

SINKERS AND COMPOSITE FISHING HOOKS IN THE NEOLITHIC OF EASTERN BALTIC

Slate artefacts from Berezovo 2 (Karelian Isthmus, North-West Russia)

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Abstract: Representative collection of slate fishing inventory was obtained from Berezovo 2 archaeological site in the Karelian Isthmus, North-West Russia. This material is attributed to the Middle-Late Neolithic, 4th ka BC. Series of typologically pronounced tools display variety of fishing equipment and imply diversified methods of fishing. Technological context allows discussing advantages of soft and foliated slate for making fishing and hunting equipment, and connections between bone and slate processing technologies.

Slate artefacts were well-presented in the Eastern Fennoscandia, including the Karelian Isthmus, during the whole Stone Age. They also were in use later, in the Middle Ages and up to the Early Modern period. Such a long-term technological tradition was based on availability of this raw material in the regions with lack of local flint outcrops; and also on its physical characteristics that made slate good for processing using knapping, flaking, sawing and finally grinding (polishing) techniques. Different kinds of slate raw material were used within the industry, and they could be used for making implements of different categories.

Slate sinkers and fishing hook parts are known in the Neolithic archaeological contexts of the Eastern part of the Gulf of Finland and particularly on the Karelian Isthmus for more than a century. Julius Ailio described a fishing rod sinker from the former Finnish municipality Kaukola on the Karelian Isthmus which he called “Angelsenker” (Ailio 1909, fig. 41–43; pl. I: 50). Sakari Pälvi published six beautifully crafted stems of various types, found in the same area, including one with a drilled hole (Pälvi 1915, pl. XI: 1–6). Similar artefacts were found in the Neolithic sites that were excavated and studied in Finland in the first half of the 20th century in Finnish provinces Northern and Southern Karelia, including the Karelian Isthmus. Rapid increasing of amount of slate artefacts including fishing hooks and line-sinkers in Finland and Karelia associates with Middle Neolithic Typical Comb Ware culture, the 1st half of the 4th ka BC (Núñez 1998, 112).

Fishing tools were rather often discussed in archaeological literature within the general problematic concerning prehistoric subsistence strategies, in relation with fishing methods and osteological collections from archaeological sites (e.g. Äyräpää 1950; Carpelan 1999; Mökkönen 2001; Nurminen 2007; Núñez 2009; Pälvi 1915; Ukkonen 2004). But until the beginning of the 21st century there were no special studies on slate fishing tools. Typology of slate fishing tools for the territory of the Karelian Isthmus and entire Finland was developed by Eero Naskali in the MA. Thesis at the Department of Archaeology, University of Helsinki (Naskali 2004).

A large collection of slate artefacts was obtained from a multiperiod archaeological site Berezovo 2 that has been completely studied in 2018 with 1700 sq.m excavation area (Gerasimov/Tkach/Goncharova 2018). It is situated in the Karelian Isthmus, at the North-West shore of the Ladoga Lake, close to the famous archaeological sites in Kaukola parish, nowadays Sevastyanovo village in the Leningrad region, Russia (Fig. 1). Archaeological finds of typologically pronounced types indicate that several cultural contexts were represented at the site (Late Mesolithic – 7–6 ka BC; Middle to Late Neolithic and Eneolithic – 4–beginning of the 3 ka BC), single artefacts of later eras up to the Modern time were also found.



Fig. 1. Berezovo 2. Location of settlement and workshop.

The site was located on a sandy terrace 25 m a.s.l. at the southern slope of a fluvial-glacial hill. According to the local shoreline chronology (e.g. *Saarnisto 2008*) the terrace could be formed during the ancient Ancylus Lake transgression maximum about 8500 cal BC. After that time the terrace was available and attracting for settling, as the Ladoga Lake shoreline was in several meters from the terrace edge till the Neva River breakthrough about 1200 cal BC, and the site location was at the southern shore of an island 1 x 1 km in size. In the most part of the site area the finds were obtained from the sandy-gravel fluvial-glacial sediments, where they penetrated from the habitation surface in the past. There were several structures (ancient pits, hearths, remains of one dwelling) in the central part of the terrace with a lens of sorted sand. They mainly contained Middle and Late Neolithic contexts.

It is worthwhile to clarify the differences in the regional periodization systems that are used within the discussing territory. In the Finnish periodization the Late Neolithic covers the third millennium BC, while in the North-West Russia the same time relates to the Eneolithic or the Early Metal Age (*Nordqvist 2018*, 51, fig. 11).

Representative series of slate fishing tools from the site can be considered as a part of the Late Neolithic archaeological context basing on the reference material; and allow discussing typology and technology of this specific category of artefacts.

The slate assemblage contains more than 1100 artefacts, total weight over 4 kg. It consists of series of projectile points, chopping tools (adzes, shaft hole axe, different kinds of miniature adzes), and also piercers, knife-like tools, pendants and some other categories. Fishing tools – sinkers and composite fishing hooks – make a significant category of artefacts. Besides the ready-made tools, numerous preforms, fragments of unfinished blanks and raw bars were found – they make about one half of the whole slate assemblage from the site.

Finds were documented with a laser total station, which allowed to determine accurately location coordinates for 391 slate artefacts found *in situ*. In addition, during the field work, after parsing the layer with a small digging tool, whole soil was sifted through a sieve with a 3.5 mm mesh according to units 1 x 1 m (in some cases 0.5 x 0.5 m) and to arbitrary layers. The soil from the defined artificial structures was sifted separately. Sifting added 770 pieces of slate finds – mainly small fragments.

