RAPPORTI SCIENTIFICI — *SCIENTIFIC REPORTS*
RAPPORTS SCIENTIFIQUES - *RELACION CIENTIFICOS*

ANCIENT SETTLEMENTS CONNECTED WITH ROCK ART IN KARELIA

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This article is a continuation of two precceding ones devoted to Karelian petroglyphs (BCSP XVI, 1977, pp. 67-86; XIX, 1982, pp. 27-48). The author aims to determine whether figures carved on lakeside rocks are actually related to neighbouring camp sites. A total of 60 carvings have been reported from the White Sea area, and 31 figures have been found in Lake Onega. These belong to different periods from the Mesolithic to the Iron Age.

In Karelia, camp sites are located in close proximity to petroglyphs, which led A.Ya. Bryusov, V.I. Ravdonikas and others to think that they were contemporary. However, the situation proved to be more intricate because such a direct relationship does not always exist and, if it does, it is fairly difficult to establish. Fortunately, favourable circumstances in Karelia may help to determine which camp sites and engravings are contemporary. Like the whole of Fennoscandia, Karelia is part of the Baltic Shield; therefore, it was and still is affected by the Earth's crust vibrations. As a result, the shoreline of big bodies of water such as the White Sea and Lake Onega are constantly 'moving'. This activity is complicated by other factors, and it is, therefore, fairly difficult to estimate its time course and to calculate its effects on individual shoreline strips of particular interest to us. Thorough investigations involving all natural sciences are needed and are currently being conducted in Karelia.

Dating of archaeological monuments using altitude information (i.e. ancient shore levels as reference points) has long been undertaken in northern Europe, particularly in Finland, Sweden and Norway. Attempts have been made to use accumulated experience in order to determine the age of rock carvings (Alto in Norway, Nemforsen in Sweden, Astuvansalmi in Finland) and to relate them to adjacent settlements. No unified procedure acceptable for general use has so far been elaborated, nor is one likely to be established in the near future. However, many regional studies of individual monuments, based on detailed geological and palaeogeographical data on various bodies of water, have been conducted and give encouraging results.

All the monuments in question - rock pictures and camp sites - are strictly confined to particular shore levels of ancient bodies of water formed in the postglacial epoch. Settlements occupy a series of up to five sequentially descending shore terraces, whereas rock carvings are confined to a much narrower range of one or two terraces. For example, camp sites found in the lower reaches of the River Vyg in the White Sea area are recorded at an altitude of 25 to 8 m above sea level, while the figures for petroglyphs

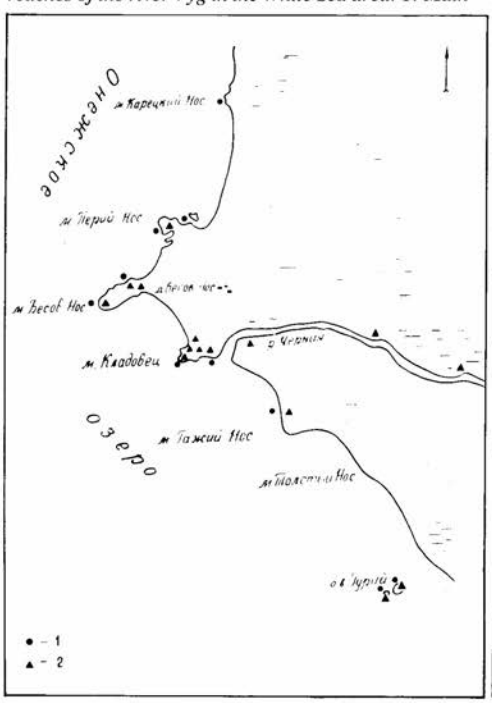
Fig. 30
Rock carvings from Lake Onega showing hunting and fishing scenes.

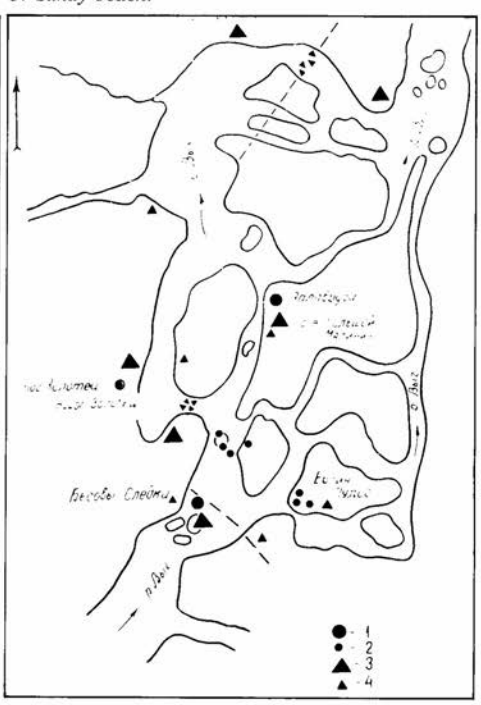
Fig. 31
Location of camp sites and petroglyphs on the Eastern shores of Lake Onega. 1. Petroglyphs. 2. Camp sites.

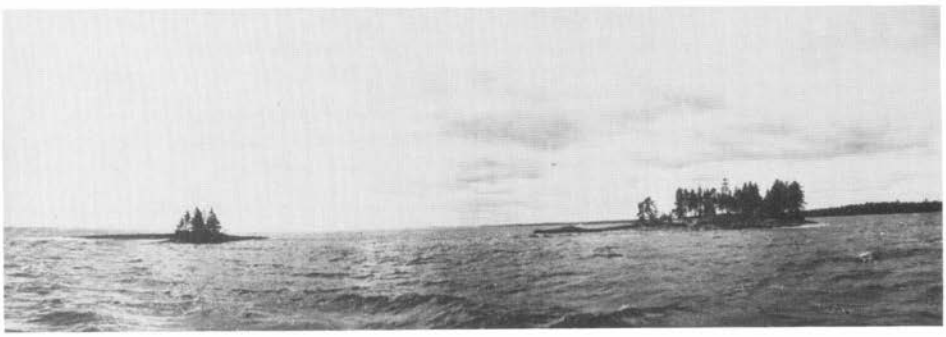
Fig. 32
Location of camp sites and petroglyphs on the lower reaches of the river Vyg in the White Sea area. 1. Main clusters of petroglyphs. 2. Small groups of petroglyphs. 3. Clusters of camp sites. 4. Individual camp sites.

Fig. 33
Bolshoi and Maly Gury Islands.

Fig. 34
Cape Kladovets - Location of camp sites and petroglyphs. 1. Individual petroglyphs. 2. Main clusters of petroglyphs. 3. Excavated areas. 4. Dwelling cavities. 5. Sandy beach.

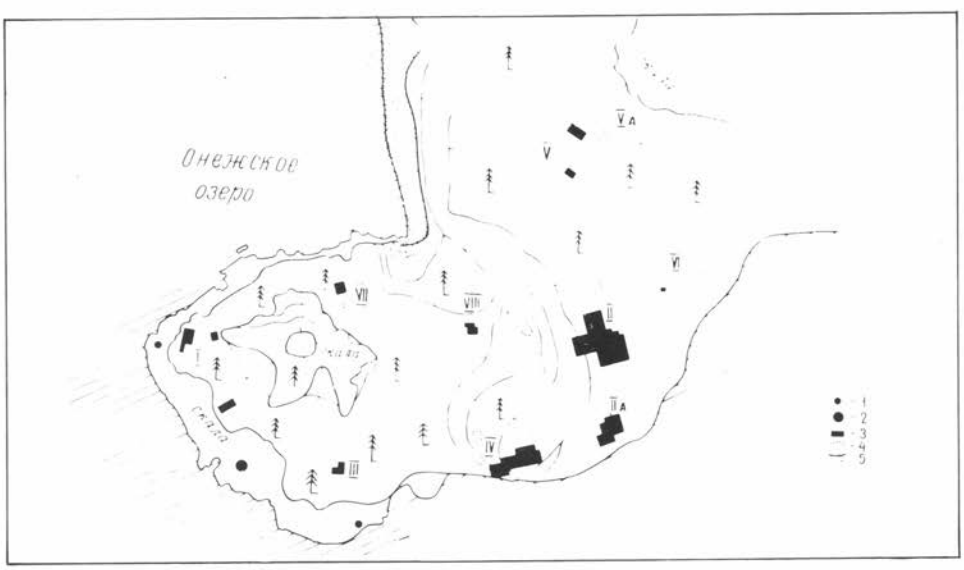






are only 22 to 14 m. On the eastern shore of Lake Onega, the altitude of camp sites is 6 to 1 m and that of rock pictures 2.5 to 0.3 m above the lake level. This is due to the fact that camp sites existed in this area over the entire primaeval epoch, and petroglyphs were created during a relatively short period. It looks as if the problem would be solved if settlements corresponding in their altitude data to the absolute altitude of petroglyphs were singled out of the total number. This, however, is not enough; one must also consider alterations in the levels of bodies of water in time and space and their relation to a general arch uplift, transgressive - regressive phenomena and other factors. Ancient settlements were usually situated close to the water edge, and a change in the shoreline immediately resulted in their relocation. In the lower reaches of the River Vyg and on the shore of Lake Onega they were located, as a rule, at an altitude of no more than 1.5-2.0 m above the water or even lower. The settlements, seasonal camps and permanent winter villages were always confined to the water edge, sometimes occupying low flat capes and islands or entirely open shore strips. Such locations would seem extremely inconvenient because strong seasonal floods, fierce winds and storms raised the water level and inevitably resulted in flooding.

