) found on the territory of such European countries as Norway, France, Germany are recognized as man-made and protected objects, regardless of their origin. They claimed to be not only of a unique scientific interest, but also attractive tourist spots. In the region under study the protected status is given mainly to natural attractions as well as to those labyrinths and petroglyphs which are located on the areas of Special Protection Regional and National Territories (SPRNT).

Unfortunately, almost all natural-man-made megaliths in the considered region are without proper protection (for example, the famous Tortoise Stone in Murmansk). Interest in megaliths, their origin and preservation all over the world is really huge. Promotion and drawing attention to megaliths as one of the most exotic recreational resources will undoubtedly contribute to a significant development of tourist capacities in the region.

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