Slate finds were stratigraphically distributed through four arbitrary layers in a decreasing order, while the thickness of the cultural layer was up to 40 cm. The thickness of an arbitrary layer was 5–7 cm and could vary when followed a surface of a distinguished lithological layer. The most of the finds were concentrated in the first (534 pieces) and the second (363 pieces) arbitrary layers. The third layer included only 78 slate finds, and just 24 were found in the fourth.

ONE HUNDRED YEARS OF TYPOLOGY AND CLASSIFICATION

General criteria for classification of slate fishing tools are mainly convinced, but defining the function of an artefact may vary depending on a stage of treatment and on different morphological characteristics. Frequent fragmentation of artefacts, as well as variety in shape, size and morphological elements make difficult their typological definition and interpretation.

Also preservation of organic materials in the Stone Age assemblages of the studied region – unburnt bone, wood, resin, threads – is very bad, which minimizes the opportunity to find a complete composite fishing hook or fishing gear. Nevertheless the 10.5 thousand years old fishing net with floats and sinkers was found in the former Antrea parish in Karelian Isthmus (*Pälsi 1920*).

The first steps to classify slate fishing hooks from Finland and Karelia, including the Karelian Isthmus, were taken by the famous Finnish archaeologist *S. Pälsi* (1915, 134). This typology described all the kinds of Neolithic fishing hooks known to the time, including composite tools. According to *Pälsi*, slate stems of composite hooks belonged to continuous typological series. Basing on analysis of morphology of stems with elongated and pointed upper end *Pälsi* suggested that the shape of the slate tools repeated the shape of those made of wood and bone in the earlier times (*Pälsi 1915, 135*).

Five types of stems from the Latvian Neolithic contexts were defined by *Ilga A. Zagorska* basing on cross-section shape and morphology of the lower part of the objects (*Zagorska 1991, 54*). This classification included not only slate artefacts, but fishing tools of other different materials (bone, antler, animal teeth) – all together 205 stems of composite fishing hooks (*Zagorska 1991, 55, fig. 5*). Stems of composite fishing hooks were found as surface finds on the shores of the Lubāns Lake and the Big Ludza Lake, as well as in the Zvejnieki burial ground, at the settlements Zvejnieki II, Rīņukalns and Abora I. Also spines were found in the same contexts but more rear. Spines are of small size, they often have sloped or extended lower part. A number of them bear traces of binding, which indicates that these points were not independent tools, but made parts of a composite hooks (*Zagorska 1991, 56*).

Classification by *E. Naskali* (2004) was developed basing on collections of surface finds and excavations made in Finland in the beginning of the 20th century. The work remained unpublished and, therefore, little known. Besides the *Naskali's* classification is the most recent one, it also considers the largest amount of material from a big territory. 91 stems and 222 sinkers were analysed in the study, about a half of the items originate from the Southern Finland and from the Karelian Isthmus (former Finnish, nowadays Russian territory). Thus the classification was based on the materials that are the most relevant for comparing with Berezovo 2 collection in geographical, chronological and cultural sense.

E. Naskali distinguished three types of sinkers, each of them was divided in two subtypes; and four types of composite hook stems. Slate spines for composite fishing hooks were not considered in the typology:

- Sinkers:
 - Type P1 (a and b) – sinker with notched heads at both ends;
 - Type P2 (a and b) – sinker with grooves at both ends;
 - Type P3 (a and b) – sinker with drilled holes at both ends.
- Composite fishing hook stems:
 - Type A1 – stem of uniform thickness, straight or slightly curved, with grooves on the upper end;
 - Type B1 – stem with an expansion in the middle part, straight or slightly curved, with grooves on the upper end;
 - Type B2 – stem with a strong expansion in the middle part, grooves are located between the center and the upper end of an artefact (“fish-shaped” upper part, with grooves or drilled hole);
 - Type C1 – conical shaped stem.

IN DARK WATERS – BEREZOVO 2 FISHING EQUIPMENT

The assemblage of slate fishing implements from Berezovo 2 consists of 54 items. 23 of them are ready-made tools (Table 1). There are series of sinkers on rather large and mainly poorly polished slate bars (Fig. 2), as well as spines (Fig. 3) and stems (Fig. 4) of composite fishing hooks.

Sinkers are presented in Berezovo 2 collection by seven complete and 20 fragmented items made of soft slate. They can be related to types P1a, P2a and P3a by E. Naskali (Fig. 2: 1–13).

Type P1a is represented by one fragmented polished slate sinker with a flattened cross-section and with only one extant notched head (Fig. 2: 11). The closest analogies to this artefact are finds from Kaukola, Johannes and Inkoo (*Naskali 2004*, 60). Sinkers with a similar “notched” way of tying are also known in the Eneolithic of the Republic of Karelia, for example, at Voinavolok XXVII settlement (*Zhulnikov 1999*, fig. 58: 3).

Type P2a is the most numerous; it is represented by seven complete and 17 fragmented finds (Fig. 2: 1–10). Most of the completed items are sinkers made of untreated or poorly polished elongated slate bars with sub-triangular or sub-rectangular cross-section. Analogies to this type of finds are known among the artefacts from Neolithic sites in the former Finnish Kaukola and Viipuri parishes; which are kept nowadays in the Finnish National Museum (*Naskali 2004*, 70). Similar artefacts are also widely presented at the sites of the Republic of Karelia – Besovy Sledki, Sulgu III, Malaya Suna I and others (*Savvateev 1991*, fig. 2: 1–22).