Both economic and psychological reasons were involved in this choice. Fishing was essential to ancient Man, so he stayed close to water. He also



felt safer on shore than in thick forest. Such localities remained attractive for thousands of years as is evidenced by settlements with different datings, clustering in remote localities over an area of 1-1.5 square km., particularly in the vicinity of petroglyphs. Settlements came into being long before rock pictures and existed much longer, suggesting that petroglyphs appeared in the inhabited territory, assuming that natural prerequisites, such as exposed lakeside rocks, were also met. An important point is that they are observed in lakeside localities where the economic life was especially active, implying that they are related to the living and working conditions of their time. These sites lie in the main waterways, open and readily accessible.

Karelian rock carvings are especially clearly linked to the water edge of ancient bodies of water. It can even be claimed that they were always carved in the surf zone between the and 1.5-2.5 water-level m. above it. This lower level of lakeside granite slope was constantly washed and the surface was therefore clean and most suitable for carving. There are almost no cases of early carvings being overlapped by later ones, althogh the main clusters (Besovy Sledki, Besov Nos, Peri III and IV, etc.) are composed of several sequential layers. This implies that the oldest petroglyphs continued to function together with new ones in a new context, thus producing creative work without major gaps and within a similar ethnic and cultural environment.

Settlements were also frequently confined to the water edge. It is not always possible, furthermore, to determine accurately the height of their lower boundary above the surface of an ancient water-line. When using the altitude marks of settlements one must account for the general configuration and steepness of the shore. They are easier to use if the shore is flat, with clear-cut shore terraces and scarps, as it is near the village of Zolotets in the White Sea area. In such cases rock carvings followed the retreat of the shoreline, and this dominating process is especially distinct. However, 1 km. upstream, in the islands of the River Vyg the altitude marks of the settlements are not so important as regards the Besovy Sledki petroglyphs. Here water always remained nearby, and only catastrophic drying or, on the contrary, considerable inundation of the river bed could make the islets inaccessible.

Many camp sites in Lake Onega, especially those in capes, are separated from the water edge by a gentle bedrock (granite gneiss) slope reaching 30 m in width. If such a slope is steep and high, then camp sites proved to be above normal marks. This must be taken into account when using altitude evidence to date camp sites and to compare them with petroglyphs.

All the settlements known from the White Sea area are located near the mouth of the River Vyg, 9-6 km. away from the White Sea. Unlike petroglyphs, they are found on both the islands and the banks of the river bed where the ancient shore levels are far more distinct. They form five separate groups in a stairway configuration. One characteristic of this portion of the river is the abundance of islands with channels between them, but the main feature is a considerable drop of the water level up to 15 m. The arrangement of the habitations reflects a general process of fluvial downcutting at the mouth and the formation of a valley at the junction with the retreating sea bay. The further downstream is the cluster of camp sites, the more recent it is. However, the predominant sequential falling of the River Vyg level and,

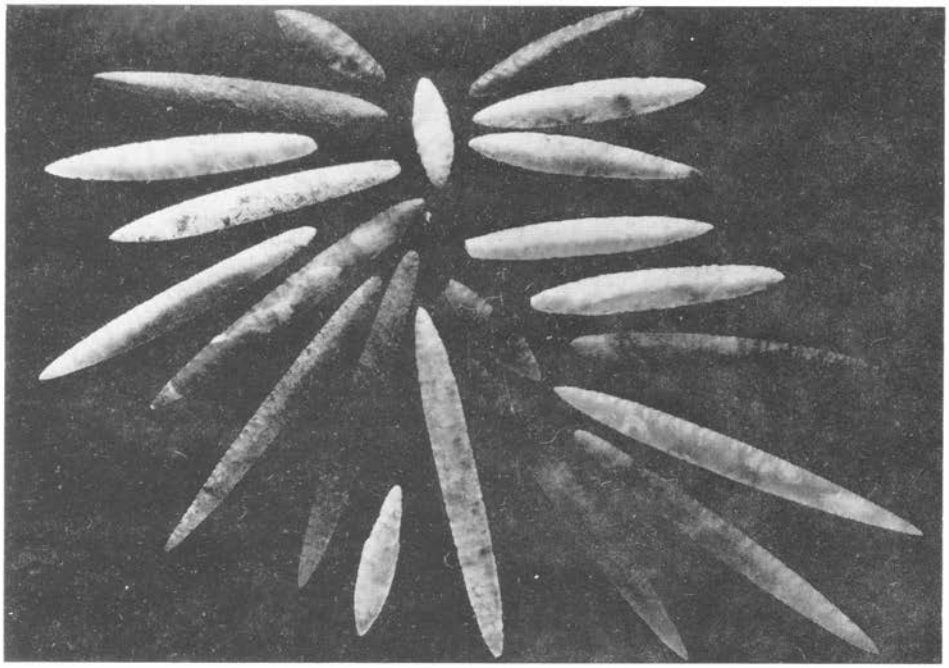


Fig. 35
Amber and arrow heads from the stone structure.

consequently, that of the White Sea was occasionally interrupted by the uplift of water. As a result the people removed their camps to higher, previously abandoned riverside sites. This is how 'multi-layered' settlements emerged, containing implements dating from different times and scattered in a 20-50 cm-thick cultivated layer of a single colour and structure. It is sometimes very difficult to determine the age of a find because many categories do not have strict dating features. Such 'mixed' camp sites prevail in the White Sea area, further complicating the difficult task of interpreting the material. Naturally, these reversible processes also had a bearing on petroglyphs.

Let us firstly discuss the settlements found near the petroglyphs of Besovy Sledki and Yerpin Pudas at the uppermost sites. They have been discovered on both banks but usually 20-25 m above sea level. The highest and most ancient ones (Lisva Gora, Yerpin Pudas, Porog Shoiruksha) contain mixed complexes, including Early Neolithic, in particular Sperrings pottery. The petroglyphs of Besovy Sledki began to appear later when the water level fell and the islets in the middle of the River Vyg bed, near the Shoiruksha cascade, were exposed.

It is generally accepted that the lower reaches of the River Vyg acquired their present-day appearance in ancient times. However our studies and those conducted by palaeogeographer E.I. Devyatova have revealed that the formation of the near-mouth portion of the river bed had ended only by the turn of A.D. The development of the islets became possible around 2.9-2.8 and especially 2.7-2.4 thousand years B.C when the high-water river bed existed. Later, with the onset of the xerothermic period, the river bed became shallow and by 2.1-2.0 thousand years B.C. had almost dried up. The

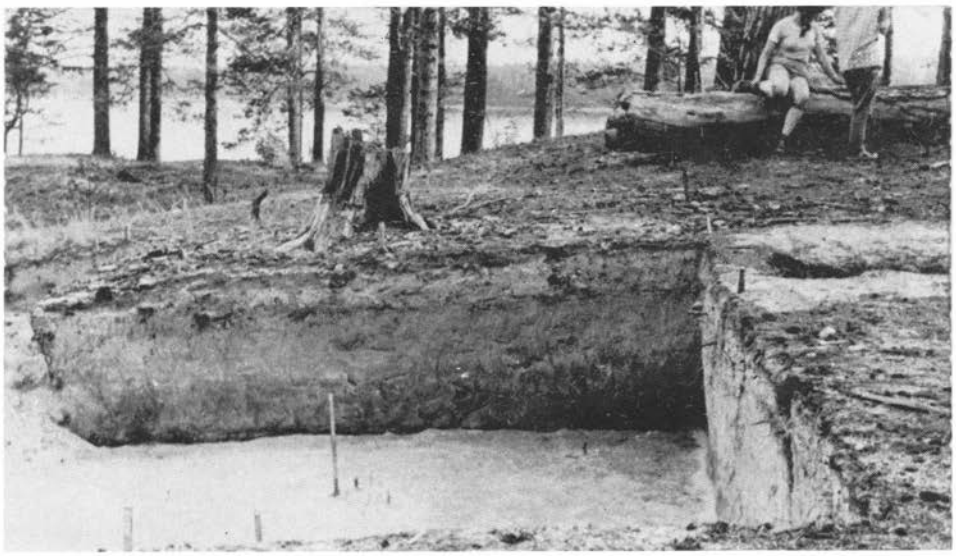


Fig. 36
Excavation on the Bolshoi Gury Island.

islands were no longer suitable for habitation. In time however, around 1.8-1.7 thousands years B.C. when the River Vyg became high-water again, people resumed visiting them. Thus, small, low, flat islets were repeatedly used by the people even after the riverside camp sites were removed towards the mouth. But which of the deposited complexes (Neolithic, Eneolithic, Bronze, Early Iron) are related to petroglyphs?

