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Prehistoric stone objects of cultural heritage as a resource for the development of tourism in the Russian Arctic

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Abstract. The article presents new tourism resources in the Arctic: stone structures, natural sculptures and objects of mixed natural and man-made origin. In the process of research of stone objects of the Arctic, the authors used standard geographical approaches and methods (adapted in physical and social geography), which ensure the identification of the relationship of stone objects with the landscape-geographical and socio-cultural environment, allow us to determine their rational functions in the geo-cultural sphere in the past and present. As a result of the research, the authors made a number of conclusions. Firstly, for the development of tourism in the Arctic region, large anthropomorphic, zoomorphic and objects of various geometric shapes that are very attractive for travelers should be included in organized routes. Many of them are available for observation as they stand out well in the landscape and are located on traditional and relevant to our time water-drag routes: on watersheds, along river valleys and seacoasts. Ancient legends and customs of the indigenous peoples of the North are often associated with such objects. Many of them are well oriented on the sides of the horizon, which allows you to use them as a sundial-calendar. Secondly, the rational use, conservation and expansion of tourism resources should be accompanied by the organization of integrated research on a geographical basis. Thirdly, solving the problem of genesis in ancient stone objects of the Arctic will make it possible to clarify modern models of geomorphological processes, reconstruction of the development of nature and culture, which will contribute to the successful development of the territory in the context of global warming.

1. Introduction

Currently, the Arctic is becoming an increasingly attractive tourism business. Global warming contributes to the development of tourism in this severe region, as well as the development of transport, means of navigation and communication, and, to a large extent, the unusual nature of the Arctic nature, the uniqueness of natural and cultural heritage sites. In the publications covering the modern possibilities of developing the Arctic regions of Russia, the beauty and dynamism of nature, archaeological finds of traces of ancient human activity (for example, petroglyphs and labyrinths about 6,000 years old), the originality of the traditional culture of the indigenous peoples of the North are noted [1], [2], [3]. However, almost nothing is said of such a promising tourism resource as unusual stone structures [4], [5].

Stone objects of various ages and genesis are widespread in the Russian Arctic. According to their shape, these objects can be divided into two groups: stone structures and stone sculptures. Among stone structures, the most common are menhirs, sieidi, less often cromlechs, dolmens, trilites, stone

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rings and labyrinths, as well as volumetric objects of geometric shapes: parallelepipeds, balls and pyramids. Anthropomorphic and zoomorphic sculptures (statues) differ from other stone objects in the smoothness of their shapes and proportions characteristic of living organisms, on which they are very similar. Almost all of the listed types of stone structures in the Arctic have their analogues in other parts of the planet.

By their origin, stone objects can be natural and artificial (man-made or artificial). There are few well-preserved artificial objects; they were created during the Stone Age and the Bronze Age, are very dilapidated and sometimes bear traces of the struggle against pre-Christian culture; today they are attributed to cultural heritage sites (petroglyphs, menhirs and some sieidi). Most stone structures are so well inscribed in the landscape that they are considered as bizarre natural formations [7], [8], [9], [10], [11]. Regardless of the genesis, all stone structures stand out sharply from the surrounding natural forms with their expressiveness, attract the attention of travelers and cause controversy among specialists.

The debatable nature of the genesis of stone structures cannot prevent their study as Heritage sites and considering them as remarkable tourism sites. Moreover, often the mystery of the objects attracts tourists and local historians who come to the Arctic regions for the purpose of independent research. Obviously, for the rational use and conservation of these objects as landforms (natural and technogenic), it is necessary to organize comprehensive scientific research using methods applied in geography, geology, geophysics, geochemistry and geomorphology. And in those cases when legends, rituals and traditions of indigenous peoples are associated with stone objects, it is necessary to use the data of ethnographic research and coordinate the recreational use of objects with carriers of a living tradition [12], [13].

2. Objects and methods of research

The article uses the results of comprehensive field studies of natural and cultural heritage in Russia, including in the European sector of the Russian Arctic.

The natural and cultural heritage is considered by the authors of the article in the conceptual field of the geography of culture, the subject of which is the geocultural space - the system of nature and culture in their interaction and interpenetration [14], [15], [16]. In accordance with the understanding of culture as a collective experience of subbiological adaptation, each object that has been preserved since ancient times can be considered as an element of geocultural space that performs rational functions. Standard field and office geographic methods provide a correct description of heritage objects (natural and cultural, material and intangible) based on the identification and characterization of multilateral connections with the natural and sociocultural environment.