Type P3a is represented by two fragmented artefacts (Fig. 2: 12, 13). The lower parts of the sinkers are broken off. One of these sinkers is well polished, flattened in the upper part and rounded in the cross-section, and has a biconical drilled hole (Fig. 2: 12). Preservation of the second item does not allow to understand the whole shape of the artefact, but it had a drilled hole in the upper part (Fig. 2: 13). Analogies to this type are known among the artefacts from Finnish parishes Kaukola, Kurkijoki and Mynämäki (*Naskali 2004*, 81).

Spines of composite fishing hooks (nine complete items) are also represented in the Berezovo 2 slate assemblage as a separate category of finds (Fig. 3: 1–6). Their sizes vary from 26 to 56 mm. The spines are made of soft slate, have a wide beveled base and sharpened at

Table 1. Berezovo 2. Size and weight of slate fishing tools.

Type	Item №	Measurements (mm)	Weight (g)
Sinkers			
Type P1a	Fig. 2: 11	45 x 19 x 4	5.8
Type P2a	Fig. 2: 1	75 x 12 x 7	9.1
	Fig. 2: 2	76 x 12 x 9	11.8
	Fig. 2: 3	62 x 10 x 6	5.9
	Fig. 2: 4	74 x 7 x 5	3.5
	Fig. 2: 5	61 x 11 x 5	5.0
	Fig. 2: 6	58 x 10 x 6	4.3
	Fig. 2: 7	58 x 9 x 4	2.7
	Fig. 2: 8	52 x 7 x 4	1.9
	Fig. 2: 9	47 x 13 x 5	4.1
	Fig. 2: 10	40 x 10 x 5	2.1
Type P3a	Fig. 2: 12	37 x 8 x 5	2.0
	Fig. 2: 13	36 x 7 x 4	1.0
	+ 14 unidentified fragments		
Fishing hook spines	Fig. 3: 1	54 x 9 x 4	2.6
	Fig. 3: 2	54 x 7 x 3	1.5
	Fig. 3: 3	45 x 6 x 4	1.1
	Fig. 3: 4	41 x 5 x 4	1.2
	Fig. 3: 5	26 x 6 x 2	0.5
	Fig. 3: 6	56 x 8 x 5	2.8
	+ 3 fragments		
Fishing hook stems			
Type A1	Fig. 4: 1	60 x 6 x 5	3.3
	Fig. 4: 2	58 x 4 x 4	1.5
	Fig. 4: 3	44 x 5 x 4	1.7
	Fig. 4: 4	34 x 7 x 5	1.5
Type B1	Fig. 4: 6	62 x 9 x 6	3.8
	Fig. 4: 7	52 x 7 x 6	2.1
	Fig. 4: 8	49 x 9 x 5	2.7
	Fig. 4: 9	48 x 6 x 5	2.0
	Fig. 4: 10	46 x 7 x 5	2.4
	Fig. 4: 11	44 x 7 x 6	2.3
Type B2	Fig. 4: 5	36 x 12 x 5	2.4
	+ 7 unidentified fragments		