A.Ya. Bryusov was the first to attempt to elucidate the relation of the Besovy Sledki petroglyphs to the adjacent camp sites in the late 1920's. He devoted special attention to the 'sanctuary', a sand-filled cavity in the granite adjacent to the rock bearing the Besovy petroglyphs. A reddish-coloured cultivated sandy layer, 30 to 85 cm in thickness and rich in findings, was disclosed immediately under the sod. Beneath this, was found sterile grey-coloured aggradated sand, in turn underlain to a depth of 100-120 cm from the surface by another cultural layer of a different dark colour. The central part of the exposed cavity was almost rectangular (8 m by 6-7m). Three natural granite steps lead from the petroglyphs to the cavity defined as the 'sanctuary' by A. Ya. Bryusov. Collections from the upper and lower layers did not differ greatly, and the time gap between them is small - a few hundred years according to A.Ya. Bryusov. He thought the lower layer to be roughly as old as the late IIIrd millenium B.C. For what purpose was the cavity used? In V.I. Ravdonikas' opinion, it was unsuitable as a common dwelling. However, the material found during excavation differs negligibly from the implements characteristic of common Neolithic settlements: its nature seems, as a whole, mundane, not cultual. The sanctuary is likely to be related to the early stratum of Besovy Sledki.

On the opposite side, in the river bed itself, in front of the very steep edge of the rock with petroglyphs, a small attenuation was revealed along the steep rock. It is 4.0-4.5 m long and 1.4 m deep. Intact and fragmentary

Fig. 37
View of the site Chernaya Rechka V, the neighbouring group of petroglyphs and Cape Kladovets.

implements, rock chips and fragments, pottery fragments, numerous pieces of wood were found in the boulder layer (0.35-0.40 m). We may note among rock implements a slate axe with a worn blade, a fragment of a chisel, fragments of grinding plates and bars, two fishing plummets, five spear and arrow heads, flinty scrapers and knife-like plates. The pottery, chiefly Early Neolithic, pit, was brought here by immigrants from the Volga-Oka interfluve. Its other varieties are also encountered, namely less delicate pit-comb Late Neolithic pottery, comb porous pottery admixed with organic matter burnt out upon heating, and asbestos pottery of the Bronze Age. This implies that these islets were visited during the Early Metal Age. The implements were either left on the rock and later washed away or thrown into water on purpose. Curiously enough, these are also chiefly everyday domestic implements. This indicates that it was here, in the vicinity of the petroglyphs, that people made and repaired their instruments, built vessels, went fishing etc. It looks as if the petroglyph site was not perceived as something to fear, but was actively employed for economic purposes.

The artefacts were found under a thick layer of stones and boulders, created by repeated changes in sedimentation conditions, variation of the river stream, ice drift, and moraine erosion. Wood, in particular a birch-tree trunk, served for absolute 14 C-dating: 5420 ± 30; 5180 ± 60; 5000 ± 60; 4495 ± 60. These dates are not quite consistent with available archaeological material and can only be related to the earliest complex of findings (pit pottery). The first rock pictures of Besovy Sledki are likely to have been carved at the same time, i.e. in the early IIIrd millenium B.C.

The area near the next cascade, Zolotets, was also extensively occupied. According to A.Ya. Bryusov, it was an insurmountable barrier for boats. Small groups of hunters had to drag these along the roundabout way and stopped for a while at the end of the route. Similar camp sites such as

Fig. 38
Small sculpture from site Besov Nos VI.

Zolotets I, XXII, contain implements dating back from the Neolithic to the Middle Ages.

Nearby, on the steep bank of the River Vyg, E.I. Devyatova revealed a section which became a reference in evaluating the development of the river bed in the sub-Boreal time, i.e. 2800/2700 - 500 years B.C. In its upper part, silty deposits are interlayered with peat. Here, peat accumulation could only have taken place at the stage when the river was half-dead and quite shallow. 14C-dated samples taken from the section have shown that the approach of a dry, xerothermic period began to be felt 2.4-2.2 thousand years B.C. and was in full strength 2.1-2.0 thousand years B.C. when the hitherto high-water river bed had almost dried up. A small insular group of petroglyphs carved, most unusually, almost at the bottom level of the river bed provided archaeological evidence supporting the 14C dating.

The third group of camp sites is located about 0.5 km. downstream, on the same left-hand riverside slope of the River Vyg. These clearly stabilised the downcutting of the River Vyg and the general sequential decline of the shoreline. Of much interest are the camp sites situated behind the settlement of Zolotets on the descending banks almost in a line, 0.8 km. long and perpendicular to the present-day river bed: Zolotets XXI, XX, VI, X, VIII. Their altitudes vary from 22 to 12.5 m above sea level. They form a peculiar chronological staircase lying just between the main clusters of petroglyphs and who are thus significant in relation to the settlements. Another insular settlement, Zalavruga IV (where the river branches into two beds separated by islands), is observed on the opposite (right-hand) bank. They are all 'multi-layered' and contain complexes deposited at different times, chiefly

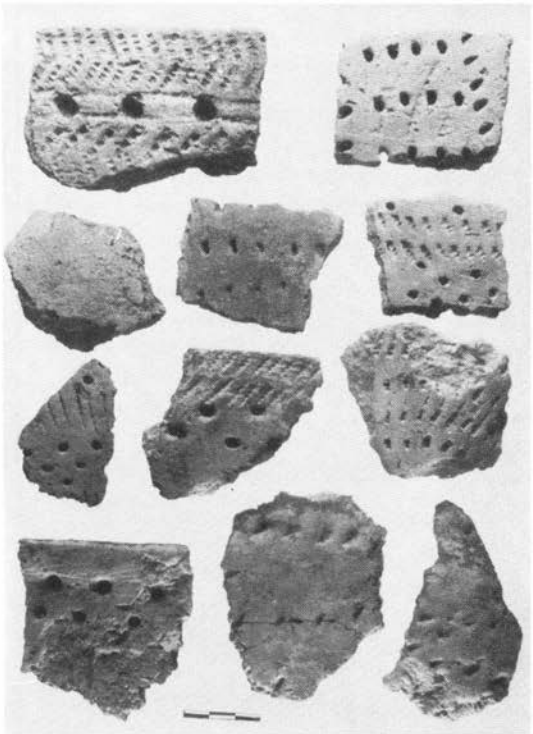


Fig. 39
Camp site Zalavruga. Artifacts and pottery.

in the sub-Boreal period, which was fairly unstable climatically, with relatively cool and humid periods alternating with warmer and drier ones. Unstable climate and the varying configuration of the river bed affected the development of both camp sites and petroglyphs confined to the open sea bay. Clusters of carvings that remained on the almost dried-up sites of the river bed seem to have lost their attractiveness and ceased to function then. Instead, new pictures were carved downstream, closer to the main body of water. However, these were submerged after a new pronounced rise in the sea level again approached the earlier clusters. The latter were once more revived, interpreted in other ways or completed with new carvings nearby. The settlements of group IV are also of interest, particularly Zalavruga I, overlapping the bulk of the Novaya Zalavruga petroglyphs. Situated on a plain, slightly sloping sandy site 15.0-17. 1 m above sea level, it measures about 90 m by 60 m and is bordered on three sides by exposed bedrock consisting of granite gneiss overlain higher, at the flat top, by a layer of sandy deposits. In 1947, A.Ya. Bryusov started the excavation of the camp site. In the winter of 1962, it was heavily damaged by the exploitation of a sand quarry. Protecting measures taken in 1963 resulted in the discovery of petroglyphs overlain by 0.8-1.0-metre of sand deposits.

About 1000 sq.m. have been stripped at the camp site. The stratigraphy proved to be simple: thin, loose sod was underlain by fine-grained white or pinkish podzolized sand with a rough rim. This, in turn, was underlain by a cultural layer proper consisting of bright-crimson-coloured sand (30-50 cm), then light-yellow sand lying on the rock. At the periphery, the cultural layer became, as usual, thinner and paler, fading out entirely. At the nor-

thern, north-western and north-eastern extremities, at an altitude of 15 m above sea level, fine-grain loamy sand of a later alluvial plain appeared in 20-60 cm-thick deposits, quite different in colour and composition.

Three fairly big masonries, erected for unknown purposes, were disclosed in the cultural layer. One masonry 1.2 x 3.6 m in size is made up of 39 boulders and stones. Another (0.8 x 0.8 m) was found only 2 m north-westwards. A third (1.5 x 2.0 m)composed of 60 stones was discovered near the northern extremity. No traces of dwellings have been found.