The comprehensive research algorithm includes: 1. creating a geographic database of stone objects in the Arctic region based on an analysis of scientific publications, available cartographic and illustrative materials, and Earth remote sensing data; 2. field studies using standard methods (description, measurement of objects and relief elements, landscape and topographic surveys, interviewing the population to identify historical events, economic and other cultural traditions associated with the object); 3. analysis of the results (using methods of mathematical geography and cartography, geoarchaeology and astroarchaeology); 4. conceptual modeling of the interaction of objects with elements of geocultural space in the past and present, determination of the conditions for the rational use of objects for the optimal development of the territorial system in the future; 5. theoretical generalization of the results obtained in the study of stone objects of the Arctic based on the concepts of "morpholithosystem", "technogenesis", modern concepts of cultural geography and related sciences [17], [18], [19], [20], [21], [22].

An important role in the creation of the database is played by work with scientific publications, which provide a diverse description of objects. Especially a lot of new objects can be found in articles on historical, ethnographic, and geographical studies [23], [24].

3. Results and discussion

The reason for the protection of ancient stone structures is, first of all, their value as objects of Heritage (regardless of their genesis). Moreover, the likelihood of their technogenic origin dramatically increases the need to protect such monuments for their study. At the same time, the need for caring for ancient monuments is also explained by their destruction, transformation over time. After all, these monuments are an integral part of the landscapes of the Arctic, which, due to the severity of natural conditions, are ecologically very fragile and vulnerable.

All stone structures considered in the article are constantly being transformed under the influence of exogenous geomorphological processes. Directly on the sea coast, stone structures are under the influence of the destructive activity of sea waves - coastal abrasion. Due to sea level fluctuations, as well as rising water levels in rivers, they can be flooded.

3.1. Geographical features of the distribution of stone objects

Let us consider the most significant geographical factors that determine the diversity of stone structures, their distribution and the main differences from the landscape environment.

3.1.1. Composition of the rock solids. The composition of the rocks from which stone structures are formed is diverse and depends on the geological structure of the area. The largest number and variety of objects are confined to places where crystalline rocks reach the day surface, mountain ranges, hills, locations of ridges, and weathering buttes. Where there are no dense rocks, for example, in the north of the West Siberian lowland, there are no stone phenomena. On the Sredniy Peninsula (north of the Kola Peninsula), the stone structures were developed in sandstones. On the Kisilya hill in Yakutia they are composed of granites. On some islands of the White Sea of granodiorites. The composition of rocks determines the strength of structures, their expressiveness. So anthropo- and zoomorphic sculptures are characterized by a large number of details, provided that they are developed in diorites, basalts.

3.1.2. Confined to tectonic damages. Megaliths are often confined to tectonic damages. This partly explains the territorial relationship between stone structures and emissions of thermal energy, gas and water emanations. The sizes of tectonic disturbances associated with megaliths can be different. For example, the sieidi on the Stone Plateau in Murmansk are an example of the manifestation of this connection at the local level. Many valleys of large rivers (for example Lena, Yenisei, Indigirka), where stone structures are found, are tectonically determined - their separate sections are laid along these faults.

3.1.3. Distinctive locations. Most often, stone objects are found on the coasts of the seas, including on the islands, including islands remote from the mainland such as Svalbard, Franz Josef Land, Novosibirsk Islands (especially on Bolshoi Lyakhovsky Island). Another regularity of the distribution of stone structures is their confinement to the banks of rivers. For example - Lena, Indigirka, Yenisei, Podkamennaya Tunguska. However, many megaliths are confined to places with a good overview of the area. Usually on hills, in places where river valleys turn, on the edge of a plateau. For example, in Murmansk there is Raven Stone trilith, there are sieidi to east of it and cuboid megaliths on the northern outskirts of the city (in the city park), are in a single field of view.

3.1.4. The degree of study of territories, their accessibility. The degree of knowledge and accessibility of the territories for research experts and curious travelers also affect the current understanding of the spread of stone structures. The largest accumulation of ancient stone structures is noted in the European sector of the Russian Arctic. Moreover, most of them are concentrated on the Kola Peninsula, as well as on the islands of the White Sea and on the Vottovar Upland in northern Karelia. In the Asian sector of the Arctic, the largest accumulation of stone structures is noted on the Central Siberian Plateau and the Kisilya Upland in the Chersky ridge system

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3.2. The distinctive forms of stone objects in the Arctic

This section briefly describes the typical stone objects in the Arctic, which most often attract the attention of tourists. First of all, they need a comprehensive study and protective status.