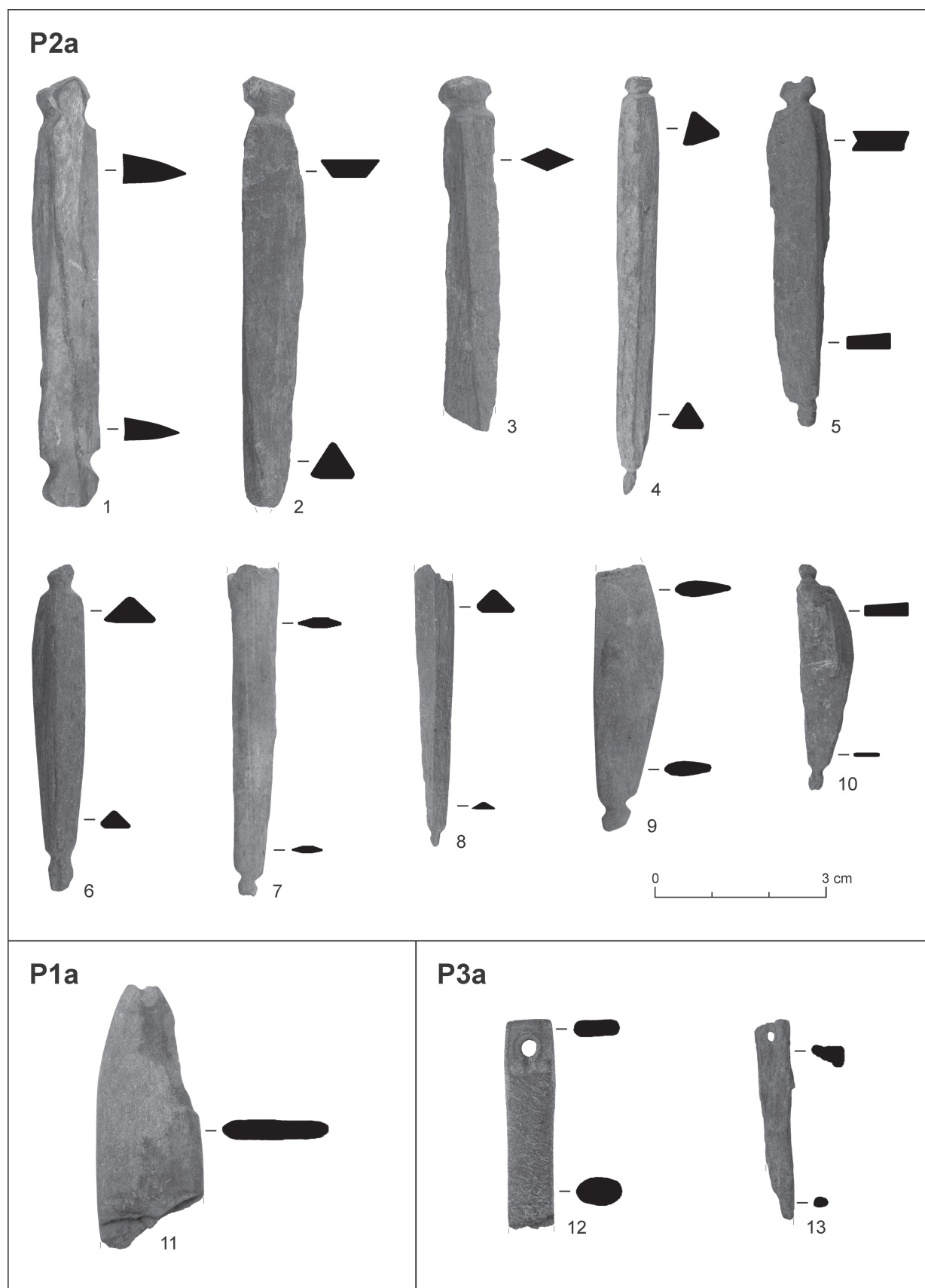


Fig. 2. Berezovo 2. Slate sinkers (photo by S. B. Shapiro).

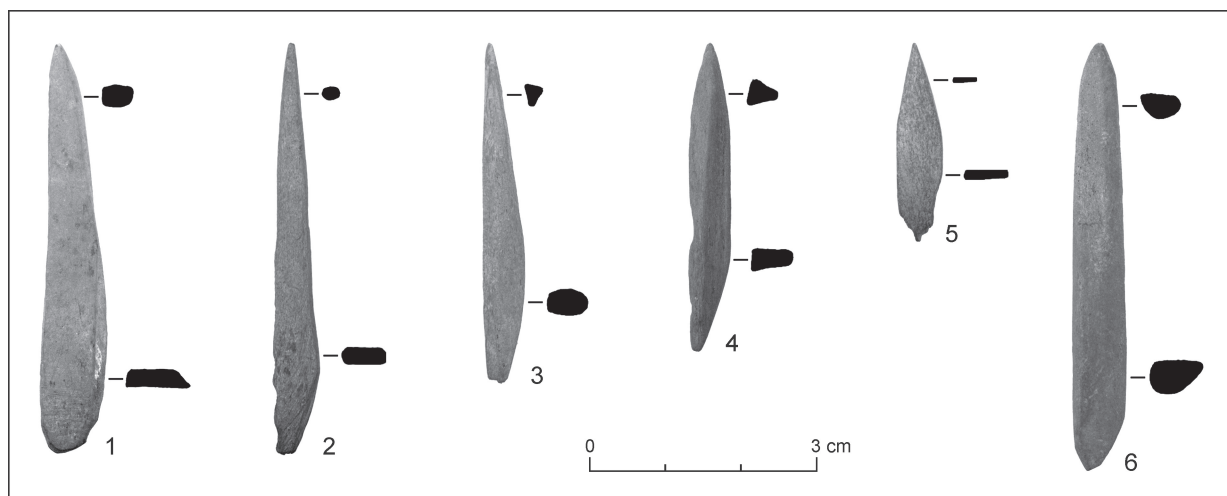


Fig. 3. Berezovo 2. Slate fishing hook spines (photo by S. B. Shapiro).