Charcoal samples taken from two hearths for 14C absolute age determination are older than the camp site of Zalavruga I. One hearth was used 4775 + 70 years ago in the south-western part of the camp site at an altitude of 16.5 m above sea level; it is at the base of the cultural layer, almost on the rock. The site is delineated by coarse-grained sediments admixed with gravel. They seem to fix the ancient shoreline at between 15 and 16 m. The second hearth, thought to have been used 4010 ± 70 years ago, was found away from the shore, near the steep edge of the scarp with petroglyphs of group VI, 60 cm from today's surface, almost on the rock. Its diameter is 0.7-0.8 m, and the ash and charcoal layer is as thick as 20 cm. It seems to be consistent with the sub-Boreal maximum for spruce. Inequigranular sands admixed with gravel and pebble surrounding Zalavruga indicate that the shoreline was at a level of no more than 14.4-15.5 m for a long time. The hearth mentioned above is quite nearby. The petroglyphs of Novaya Zalavruga were probably carved during that period.

The rock implements comprise 1036 items and almost 11 thousand fragments of flint, slate and quartz. Articles made of flint brought from other localities are predominant (503). Flint was used with care to produce chiefly small articles: scrapers, knife-like plates, chisels and arrow-heads. Numerous implements are present as fragments of incidental shape (88). Scrapers are prevalent totalling 240, with different shapes and sizes including minute ones (diameter 1.5 to 2.3 cm; length of the scraper edge up to 1.5 cm). Sixty-two arrow-heads have been found, of which only 33 are intact or represented by fragments large enough to give an indication of their original shape. There are two fragments of schist points belonging to the so-called 'narrow type without thorns' and also ten spearheads and darts. Among household utensils are slate knives (16) and knife-like plates 2.6 to 6.7 cm in length (37). Quartz instruments and articles number 336, 49 nuclei, 54 'hammers', 70 scrapers, 3 drawing-knives, 31 knife-like plates, 65 chisels, etc.

The inhabitants of Zalavruga I used polished cutting instruments and other slate articles (total 59) of which only 16 are intact, including about ten axes. Three implements include drilled holes. Fragments of a slate dagger, of rings with holes and a strange cone-shaped object are also noteworthy. Abrasives are fairly abundant: 80 grinding plates, 27 oilstones (made of sandstone, quartzite, granite), 15 saws usually of thin quartzite plates (including fragments) which were used for carving on slate surfaces. Several amber articles have also been found, among them a pendant of irregular oval shape, two small unattractive fragments and part of a cylindrical bead with a hole.

Pottery is, as usual, predominant in the finds, totalling over 1500 fragments. It belongs to various types: comb, porous and asbestos, late pit-comb being

less common. Fragments of 'hybrid' vessels suggest the simultaneous existence of the main pottery varieties. It cannot be ruled out, however, that two chronologically close complexes are represented here, namely the final Eneolithic and the Early Bronze Age. According to E.I. Devyatova, the well preserved cultural layer of the Zalavruga I settlement overlying the petroglyphs was formed no earlier than 1500-1300 B.C. on top of the alluvial layers developed during the White Sea transgression that took place 1900-1600 B.C. If earlier material (for example, that contemporary with the hearths or carvings) did exist, must have disappeared completely with subsequent washing and redepositing.

The other camp site, Zalavruga II, is located 200 m to the south-east and is 3 m higher, at 17.5 m above sea level, 40 m off the bank of the rivulet. It occupies the top of a dome-like hill composed of crystalline bedrock overlain by alluvial sandy deposits as thick as 0.4-0.8 m. A prospecting excavation (52 sq.m.) was started here as early as 1964. In 1970, the monument was severely damaged during sand excavation and, therefore, required urgent examination. An unusual piece of masonry was found. It stretches almost north-south for 9 meters; withouth the southern extremity which is slightly isolated and was probably added later, its length is 5.7 m. It is 2.5 m wide at the base, 1.8 m in the middle and 1.0 m before the southern proximity. In this tapering portion, stones extend for 2.3 m to form a solid mass. 'Windows' looking like very small chambers were found. In the process of clearing inside the masonry a cultural layer with pinkish and bright-crimson spots was traced. Along the eastern edge of the masonry a boundary seen as a straight line of crimson colour was clearly observed for 4 m and along the western edge for 3 m. It stands out quite distincly against the light coloured mainland sandy background and corresponds exactly to the edge of the masonry.

The masonry was dismantled and 429 implements and articles were found, including 68 amber articles - the biggest amber collection in Karelia. Thirty-

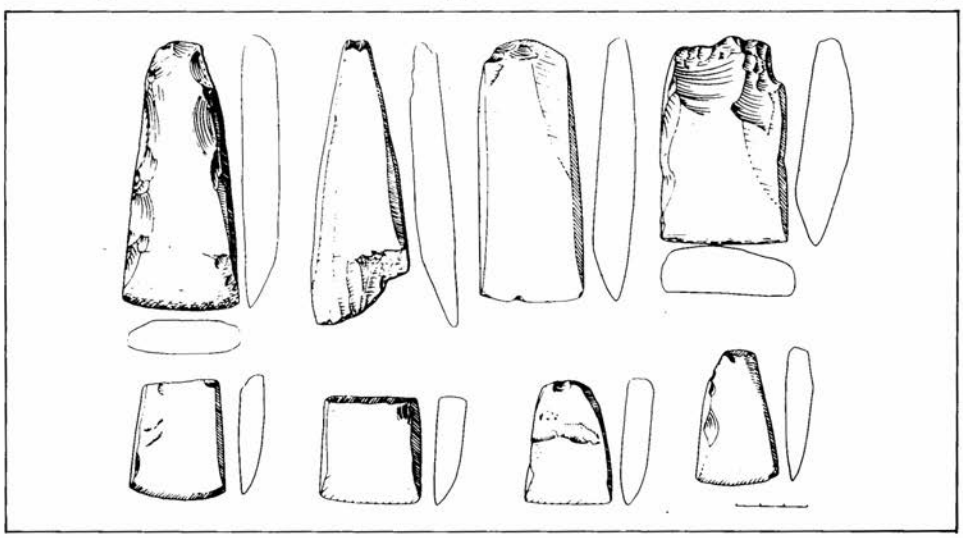


Fig. 40
Kladovets II[a] site. Schist axes of the petroglyph period.

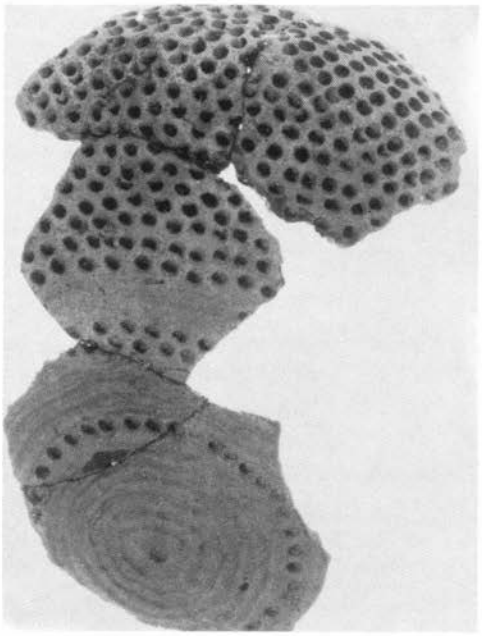


Fig. 41
Kladovets II[a] site. Pottery of the petroglyph period.

two are pendants (3 fragments), 41 buttons with a Y-shaped hole (including 5 fragments) and one an unknown article. Analysis has shown the amber to be of Baltic origin.

Tools and articles made of quartz are predominant among rock implements, totaling 249. These are chiefly fragments and chips of arbitrary shape bearing traces of processing (91), 41 knife-like plates, 21 scrapers, 21 chisels, etc. There are 58 schist implements: an adze, a chisel, 14 fragments of cutting tools, 33 grinding plates and whetstones, a piece of plummet, 2 saws, a slate spearhead, etc. Among the 125 flinty tools there are 15 scrapers, 22 knives and knife-like plates, 34 chips with traces of processing and 2 nuclei. Most attractive are the arrow-heads (40 in all, including fragments), in particular a large series of narrow elongated arrow-heads retouched in a spurt-like manner. Two hundred and three pottery fragments were found of three varieties: pit-comb (including rhomb-pit), asbestos and comb-porous.

The variety of material is probably due to the fact that the masonry, a burial structure composed of natural stones and boulders, proved to have been erected at the site earlier occupied by a more ancient camp with a poor cultural layer. One cannot rule out the possibility that some of the common findings were transferred to the masonry from that layer. However, the most valuable complex, amber decorations and perfect arrow-heads, is related only to the masonry. Conditions most favourable for inhabiting this locality developed 1.6-1.4 thousand years ago. It is then that the camp site itself is most likely to have been established. The rich grave containing amber decorations belongs to the Early Bronze Age.

The last group (V) is composed of the Gorely Most camp sites I-VIII that existed after petroglyphs during the Late Bronze and the Early Iron Ages. They are located on the left-hand bank, slightly downstream, in the flood land terrace zone with marks of 7-13 m above sea level. This had probably

been formed as late as the Atlantic time, when the river bed started to acquire its present-day appearance. Flinty implements prevail at the camp sites. New types of clay work are observed: late asbestos, reticulate, hatched, etc. This is related to the appearance of newcomers who travelled from the south and from the east. Stone cutting instruments were replaced by metal (iron) ones.