3.2.1. Sieidi. Sieidi are most often found in the European sector of the Arctic, especially on the Kola Peninsula and in the north of Karelia. About 500 such objects were recorded on the Vottovar Upland in Karelia. A stone plateau covered with several tens of sieidi rises above the city of Murmansk (Figure 1).



Figure 1. Sieidi on the Stone Plateau in Murmansk. Photo by A Grigoriev, 2012.

3.2.2. Stone statues. Stone sculptures survived mainly in the Asian sector of the Arctic, mainly in Yakutia. Among them are the Kigilyakhs of the Kisilyakh Upland, the Alazey Plateau, the Kün Tas and Polousny ridges. In the European part of the Arctic, an accumulation of stone sculptures was recorded on the Sredny peninsula in the north of the Kola Peninsula. The variety and size of stone sculptures on the Kisilya hill in Yakutia is especially striking. The Kigilyakh buttes reach a height of 25-30 m. Among them there are many anthropomorphic faces, which is reflected in the name of the Kisilyakh Upland - "Stone People".

3.2.3. Rare forms of natural/man-made sculptures. Among the rare forms of stone structures there is a pyramid located on Svalbard, parallelepiped on the Sredniy Peninsula and a stone ball on the Vottovar hill. Of particular interest are stone anthropo- and zoomorphic sculptures and bas-reliefs, their amazing variety. So on the Sredny Peninsula (north of the Kola Peninsula) you can see sculptures resembling seals. In Murmansk, on the edge of one of the steep slopes, a turtle is installed. A walrus is sculpted on a rock near Franz Josef Land. It is sometimes amazing to see sculptures of creatures that do not live in the Arctic. For example, a stone camel on Bolshoy Lyakhovsky Island

3.2.4. The navigational purpose of natural and natural/man-made stone sculptures. Due to its shape and location, some stone structures could serve as landmarks for ease of movement. For example, at the mouth of the Lena River, the island of Pillar (Stolb), with a huge anthropomorphic profile, is clearly visible. The stone sculpture of the turtle in the Skalnoye area in Murmansk is oriented to the east - an important direction for orientation. Guests and residents of the White Sea coast of the Keret Bay are well aware of the anthropomorphic sculpture rising from the water (Figure 2).



Figure 2. Anthropomorphic morphosculpture in the Keret Bay. Photo by A A Bobkov.

3.3. Legends of stone structures as a source of information about the model of the world of ancient man

Of course, legends cannot give a scientific idea of the features of stone structures. However, undoubtedly, they are significant for travelers, "reviving" the picture of landscapes with phenomena. Traditions are often associated with historical peoples, which are not related to the creation of stone structures. Sami traditions speak of spirits that can turn into sieidi stones, which supposedly can move. The writer Mikhail Prishvin recorded legends in which some of the stone statues are sorcerers turned into stones. Such is a whale-stone, an island on the island of Imandra and stone figures in the Kola Bay area.

The most famous place in Yakutia is the site of the concentration of megalithic structures and especially the statues on the Kisilya hill, which was included in the traditions of the Yakuts. Stone buttes with anthropo and zoomorphic faces are called Kigilyakhs (Kisilyakhs) in Yakutian, which means "stone people". It is believed that once there was a warm climate and inhabited by many people. But with the deterioration of the climate, cooling, people began to go south. And then evil giants turned them into stones - just on the Kisily hill, when refugees crossed it.

It is noteworthy that similar legends connecting the formation of stone sculptures with giants are common in other parts of the planet. For example, on the Shaitan-Zhiga plateau in Uzbekistan and on the Man-Pupu-ner hill in the Komi Republic. According to English legends, the construction of the most ambitious megalith of Europe, Stonehenge, is associated with giants.

4. Protection and rational use of stone objects in the Arctic

The reason for the protection of ancient stone structures is, first of all, their value as objects of Heritage (regardless of their genesis). Moreover, the likelihood of their technogenic origin dramatically increases the need to protect such objects for their study. At the same time, the need for caring for ancient monuments is also explained by their destruction, transformation over time. After all, these monuments are an integral part of the landscapes of the Arctic, which, due to the severity of natural conditions, are ecologically very fragile and vulnerable.