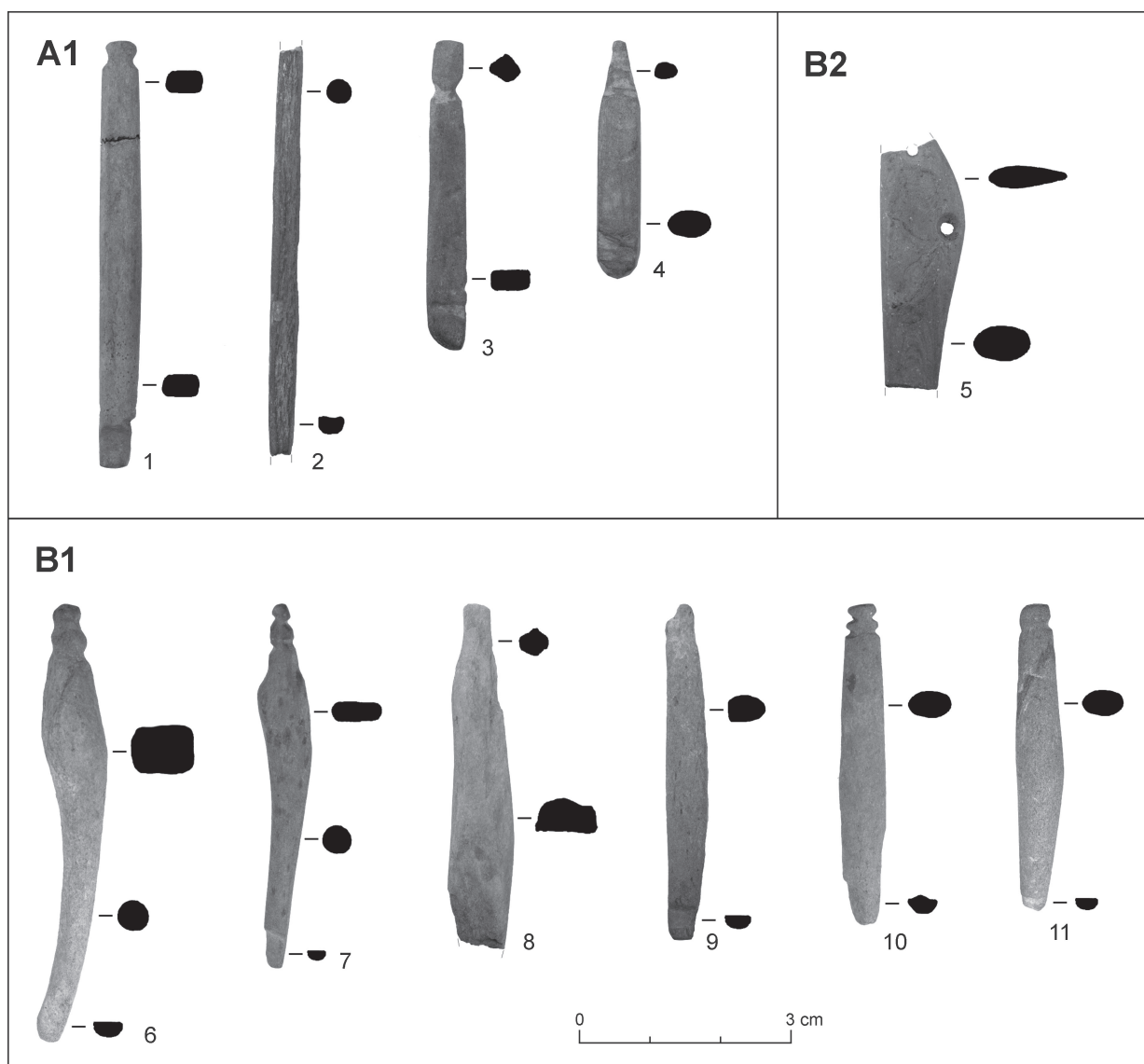


Fig. 4. Berezovo 2. Slate fishing hook stems (photo by S. B. Shapiro).

the end. Some items (e.g. Fig. 3: 2) have notches at the base opposite the beveled part. They probably served to tie a spine to a hook stem. The spines crosssections are subcircular or sub-triangular, the smallest item has a flattened crosssection. Large items (e.g. Fig. 3: 1) probably could serve for catching very big fish. One of the finds can be considered as an unfinished spine with a treated lower part (Fig. 3: 6). The number of spines found on the site is less than the number of stems, which can be indirect evidence that spines (as well as other fishing tools) were made more often of organic materials (bone, antler, wood, etc.), and have not preserved in archaeological contexts (Koivisto 2017, 26; Núñez 1998, 123).

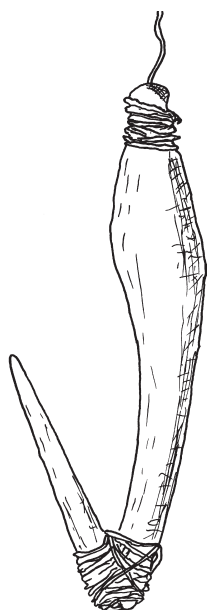


Fig. 5. Graphic reconstruction of a composite fishing hook (drawing by M. A. Kholkina).

The stems of composite fishing hooks (eight complete items, 10 fragments) are represented by several recognizable shapes. The assemblage from Berezovo 2 contains types A1, B1, B2 by E. Naskali. Artefacts were made of soft slate. The common feature in their design is presence of an attachment place in the upper (head for tying) and lower (notch) parts of an artefact. Sometimes a notch was supplemented with scratches made on purpose for better binding when attaching to a spine. According to reconstructions (also based on complete composite fishing hooks found in other regions) a stem and a spine could be tied together with plant fiber or tendons and fish glue or tar and wax mixture (Fig. 5; for other similar reconstructions see: Krutikova/Tsoi 2018, 27; Pälsi 1915, 134).

Type A1 is represented by three complete items and six fragments (Fig. 4: 1–4). The first one (Fig. 4: 1) was found in fragments in different parts of the excavation area and refitted. It is 60 mm long, elongated in shape, sub-rectangular in a crosssection. The second item (Fig. 4: 2) was found with both ends broken; it seems to be similar to the first one, but subcircular in a crosssection. The third stem (Fig. 4: 3) is 44 mm long, of elongated shape, sub-rectangular in a crosssection. Its head was separated by circular cuts, and there is a notch for attaching a spine in the lower part. The fourth stem (Fig. 4: 4) of the A1 type is the smallest in the group (34 mm long), rounded in a crosssection, its head is narrowed upwards. The closest analogies to these tools are presented in materials from Kaukola and Evijärvi (Naskali 2004, 27).

Type B1 is represented by five complete items and three fragments (Fig. 4: 6–11). They also can be divided in two subtypes. The first is presented by two well-treated large stems 52 and 62 mm long, curved in profile, with a head for tying that was formed by two circular grooves in the upper part with a subcircular crosssection, and a steep extension in the middle part that has a rectangular crosssection (Fig. 4: 6, 7). Further down the stems were gradually getting narrow and obtain a subcircular crosssection; there is a notch for attaching a hook spine at one side of each of the stems.

The items of the second subtype within B1 type are of cylindrical shape with an extension in the middle part, and have relatively small size – 44, 46 and 48 mm long. Heads of these stems were marked out by one (Fig. 4: 9, 11) or two (Fig. 4: 10) cuts. In the lower part there is a notch for a hook spine that directed straight (Fig. 4: 9, 11) or with a slight angle upward (Fig. 4: 10). The closest analogies to the finds of the type B1 can be found in materials from Kaukola, Viipuri, Kuusjärvi (Naskali 2004, 34).