Active study of the camp sites in the vicinity of the Onega petroglyphs was started by B.F. Zemlyakov and A.Ya. Bryusov in the 1930's and is still in progress. Of seven known localities, they only excavated three on a small scale. To date, 31 settlements are known in the immediate vicinity of the petroglyphs. This number may be doubled or even trebled if we take into consideration that many of them were inhabited repeatedly. Here there are short-term hunters' camps and long-term permanent settlements with semi-mud huts. They are all concentrated, forming small clusters in which settlements with mixed complexes dating back from different times are predominant. In such clusters, or nests, altitude variation is not great (5.5 to 1.5 m above lake level). This makes it difficult to reveal settlements (complexes) contemporaneous with the carvings. Yet such variation occurs more frequently than that of petroglyphs, implying that altitude data may be used here, although not so accurately. Mesolithic settlements (layers, to be more exact) are abundant here, in contrast to the lower reaches of the River Vyg. Their formation prior to petroglyphs indicates that the Besov Nos area was inhabited no later than VII millenium B.C.

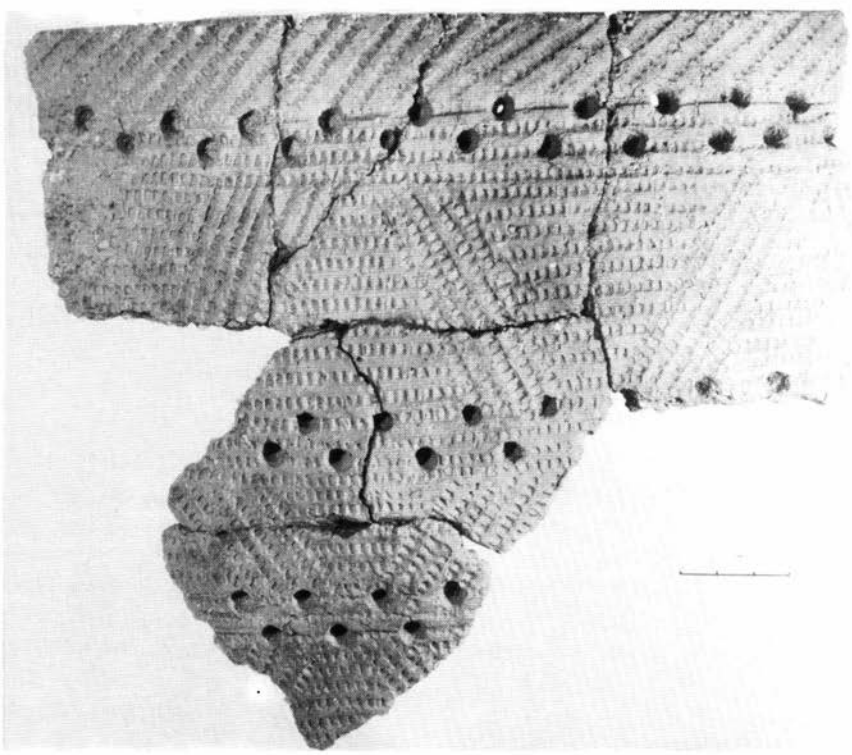


Fig. 42
Kladovets IV - Eneolithic pottery.

It is best to begin the discussion with the northern settlements. Here, in the mouth of the River Vodla, individual findings were repeatedly encountered in the past. But it was not until 1979 that, on the right bank, four camp sites, Ust-Vodla I-IV (Neolithic - Early Iron Age), were discovered. They extend from the rock with petroglyphs for 200 m with short intervals. No further traces have been found along the lake shore until Peri Nos, i.e. for over 15 km.

Camp sites are mainly concentrated in Besov Nos, Kladovets and the lower reaches of the River Chernaya. Their number again decreases sharply southwards, and no camps are known beyond the Cape of Gazhy Nos and the Gury Islands.

Traces of a camp site were observed at the extremity of Cape Peri as early as the 1930's. However, it was not until 1974 that it was rediscovered, between the bases of the capes with petroglyphs Peri II, III and IV, at an altitude of 1.9-3.0 m. It occupies about 900 sq.m. During excavation a cultural layer up to 40 cm thick was revealed. It contained an arrow-head, two fragments of whetstones, a schist pendant and 17 pieces of pottery of Neolithic appearance, with pit and comb ornamentation. The nature of the campsite, which seems to date from roughly the same time as the Peri Nos petroglyphs, remains to be elucidated. The extremity of the low cape jutting out offshore is, however, unsuitable for permanent habitation.

Some findings were revealed on the shore of the bay between Peri and Besov Nos and on the beach of another bay between Besov Nos and Kladovets. This implies that in ancient times camps were set up not only in capes but also on these shores. However, it is in these locations that the configuration of the original shore suffered most pronounced alteration. Their gentle arcs became deeper and deeper entrenched, washing away the shore and destroying traces of human residence.

Camp sites are much better preserved in capes, including Besov Nos, where they were protected from being washed out by a bedrock belt extending along the water edge. Immediately at its base, at an altitude of 2.5 to 3.0 m, 230 m to the north-east of the northern cape petroglyphs, were found some remains of the Neolithic camp site called Besov Nos V containing pit-comb pottery. It had been almost completely destroyed by washing. Around the XIII-XIVth centuries, it was overlapped by a settlement which was also considerably undermined.

Besov Nos VI is a well-preserved two-layered settlement. It lies nearby, just at the base of Besov Nos, still closer to the northern group of petroglyphs, on a high (5-6 m) shore with a series of small, flattened ramparts. It occupies a fairly flat site (45 x 50 m) between the steep slope of the shore, a ravine and the basement of the rocky moraine elevation. It is confined not to the present-day shore from which it is separated by a few meters, but to the ancient bay entrenched at the base of Besov Nos that probably separated it from the original shore. Thirteen rounded shelter cavities up to 40-50 cm in depth are clearly traceable on the present-day surface. The dwellings became putrid long ago, their edges are swollen up but the pits are still visible. The excavation of the camp site was conducted by G.A. Pankrushev in 1969, 1980 and 1981, 292 square meters being stripped.

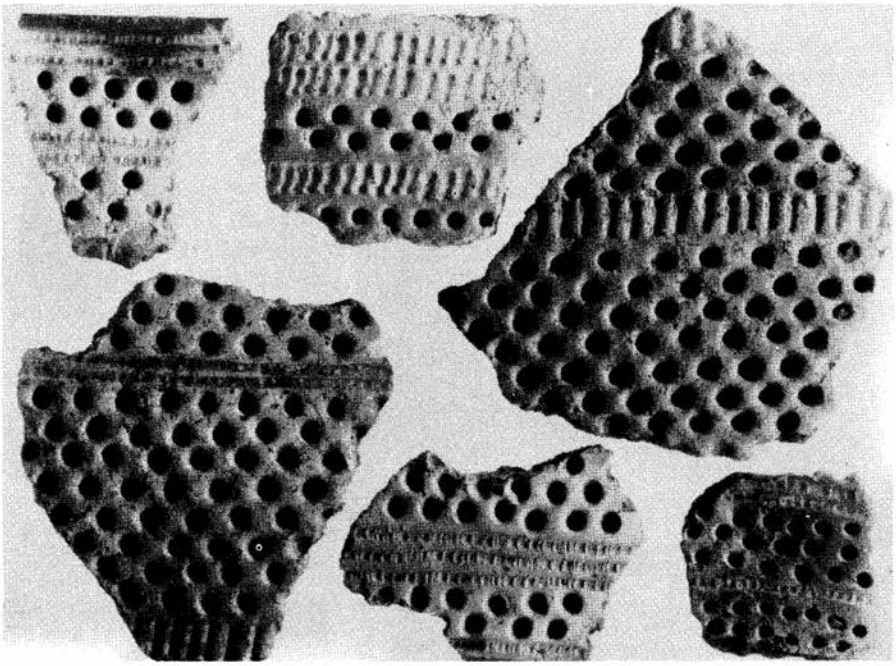


Fig. 43
Pottery from the excavated bed of river Vyg.

The dirty-yellow, in places almost orange, sandy layer (15 to 80 cm thick) proved to be underlain by a partially washed-out bottom cultural layer of humus-infiltrated sand (15 to 140 cm thick). Between them is a mixed layer of variegated colour (5-6 to 140 cm). It indicates that this locality was inhabited twice.

The bottom Mesolithic stratum (8300 ± 80; 7560 ± 70) which was formed long before the petroglyphs, around the late VII-VI millenia B.C., contained axes, chisels, fragments and semi-finished tools, a plummet for a fishing net, scrapers, knife-like plates, nuclei, pieces and chips of rock, mostly schist, and pieces of ochre.