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The destructive effect on the stone structure is exerted by the processes of physical and frosty weathering. An undoubted role in the transformation of stone structures is played by processes associated with the thawing and re-freezing of soils in the conditions of "permafrost". For example,

the "field" of stone pillars, typical menhirs, established on the island of Popov-Chukhchin near the Taimyr Peninsula. All of them, under the influence of permafrost processes, squinted in different directions, and some even fell.

Under the influence of natural processes, mainly frosty weathering, the kigilyakhs were destroyed on the Chetyrehstolbovoy Island in the East Siberian Sea. Travelers observed them for 200 years from the moment of their discovery in 1821 by F P Wrangel. However, during the next 50 years, by the end of 20th century only two of them left.

The destruction of stone structures also occurs under the influence of various human activities. Most visibly this can be observed in the most developed regions of the Arctic. On the islands of the White Sea, megaliths, as monuments of culture alien to the Soviet power, in the 30s of the XX century. destroyed by Soviet Security Agencies (NKVD). Local people were forced to dump them into the sea. The heavy ones were simply overturned (such as the famous stone chair on the Chernetsky Island, Kuzov archipelago). In the pre-Soviet period, many "pagan" structures, in particular on the Solovetsky Islands in the White Sea, were also destroyed. Their parts were used in the construction of monastery buildings.

During the Great Patriotic War ancient stone structures which situated on the hill where the monument to the defenders of Murmansk stands, were severely affected by enemy bomb attacks. Only individual sieidi have survived. Sometimes stone phenomena are destroyed consciously by vandals. On the heights of Vottovar at the beginning of the XXI century a megalith - a large stone ball was dropped from a pedestal and drowned in the lake.

Due to a lack of understanding of the importance of ancient stone structures, many of them, especially solitary ones, are not protected. The situation is better in the European sector of the Arctic, where some objects included into the protection zones. Among them are the islands of the Solovetsky archipelago in the White Sea (UNESCO object). The megaliths are located on the territory of such reserves as Pasvik, Lapland, Kandalaksha, and the Seydozersky nature reserve. Mount Vottovara obtained a protective status as an object of a regional level.

In the Asian sector of the Arctic, the northernmost accumulation of megaliths is situated on the islands of Chetyrehstolbovoy and Bolshoi Lyakhovsky located on the territory of the Ust-Lensky reserve. Particularly "lucky" were the megaliths of the Putorana plateau in the north of Central Siberia, part of which is a UNESCO object as well.

Ancient stone structures attract the attention of tourists and travelers. However, access to their locations in most cases is very difficult due to the lack of the necessary tourist infrastructure. An exception is the most accessible Solovetsky archipelago in the White Sea. Tourism begins to develop from Murmansk to the Sredniy Peninsula. Here, in the European sector of the Arctic, sea tourism is developing, although it is very expensive tourism, mainly for foreigners (in particular, Franz Josef Land).

In Asian Russia, tourism is actively developing in Yakutia on the Kisilya Upland. From Yakutsk there are organized tours by plane, then by motor boats and on foot, as well as by helicopter. But they are clearly not enough protected - as a natural object of local importance. Cruises on the Lena River allow you to get acquainted with another attraction - Lena Pillars.

Careful attitude to the objects of natural and cultural heritage, the search for new unique objects, will allow us to find a positive answer to the question "Are there enough interesting objects in the Arctic?" and contribute to the socio-economic development of the Arctic regions [25], [26], [27], [28], [29].

5. Conclusions

Ancient stone structures are very numerous in areas composed of solid rocks and are distributed almost throughout the Russian Arctic. They are marked by the attention of local peoples and travelers, therefore they are of great interest as objects of Heritage, regardless of their natural or natural/manmade origin.

For science, the results of studies of the genesis and condition of stone objects are equally important, because this allows us to adjust modern models of geomorphological processes, reconstruction of the development of Arctic landscapes and the history of their development. Until now, all explanations have been reduced to an unsubstantiated assertion about their natural genesis with the addition of relief factors (such as: made by a glacier, weathering processes ...). But the mechanism of the formation of their explicit man-made appearance by known exogenous geomorphological processes has not been completely clarified. Separate criteria have been developed for their technogenic genesis, but further research is required.

Regardless of the genesis, the stone monuments of the Arctic are significant as a tourist resource, still poorly studied and largely unused.

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