Type B2 is represented by one fragmented find (Fig. 4: 5). It is a fragment of a stem with both ends broken off, with a lenticular section in the upper part, an oval section in the lower part and an asymmetrical extension. Two biconical holes have been drilled in the upper part and on the extension of the tool. This find can be attributed as a rather rare “fish-shaped” fishing hook stem type. One of the most perfectly designed examples is a large one (about 9 x 12 cm) from the assemblage of Typical Comb Ware site Leppävirta Moninmäki Holopainen in the Eastern Finland (Koivisto 2017, 28, fig. 6; Luho 1966). On the Russian territory complete artefacts of this type are known from materials of the Karelian Late Neolithic sites with Comb Ware: Chernaya Guba IV, IX and Suna IV in the Onega Lake region (Vitenkova 2002, 124,

fig. 51: 5). Similar fragment was found in the field of Juho Paavilaisen (Juho Paavilaisen Rantapelto) in Kaukola (*Pälsi 1915*, pl. XI: 1). A fragment of similar tool was found at Tundozero VIII site at the south-eastern shore of the Onega Lake (*Ivanischeva M. V./Ivanischeva E. A. 2018*, 135, fig. 1: 4). The last two items have only one drilled hole in the extension. The same feature differ the Berezovo 2 “fish-shaped” hook from the finds from Räisälä, Kurkijoki and Rääkkylä parishes (*Naskali 2004*, 42), as well as from the stem from Viipuri Häyrinmäki site (*Erä-Esko 1995*, 16).

It was suggested (*Zagorska 1991*, 57) that stems could be used not only just as parts of fishing hooks, but also as sinkers; extended (fish-shaped) stems could serve as spoon-baits or trolls and could be used without bait, as they might glitter in water. This may also imply the existence of various individual fishing methods, such as catching on a float, as well as luring and trolling, when fishing lines were drawn through the water. The last could be carried out from a static position as well as from a boat.

SLATE FOR WOOD AND SLATE FOR FOOD – DIFFERENCES IN RAW MATERIAL

The slate assemblage from Berezovo 2 site can be divided in two main groups basing on hardness and foliation of the raw material. The first and the larger one unites pieces of relatively soft and highly foliated slate (824 pieces). High foliation is a pronounceable characteristic of this group, well-observed on the broken surfaces. Another group (338 pieces) is presented by artefacts of hard slate, including metatuff from the western shore of the Onega Lake (so-called green Onega slate).

J. Ailio (1909, pl. I: 44) defined soft foliated slate as Schiefer. In comparison with hard Onega slate soft slate is worth (or almost incompatible) for processing by knapping technology because of low fracture stability. Softness and high foliation also limits its use for manufacturing of a number of categories of tools, like adzes and other chopping macrotools, as well as the use of traditional methods of processing slate such as flaking and pecking (*Shakhnovich 2007*). This is probably why use of these techniques for slate processing was minimally represented at the Berezovo 2 site. This also explains the fact that tools of soft slate mainly were not intended for processing materials like wood, and served as hunting projectile points, fishing tools or belonged to the spiritual sphere (*Tarasov 2001*, 144). However, this raw material clearly had a number of advantages. It is easy to obtain thin bars by deliberately delaminating slate blocks with stone flake wedges and a hammerstone or a mallet. Frequently these bars were found as semi-finished forms. Due to its softness, this raw material requires less labor for processing and is easily amenable to abrasive techniques – grinding and sawing (*Tarasov 2001*, 142). This makes processing technology for the soft slate similar to bone processing technology (*Zhilin 1993*). Also, this raw material has relatively low weight, which could be important for production of arrowheads and certain categories of fishing equipment.

WHAT'S THE SLATE FISHING TOOLS DISTRIBUTION IN SPACE AND TIME?

Chronology of slate fishing tools is rather wide and covers the entire Neolithic period, also runs beyond its borders. Fishing tools, interpreted as sinkers, are known in materials of the Early Neolithic Sperrings culture (*Vitenkova 1996*, 75). Slate parts of composite fishing hooks are presented in the Middle Neolithic and later sites in Karelia (*Savvateev 1991*). Finnish researchers generally date slate hooks to the Neolithic, but admit the Mesolithic age of sinkers used with bone or wooden hooks for fishing (*Minkkinen 2000*; *Naskali 2004*). Sinkers of several different types with varying degrees of processing, from rough bars with notches to well-polished tools, are associated with Typical Comb Ware culture, however, some artefacts have later dating in the Finnish Late Neolithic (*Naskali 2004*, 63–84).

Geography of slate fishing tools distribution is quite wide – these are the Baltic states, Finland and North-Western Russia including the Karelian Isthmus, Karelia, as well as a number of sites in the Vologda, Arkhangelsk regions and the Republic of Komi.

There are many finds of slate artefacts associated with fishing at the Stone Age sites in Karelia (*Savvateev 1991*, 188, 190, fig. 2). Items with circular grooves on upper and lower ends and flattened parts

for attaching a spine, mainly grinded or polished over the entire surface, were considered as stems of composite fishing hooks. These features are distinguished as distinctive in comparison to sinkers with lateral notches on raw or almost unprocessed elongated slate bars (*Savvateev 1991, 190*). It has been suggested that stems with transverse cuts and a narrow polished end could be punches for making pit ornamentation on Neolithic ceramics (*Lobanova 1994; Shakhnovich 1995; Tarasov 2001, 144*).