The top Eneolithic layer which developed soon after the transgression, i.e. about 1700-1500 years B.C., proved to be much richer. It contained many schist cutting tools, fragments of semi-finished products and abrasives, a slate pendant, flinty scrapers and knife-like plates, nuclei and nucleus-like pieces of flint but very little pottery - only a few pieces bearing pit and comb ornamentation.

A piece of tiny anthropomorphous sculpture (upper part) made of tubular bone 2.3 x 0.8 x 0.45 cm in size is noteworthy. The face has a long straight nose, prominent cheek-bones and eyebrows above the deeply sunken eye-sockets. The face tapers markedly both upwards and downwards to a wedge-like beard trailing down the chest. Arms are distinguishable on the torso. It is not quite clear what period (or time span) this unique sculpture dates from.

Four semi-mud huts were stripped in the course of excavation, two being Mesolithic and two Eneolothic. The Mesolithic dwellings are rounded and remind one of hide tents. One is 4.8 x 3.7 m in size and 0.6 to 1.2 m in

depth. The Eneolithic dwellings are triangular and were probably built using cut trees (framework method). One is 32-33 sq.m. in area, the other is somewhat smaller, and both are fairly deep.

During the maximum Eneolithic transgression, the Mesolithic dwelling long since abandoned, was washed out. However a Mesolithic layer is well preserved in the dwelling cavities. The lowering of the water level began at a time when the water was still relatively high - about 2 m higher than the present-day level. It was then that people inhabited this locality again, and an Eneolithic layer was formed. Thus, two cultural layers belonging to different times form a chronological 'fork' encompassing petroglyphs. These were in existence when the first Mesolithic settlement, dating back from VII-VI millenium B.C., had already been abandoned and forgotten and the second (Eneolithic) settlement, belonging to the second quarter of II millennium B.C. did not yet exist. With a lowering of the water level the configuration of the shore was changing and eventually the bay was eroded by water. The locality became unsuitable for habitation and was therefore abandoned.

According to A.Ya. Bryusov, the next camp site was temporary. People could not live there permanently because of strong winds and difficulties in mooring their boats. It is located immediately at the extremity of Besov Nos, behind a rock with petroglyphs, in a granite cavity, where the investigator found schist implements, stones with saw marks, pieces of saws, flinty leaflike arrow-heads, scrapers, nuclei and homogeneous fragments of pit-comb pottery of 'rigorous geometric style'. The soil of nearly the whole area was later dug over repeatedly for economic purposes. We found it to contain a few tools made of schist, flint and quartz and fragments of Neolithic pit-comb pottery of the IIIrd millenium B.C. It is probably here that people visiting the petroglyphs of the central group of Besov Nos stopped for a short rest. It is, indeed, hardly suitable for permanent dwelling.

The largest and most compact cluster of settlements is concentrated at Cape Kladovets. They occupy practically the entire territory from the base to the extremity, including some offshore sites.

The next settlement, Kladovets II, seems to belong to the Eneolithic. It occupies the southern and south-western part of the cape, immediately above the lakeside slope with petroglyphs and covers up to 20 m in width. Its area is about 2500 sq.m. and the altitude above Lake Onega is 4.0-5.9 m. It also covers part of the slightly concave high and steep southern shore of Kaldovets. In the prospected areas totalling 44 sq.m. were found some ten flinty knife-like blades, scrapers, a few fragments of schist, flint and occasionally quartz. Pottery, almost wholly of pit-comb type, is represented by only 18 fragments. Like in Kladovets I, no traces of dwelling hollows have been found here. The nature of this large but still poorly excavated settlement is not yet quite clear.

Eastwards, almost immediately behind the ridge stretching as far as the high (6 m) and steep crumbling shore, is located one more camp site called Kladovets IV. Four dwelling cavities are traceable in its territory occupying 900 sq.m. In 1969, 1978, 1980 and 1981, 468 sq.m. were stripped in the course of excavations conducted by G.A. Pankrushev. It became clear that,

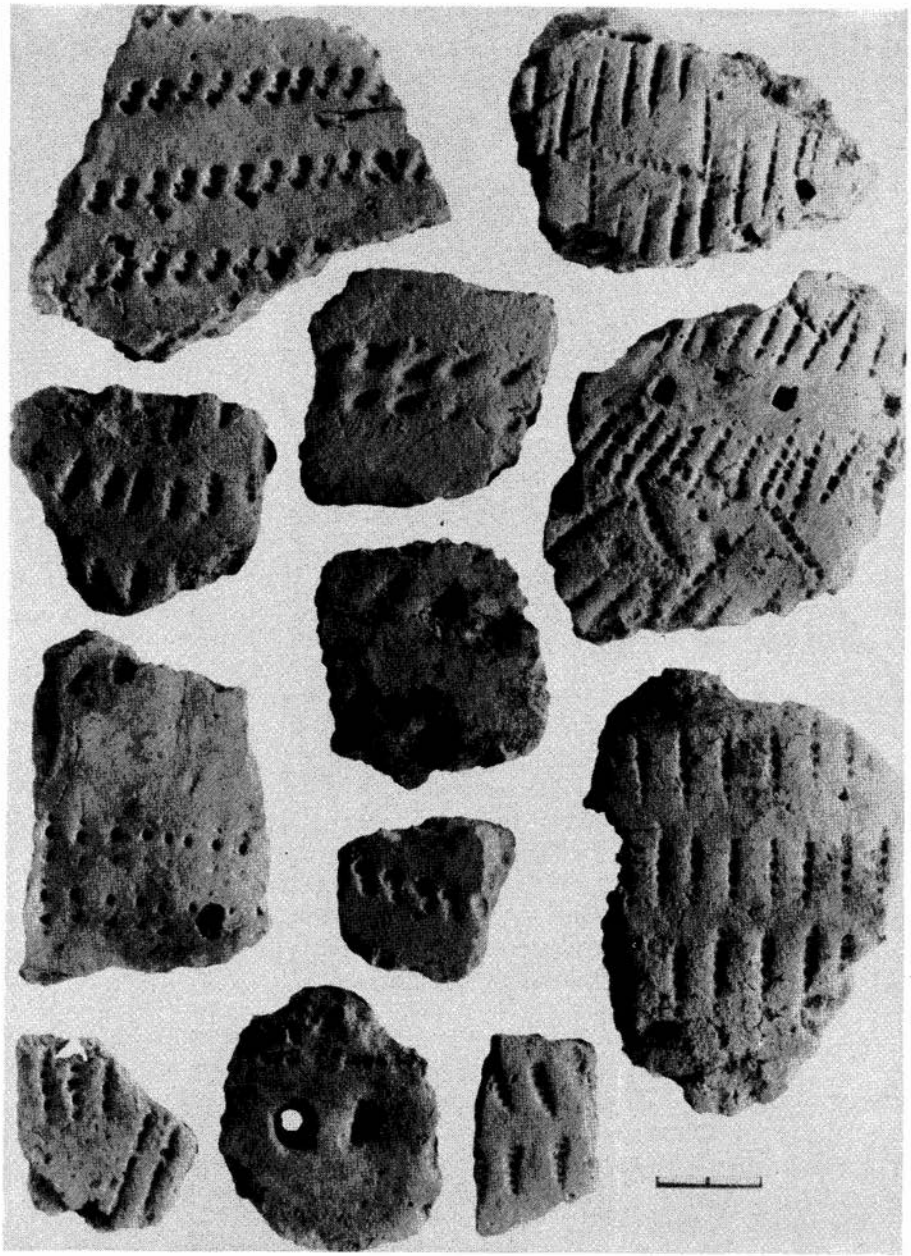


Fig. 44
Zalavruga I site. Artifacts and pottery.

there also an Eneolithic settlement laid over an earlier Late Mesolithic one. The bottom Mesolithic cultural layer (20-100 cm thick) is remarkable for its dark colour and contains microlithic flint implements.

The base of a rounded Mesolithic dwelling 6 m in diameter and 28 sq.m. in area with a large camp-fire almost in the centre was stripped. It was composed of a dark (black) layer with numerous finds. Three circular dwellings 28, 24 and 21 sq.m. in area, belong to the Eneolithic. One is 5.7 m in

diameter and has a campfire almost in the centre. The second dwelling, 6 m in diameter, has a more complicated structure. It is deeper than the others - approximately 2.9 m below the highest point of today's surface of the camp site. The central part of the dwelling is 3 m in diameter and about 0.5 m deep. It is surrounded by a plot 1.5 m wide where the camp-fire was kindled.

The characteristics of the three Eneolithic dwellings are their rounded shape, the considerable depth of the pits and the fairly small number of finds. They probably represent hut structures of hide or bark, intended for a single family.

Very little pottery has been found both in the dwellings and in the entire Eneolithic layer. Four types are represented: Sperrings, only one fragment seemingly brought from the neighbouring settlement; asbestos, fragment; porous, 7 pieces. These are traces of a later camp dating back from the Bronze Age. The fourth type, pit-comb of Eneolithic appearance, is predominant. It is fairly crude, thick-walled, decorated with rounded and, less frequently, diamond-shaped pits and comb-like marks. The Mesolithic layer is thought to date back to the early half of the VIth millenium B.C. (C14-7840 ± 60), the Eneolithic to 3400 ± 60 years ago (estimated from the coal found in the dwelling). The latter was formed after the maximum of the trangression, in the second quarter the of IInd millenium B.C.