An excellent series of polished sinkers, more than 60 artefacts, were obtained from excavation of the Okhta I site in the territory of Saint-Petersburg (*Gusentsova/Sorokin 2018, 126*). These are flat or volumetric well-polished tools, expanded to the middle part, with notches and heads for tying.

Stems of composite fishing hooks of slate are presented in Neolithic collections from the North-East of the European Russia, but in smaller amount (*Kozyreva 1991*). In particular, two stems were found at Andozero II site in the Vologda Region (*Oshibkina 1978, 46*). Two fragments of stems and one complete item with square, lenticular and rounded crosssections came from surface finds at Tudoszero VIII settlement (*Ivanischeva M. V./Ivanischeva E. A. 2018, 136*). 12 bone stems with two notches for tying at the ends that could be used as parts for composite hooks or as what nowadays we call spinners were found at the peat-bog site Karavaikha IV, which was interpreted as a fishing place (*Kosorukova 2018, 129, 131, fig. 1–10*). Stems with rounded crosssections and with heads at both ends were found at Kubenino site (*Foss 1952, 107*). Researchers have repeatedly suggested that one of such head (probably a large one) or a notch were used to tie a fishing line, and the other served to attach a spine (*Kozyreva 1991, 227; Krainov 1991, 138*). Finds of similar shapes are known in Volosovo culture contexts on the Upper Volga – Sakhtysh I, Strelka I, etc. (*Krainov 1991, 138*). These stems were made not only of slate, but also of bone. The most eastern finds of such stems are probably tools from the Vis II peat-bog, where stems with notches at the ends were found (*Burov 1966*), and the Vis III peat-bog, where a small polished stone stem with head in the upper part was found (*Burov 1968*).

As for the distant analogies, the Kitoysky type of composite fishing hook deserves mention. Artefacts of this type were found first in 1881 in a burial context and in the early stages of the study were considered as pendants and symbolic fish images. This category of artefacts is widely represented primarily in the Neolithic funerary sites of the Baikal region, in particular, in the Kitoysky burial ground and in other sites of the Angara basin (*Goryunova 2002; Okladnikov 1974*). The same stems are presented among the finds from the second cultural layer of the Shrakshura III site at the Baikal Lake. This layer is dated by the radiocarbon method to the Early Neolithic, 7420–7290 cal BC (*Novikov/Mamontov/Goryunova 2018*). Despite constructive similarities, this type of composite fishing hooks is quite different from the Fennoscandian composite hooks in a number of morphological characteristics (*Gurina 1991, 22*). There was an experiment to make a fishing hook of the Kitoysky type using prehistoric technologies. It has taken about three hours to make a fishing hook stem and about seven hours to make a complete composite tool that withstands up to 13 kg of static load (*Krutikova/Tsoi 2018*). As direct relations of such remote areas as Fennoscandia or North-West Russia and Trans-Baikal region are hardly possible, it seems more probable that morphology of composite fishing hooks in those areas was elaborated independently because it fits well to the function of those artefacts.

CONCLUSIONS

Slate assemblage from Berezovo 2 is a valuable source for studying the variety of fishing equipment within the same Neolithic tradition, and technological approaches including raw-material strategy for production of such inventory.

Certain categories of slate finds at Berezovo 2 were made directly on the site, as evidenced by presence of blanks and fragmented or defective pieces. Soft and highly foliated local slate was used for making fishing and hunting equipment. This material is relatively light and easy to process by abrasive techniques. In contrary, the chopping tools were made of hard metatuff from the Onega Lake and presumably were mostly imported as ready-made objects.

Variety of the fishing inventory supposes developed and diversified methods of fishing, including using individual equipment for catching rather big fish.

Spreading of the same types of fishing inventory in a large territory of the Karelian Isthmus, the Republic of Karelia and Finland is another evidence of a stable system of contacts and an exchange within the Neolithic Comb Ware community.

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Závažia a zložené rybárske háčiky z neolitu vo východnom Pobaltí

Bridlicové artefakty z lokality Berezovo 2 (Karelská šija, severozápadné Rusko)

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Súhrn

Bridlicové artefakty boli v oblasti východnej Fennoškandinávií často využívané počas doby kamennej, ako aj neskôr. Takáto dlhodobá technologická tradícia bola založená na dostupnosti a fyzikálnych vlastnostiach bridlice, ktorá bola vhodná na spracovanie otlkaním, štiepaním, pílením a napokon brúsením (leštením). Rôzne druhy bridlicovej suroviny mohli byť využívané na výrobu nástrojov rôznych kategórií.

Bridlicové závažia a časti rybárskych háčikov sú známe v neolitických archeologických kontextoch už viac ako storočie. Územie ich rozšírenia je pomerne veľké. Patria sem pobaltské štáty ako Fínsko a severozápadné Rusko. Rybárske nástroje boli pomerne často opísané v archeologickej literatúre ako súčasť hlavnej problematiky, ale až do začiatku 21. storočia chýbali štúdie zamerané na bridlicové rybárske závažia.