Camp site Kladovets VII lies on the northern side of the cape, above the lakeshore rock, at the bottom of the sand dune. It occupies a relatively flat site adjoining the edge of a high (6 metres) and fairly steep slope 17 m long. In the pit (36 sq.m. area) a thick and bright cultural layer heterogeneous in colour was revealed. It is composed of yellow (12-72 cm, usually about 40 cm thick) and dark-grey humus-infiltrated sand containing pieces of coal (20-60 cm). This implies that the site was inhabited repeatedly, which was supported by the articles found. Even the pottery, although represented by only 11 fragments, is of three types: Sperrings, pit-comb (both are Neolithic) and asbestos (Bronze Age).

Of 162 available tools those made of flint are predominant: knife-like blades, retouched flakes, scrapers. Flinty chip and debris are fairly numerous but only seven nuclei are present. Fifteen cutting implements or fragments made of schist have been found with markedly worn out blades. A diamond-shaped object with a hole in the middle (4.3 by 3 cm) is also noteworthy. It bears a groove at one end to facilitate fastening and the opposite end is broken.

The adjacent camp site, Kladovets VIII, discovered by G.A Pankrushev in 1981, lies nearby, at the end of the hollow entrenched into the cape. In ancient times this hollow was a fairly deep bay. The site is two-layered; the Mesolithic layer dating back from the early half of VIth millenium B.C. (C14-7760 + 100) is strongly eroded, whereas the Eneolithic one is well preserved. Both were formed when the lake level was higher than today and when the bay was still 'alive'. The inlet was gradually eroded and a sand hill (dune) arose at this site. In this way reliable data were obtained indicating a relatively late appearance of lakeside hills and dunes, and a late development of the current shore configuration - not earlier that the second quarter or the middle of the IInd millenium B.C. E.I. Devyatova disclosed traces

of a half-destroyed seemingly two-layered camp site (Neolithic, Mesolithic) beneath a dune on the shore of the bay separating Besov Nos from Kladovets.

The extreme northern corner of Kladovets projects slightly into the lake towards Besov Nos. There, on a small cape, a single solar symbol is carved. It is overlain (7-8 m above the water) by the well-known camp site Kladovets I. Additional studies have shown that it was visited at different times: during the Late Neolithic, Eneolithic, and occasionally Bronze Age.

Behind Kladovets IV, the very steep, almost vertical, slope of the shore widens and becomes more gentle. On it are two fairly distinct terrace-like scarps; one is very low and stretches immediately along the water's edge, the other is offshore. Camp sites - Kladovets II and IIa - have been found on both. They were probably combined to make a single settlement as the distance between them is only about 20 m. However, if we take into consideration their isolated position, different altitudes, characteristics of their stratigraphy and the articles found, it would be better to discuss them separately.

The strikingly low altitude of Kladovets IIa, 1.0-1.5 m above the level of Lake Onega, is noteworthy. Additionally, it is strange that it closes a flat but extremely rocky site (eroded cobble round-stone) adjoining the modern narrow boulder beach. The selection of this site may be explained only by the people's wish to live close to water. A bright and very rocky cultural layer represented by brownish sand (15 - 40 cm thick) and rich in finds was revealed in the 100 sq.m. pit. Small flint tools used for cutting and scraping are prevalent. Cutting instruments made of schist - axes, adzes, chisels, etc. - are abundant but the state of the blades indicates that many of them have not yet been used. There are only three crude articles made of quartz.

Pottery (641 fragments), chiefly of pit-comb type (601 fragments), is strikingly abundant. Pit pottery of Lyal appearance is predominant. The articles are thin-walled, well burnt, with round deep pits in the ornamentation bulging on the inner side of the walls (347 fragments). Sperrings type pottery (22 fragments) is ornamented with imprinted fish vertebrae, ropes and lines. Pit-comb pottery is also present. The vessels are speckled with rhombic pits, usually very clear-cut and deep, also bulging on the internal surface of the walls. Comb-like outlines are dominant only on one vessel. It is essential to understand the chronological interrelation of these clay dish varieties. As a whole, they belong to the late half of the third and the first quarter of the second millenia B.C. Sperrings pottery could have co-existed with the pit-comb type, the rhombic-pit type possibly appearing later, in the late Neolothic - early Eneolithic.

Kladovets IIa could only have existed at the modern (or lower) level of Lake Onega. It is the closest in time to rock carvings. The local population employed Sperrings pottery, which was about to go out of use at that time. It was used mostly by those who were skilful enough to make the pit-and the increasingly produced rhombic-pit pottery. Ten fragments representing traces of later infrequent visits to this locality look like alien inclusions.

Four hundred sq.m. were stripped in Kladovets II, which occupies a total area of about 1300 sq.m. Its upper part is located on the second terrace-like scarp at an altitude of about 4 m above the lake level. Only the lower part descend from the fairly distinct edge down the steep slope to the camp site of Kladovets IIa. Three dwelling cavities indicate the permanent nature of the settlement. In one of these, excavation has made it possible to trace the basement of a Neolithic dwelling, which seems to be of the framework type. This 28 sq.m. rectangular dwelling is dug 80-100 cm and 60-70 cm deep below the modern and ancient surfaces, respectively. Dark-coloured sand bands containing pieces of coal are the only remains of the decayed logs that once made up the walls. A rounded hearth, 1 m in diameter and built of 18 small stones, is found in the middle of the dwelling. The basement of a rounded structure about 4 m in diameter was found in the second cavity. Its bottom was overlain by a yellow-greenish sand layer clearly transferred from some other place. Its small dimensions and very few finds suggest it was used for auxiliary purposes.

The heterogeneous mixture of finds in a uniform cultural layer makes it very difficult to clarify exactly how many settlements succeeded each other. Probably the settlement with the Sperrings pottery and schistose stock appeared first in the lower part. At the same time or a little later appeared a population using pit pottery of the so-called Lial type. Later in the Eneolithic and the Bronze Age traces of short-term camp sites were left. The ealiest of five C14 absolute dates is Late Neolithic - the last quater of the IIIrd millennium B.C. The rest belongs to the Bronze and the Early Iron Ages.

Two more Mesolithic camp sites - Kladovets V and Va - were discovered at the base of Cape Kladovets at a great distance from both shores on a flat sandy surface 4.1-3.5 m above the sea level. They differ notably in terms of the household utensils recovered. At that time the cape was still an island, separated from the shore by a strait with camp sites set up on it. The high coastal dune, which now separates the camp sites from the northern cape shore, was absent. Traces of a Mesolithic sepulchre were found nearby. Kladovets is particularly valuable because of its two-layered settlements which give us the chronological fork bounding the petroglyphs. Kladovets also contains some settlements close in time or even contemporary with petroglyphs (Kladovets II-a).

Another archaeologically rich group consisting of 12 camp sites is situated in the lower reaches of the River Chernaya, mainly on the right bank. Most of them have been damaged by tillage. Superficial investigations show that each of them was large and stretched along the coast for 200-300 m and more. Only one, River Chernaya V, which is nearest to petroglyphs found on the island before the mouth of the river, is situated just on the shore of Lake Onega. Its traces are left at the top of the low (1.55-2.20 m) flat rock which frames the river mouth. The cultural layer remained intact here, in spite of the relatively small height, the proximity to the water and a sandy gravel beach. The layer reached 40 cm and had a bright reddish-brown colour. Excavations undertaken over an area of 44 sq.m. have exhausted it completely. The most common among 76 tools and stone articles are silicic scrapers, fragments of arrow-heads and knife-like blades. Cutting

polished schistose instruments and their fragments are also found, as are splinters of flint, shale and quartz.

The pottery consists of 227 fragments of six different types. Reticulated and dotted types of Early Iron Age prevail, but there is also pit-comb pottery and more than 20 'porous' crocks with a comb ornamentation of the Bronze Age. Asbestine pottery is poorly represented, and there are only fragments of smoothbore pottery without ornament, belonging to the Iron age. It means that articles of various ages are mixed in a cultural layer uniform in colour and composition. Judging from the fragments of the vessels, long-term camp sites appeared here three times, first in the Neolithic and then in the Early Iron Age. Each time the water level was not much higher than the present one, otherwise this place would not have been suitable even for temporary camp sites and a cultural layer of such colour and thickness could not have formed. The Neolithic complex of pit-comb pottery is probably contemporary with the petroglyphs.

Camp site River Chernaya VI, covering an area of about 600 sq.m., is situated almost opposite and about 65 m from the island with petroglyphs, on the shore behind a dune ridge. This camp site is interesting for its low location and for the composition of the cultural layer - black, yellow or green-grey clay lying under turf and a sandy layer. It appeared in the Neolithic as is indicated by the presence of pitcomb pottery and Sperrings.