Veľkú kolekciu bridlicových artefaktov (viac ako 1100 predmetov) sa podarilo získať z archeologickej lokality Berezovo 2, s osídlením z viacerých období. V roku 2018 bola preskúmaná plocha s rozlohou 1700 m². Nálezisko sa nachádza na Karelskej šiji, na severozápadnom brehu Ladožského jazera. Archeologické nálezy typologicky výrazných typov indikujú prítomnosť viacerých kultúrnych komplexov (podľa regionálnej archeologickej periodizácie: neskorý mezolit – 7.–6. tisícročie p. n. l.; stredný až neskorý neolit a enolit – 4. až začiatok 3. tisícročia pred n. l.). Reprezentatívne série bridlicových rybárskych nástrojov z lokality môžeme na základe referenčného materiálu zaradiť do neskorého neolitu. Na základe tvrdosti a vrstevnatosti suroviny môžeme tento súbor rozdeliť na dve hlavné skupiny. Prvá a väčšia skupina zjednocuje kusy relatívne mäkkej a výrazne vrstevnatej bridlice. Mäkkosť a výrazná vrstevnatosť obmedzujú použitie suroviny na výrobu mnohých kategórií nástrojov, ako sú sekery s krížovým ostrím a iné sekacie nástroje, podobne ako aj pri výrobe štiepanej industrie. Tento materiál však má aj mnohé výhody. Vyžaduje menej námahy pri spracovaní, dá sa ľahko brúsiť a je relatívne ľahký, čo mohlo byť kľúčové pri výrobe hrotov a niektorých typov rybárskych nástrojov. Niektoré kategórie bridlicových nálezov z Berezova 2 boli vyrobené priamo na lokalite, čo dokladá prítomnosť polotovarov, fragmentov alebo poškodených kusov.

Ďalšia skupina artefaktov je z tvrdej bridlice, vrátane metatufu zo západného brehu Onežského jazera (tzv. zelenej onežskej bridlice). Tieto predmety boli pravdepodobne importované ako hotové výrobky.

Súbor bridlicových rybárskych nástrojov z Berezova 2 obsahuje 54 predmetov, pričom 23 z nich sú hotové nástroje. Sú to série závaží na pomerne veľkých a najmä slabo obrúsených bridlicových tyčinkách (obr. 2), ako aj trňoch (obr. 3) a stopkách (obr. 4) zložených rybárskych háčikoch. Artefakty boli vyrobené z mäkkej bridlice.

Všeobecné kritériá pre klasifikáciu bridlicových rybárskych nástrojov sú pomerne dostatočne definované, no určenie funkcie predmetu sa môže líšiť v závislosti od štádia opracovania a od rôznych morfológických vlastností. Predpokladá sa, že stopka háčika mohla slúžiť nielen ako časť rybárskeho háčika, ale aj ako závažie. Stopky v tvare ryby mohli slúžiť ako lyžičkové návnady alebo nástrahy na prívlač. Dali sa použiť aj bez návnady, čo môže naznačovať existenciu rôznych individuálnych spôsobov rybolovu. Prvé kroky ku klasifikácii bridlicových rybárskych háčikov z Fínska a Karelska urobil S. Pääli (1915) začiatkom 20. stor. a ďalšie generácie vedcov ju ďalej rozpracovali. Najnovší systematický výskum typológie bridlicových rybárskych nástrojov v skúmanej oblasti urobil E. Naskali (2004) na začiatku 21. stor. Táto klasifikácia bola založená na materiáloch, ktoré boli najrelevantnejšie pre porovnanie s kolekciami z Berezova 2 v geografickom, chronologickom a kultúrnom kontexte. Závažia sú v súbore z Berezova 2 zastúpené siedmimi celými a 20 fragmentárnymi exemplármi. Mohli by súvisieť s typmi P1a (jeden neúplný exemplár), P2a (najpočetnejší – sedem celých a 17 neúplných exemplárov) a P3a (dva neúplné exempláre) definovaných E. Naskalim. Analógie k týmto nálezom sú známe medzi predmetmi z neolitických lokalít v Karelsku a Fínsku.

Trne zložených rybárskych háčikov (9 úplných exemplárov) sú tiež prítomné aj v bridlicovom súbore z Berezova 2 ako samostatná kategória nálezov. Majú širokú skosenú základňu, na konci zaostrenú. Niektoré predmety majú vruby, ktoré pravdepodobne slúžili na priviazanie trňa k stopke háčika.

Stopky zložených rybárskych háčikov (osem úplných exemplárov, 10 fragmentov) predstavujú niekoľko rozpoznaných tvarov podľa E. Naskaliho – typy A1 (tri úplné exempláre a šesť fragmentov), B1 (päť kompletných exemplárov a tri fragmenty), B2 (jeden neúplný nález). Ich spoločným znakom je prítomnosť úchytu v hornej (hlavica

na uviazanie) a dolnej (vrub) časti predmetu. Bridlicový súbor z Berezova 2 je kľúčovým prameňom pre štúdium variability rybárskych nástrojov v rámci neolitickej tradície a technologických prístupov, vrátane materiállovej stratégie pre výrobu takeého inventára.

Rozmanitosť rybárskeho inventára predpokladá rozvinuté a diverzifikované metódy rybolovu, vrátane používania jednotlivých nástrojov na chytanie pomerne veľkých rýb. Rozšírenie rovnakých rybárskych nástrojov na veľkom území Karelskej šije, Karelskej republiky a Fínska je ďalším dôkazom stabilného systému kontaktov a výmeny v rámci neolitickej komunity, tzv. kultúry hrebeňovej keramiky.

Obr. 1. Berezovo 2. Situovanie sídliska a dielni na mape.

Obr. 2. Berezovo 2. Bridlicové závažia (foto S. B. Shapiro).

Obr. 3. Berezovo 2. Trne bridlicových rybárskych háčikov (foto S. B. Shapiro).

Obr. 4. Berezovo 2. Stopky bridlicových rybárskych háčikov (foto S. B. Shapiro).

Obr. 5. Grafická rekonštrukcia zloženého rybárskeho háčika (kresba M. A. Kholkina).

Tabela 1. Berezovo 2. Veľkosť a hmotnosť bridlicových rybárskych nástrojov.

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