Some places suitable for habitation are observed south of the mouth of River Chernaya, but the number of camp sites here is rather small. One of them belonging to the Mesolithic is situated in Cape Gazhy Nos on a high (7-8 m) sandy terrace, 25-30 m from the petroglyphs.

The great number of Mesolithic camp sites indicates that the region of Besov Nos was cultivated even in the VII-Vth millenia B.C. It is interesting that people settled on the capes or coastal islands, i.e. places more suitable for temporary, seasonal life. But taking into account the thickness and brightness of the cultural layer, the abundance of finds and the presence of dwellings, we came to the conclusion that there were indeed constant, longterm settlements here.

A large sandy hill rises along the western shore of the Island Bolshoi Gurii. Its top rises to a height of 6 m above lake level and 1.5 m above the flat and sandy surface of the island (below is the crystalline basement). A settlement is buried under the hill, but unfortunately the shores are being washed away resulting in its gradual destruction. Only 300 sq.m. remained of the camp site area. In 1976, a 44 sq.m. pit was dug to a depth of 2 metres. A cultural layer very bright in colour was found under a large layer of lake sand. This cultural layer (8-80 cm thick with an average 24-30 cm) is composed of dark even black sand with reddish crimson inclusions and rough upper and lower edges. A black coal layer (8-30 cm thick usually 20-24 cm) was found under it.

Half of the stone household utensils are silicic (33 tools out of 61). Judging from the presence of fragments, the occupation of the island population was making and repairing tools. A thick cultural layer and various silicic and schistose implements characterise this settlement. Pottery is abundant with vessels of different sizes from diminutive thin walled to large ones. Advanced

pit-comb pottery prevails (240 fragments), the most common element of ornamentation being round pits. Only a few crocks are decorated with combs, and diamond-shaped pits are absent. Sperrings is represented by only 25 fragments variously decorated: imprints of cord, fish vertebraes, lines. Our attention was attracted by fragments of Sperrings vessels coloured with ochre and bearing a figure. There are also comb imprints which is very rare for Sperrings. Finally, single crocks of porous, asbestos and smooth-bore pottery were found.

It is interesting that the upper sand layer at a depth of 30 cm also bears finds. They are also present in holes dug in different parts of the island at some distance from the main pit in sand of different colour, yellow or orange. The pottery is of two types, developed pit-comb and asbestos, meaning that people visited the island even after the main Neolithic layer dating back from the IIIrd millenium B.C. was buried under lake sand.

One could hardly expect traces of a settlement to remain on the tiny (36 x 75 m) Maly Guri island with its little strip of soil (90 sq.m.) at a height of 2.5-3.0 m above lake level. It is strange that such a small patch of ground can resist the powerful effect of a big lake. The island is completely flooded during storms, but the soil seems to adhere to the rock. Under three turf layers are found fragments of flint and quartz and crocks of late reticulate pottery (Early Iron Age) in a dirty-orange sand layer, 20-30 cm thick. Although the petroglyphs are found only 25 m away they are not contemporary with the fishermen's settlement.

In ancient times when early settlements were set up, all the Guri Islands were possibly connected. Thus camp sites situated near petroglyphs differ greatly one from the others. Some are temporary settlements, some are permanent with traces of winter dwellings. Part of them remain intact, others were damaged and almost destroyed by nature. However, remaining areas suitable for excavation are very extensive. According to preliminary calculation they occupy several hectares, although only a small part has been investigated, with only some pits and diggings being laid. The cause lies not in lack of interest of archaeologists in this material, for they understand that immediate large-scale excavation could give them important data in connection with petroglyphs. But monuments which are not in danger must be preserved for the future. The level of field work and potential of archaeology rise from year to year owing to the achievement of the natural sciences. In the future, combining field work with a broad range of scientific methods will help us extract more reliable information and valid conclusions from the camp sites than we can today.

The material accumulated does allow us, however, to make some definite conclusions. It shows us, for instance, that the Mesolithic layers of camp sites Kladovets IV, V, V-a, VII, VIII, Besov Nos, and Gazhy Nos appeared earlier than petroglyphs. Camp sites such as Ust-Vodla III, Peri I, Kladovets II-a, River Chernaya V and Island Bolshoi Guri (Neolithic complex) are more or less synchronous with petroglyphs. Finally, the Eneolithic layers of settlements Besov Nos VI, Kladovets III, IV, VIII and layers of the Bronze and the Early Iron ages appeared after the petroglyphs were submerged into water.

One important event is the Eneolithic (sub-Boreal) transgression, which took place nearly 1850 years B.C. according to Pankrushev. He proposed that this transgression had been caused by the alteration of the height of rapids flow in the bed of River Svir, which joins lakes Onega and Ladoga. The dam formed caused the water to rise to 3.2 m in Lake Onega. Lowering of the water level was very slow and it is only in our times that the lake acquired its modern outlines.

The beginning of the transgression (1850 years B.C.) allowed us to determine the upper chronological boundary of the Onega petroglyphs. At present both the petroglyphs and the lowest camp sites are under water. This is confirmed by Eneolithic settlements which lie unnaturally high and occupy the location of more ancient Mesolithic sites. The time period nearest to the peak of the Eneolithic transgression is determined by camp sites Besov Nos VI, Kladovets IV, etc.,formed in the second quarter of the IInd millenium B.C. Since the subsequent regression persisted until AD it may be supposed that rock art traditions in Lake Onega ended then forever.

It is much more difficult to determine the lower chronological limit of the Onega petroglyphs. The rocks used as a canvas began to emerge from the water early; the upper layer (1-2.5 m above lake level) was exposed ca. 6500 years B.C. according to Pankrushev. It seems that the first figures could have appeared before the water level was at the maximum mark. But the emergence of rocks from the water is not strictly related to the appearence of figures on the rocks. It will be recalled that the earliest layer of Onega petroglyphs is a famous triad found in the extremity of Besov Nos, and that the 'demon' was the first figure to have been made. But it is quite low (105-146 cm high) and could have appeared only when the lake level was close to the modern one. In any case it could not have been higher than 1 m. The shoreline was in such a position (1 m higher that the modern level) nearly 4000 B.C. This indicates that the 'demon' was made in the period between 4000 and 1850 years B.C. but most likely nearer to its end. Furthermore the utilization of the rocks and the creation of this art complex demanded a great deal of time. Therefore the lower limit may be the second quarter or middle of the IIIrd millenium B.C.

Palaeogeogapher E.A. Devyatova, together with other archaeologists, investigated various sites of Lake Onega. They observed repeated fluctuations of the lake level and distinguished a number of transgressions, the most important being the Atlantic polyphase. Phase I was the strongest after which the water level rose presumably by at least 4 m.

During the sub-Boreal period which was remarkable for its unstable climatic conditions, there were also a number of rises and falls of the level of Lake Onega. Nearly 2.8-2.7 thousand years B.C. a drop in the level was observed. Nearly 2.5-2.4 thousands years B.C. a subsequent rise took place, when the water was at least 2 m higher than today. Then nearly 2.3-2 thousand years B.C. came the next and most pronounced lowering. In the late half of the sub-Boreal time nearly 1.9-1.7 thousand years B.C. took place the next considerable rise (by approximately 2-2.5 m).

These conclusions are preliminary because the studies conducted by E.I. Devyatova are not yet complete. They do reveal, however, the direction

of her work: a model of the development of Lake Onega in the Holocene different to ours. E.I. Devyatova also believes that the level of Lake Onega during the Atlantic and the sub-Boreal periods did sometimes fall but never descended lower than the modern one. According to her the upper limit of the petroglyphs may be determined by a rise in the water level in the late second of the sub-Boreal period, i.e. 1.9-1.7 thousand years B.C., which corresponds to Pankrushev's sub-Boreal Atlantic transgression. As for the lower limit of Onega petroglyphs, they probably appeared during the fall of the lake levels i.e. nearly 2.8-2.7 or 2.3-2 thousand years B.C. which agrees with our conclusion.

Certainly, the problem of dating the petroglyphs has not yet been solved. The precision of dating depends on the thoroughness of future general archaeological and geological studies of the shoreline. Furthermore, the investigations still have many serious, though justified differences. For example, some scientists interpret archaeological information in the light of geological data, while others use the opposite approach. Because of this, discrepancies in the final conclusions are unavoidable.

The future task will not be to revise previous conclusions, but rather to make them more accurate. This applies especially to the dating of the Karelian petroglyphs. Further new archaeological material, contemporary with the petroglyphs, will certainly be revealed. This could provide additional information to help in the complex process of archaeological dating.

Résumé: Une analyse des relations entre gisements archéologiques, variations des niveaux de l'eau dans le lac Onega et sites d'art rupestre mène l'auteur à distinguer des phases de l'art rupestre entre 4000 et 1850 ans av. J.-C.

Riassunto: Una analisi di relazione tra giacimenti archeologici, variazioni del livello del lago Onega e siti d'arte rupestre portano l'autore a distinguere fasi dell'arte rupestre tra il 4000 e il 1850 a.C.