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## **A GROUP OF LATE COMB WARE FROM THE KARELIAN ISTHMUS**

The purpose of the study was to characterize a group of Late Comb Ware (Ka III) from archeological sites on the Karelian Isthmus: its technology, morphology, chronology, distribution and origin. The Karelian Isthmus is probably the eastern periphery of the Uskela Ware area and a group of ceramics was found that fits most of the main criteria, proposed for the materials in Finland, but with some peculiar features. Uskela-like ceramics in the eastern part of the Gulf of Finland is one of the earliest groups of porous ceramics, which coexisted with the Typical Comb Ware and has much in common with it and with the Eastern Swedish Pitted Ware. Due to rather limited area and chronology, for the north-western regions of Russia the existence of Uskela-like ceramics seems to be a rather local episode, while the main area of this ceramics is on the territory of modern Finland. Finally, such pottery on the Karelian Isthmus can probably serve as one of a few evidences of the influence on this area from the territories situated far to the west.

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### **Introduction**

In the end of the Neolithic in the 2nd half of the IV millennium BC in the eastern part of the Gulf of Finland region Typical Comb Ware (Ka II) gradually gives place to a row of different groups and types of organic- and asbestos-tempered ceramics (Uskela, Kierikki, Pöljä, Orovnavolok-XVI, Vojnavolok-XXVII, Pyheensilta, etc.). Unlike the Typical Comb Ware this new pottery seems to be rather diverse and can hardly be regarded as one and the same tradition.

To avoid confusion, we need to point out that the studied period (the end of IV–III millennium BC) is defined in different ways by researchers. For the north-western regions of Russia this time interval is traditionally called “Early Metal Period” (Gurina 1961, 82) – this very term will be used in the current work. At the same time, in the neighbouring Finland and Estonia this chronological framework includes the end of the Middle and the Late Neolithic periods (Nordkvist et al. 2015, 137). According to this periodization, the existence of the

Uskela Ware falls completely in the Middle Neolithic (Asplund 2008, 52; Seitsonen et al. 2012, 110).

The 2nd half of IV millennium BC is a time of serious changes in climatic conditions. This period falls on the Littorina stage of the Baltic Sea – on the time of its significant regression (Miettinen 2002, 81; Sandgren et al. 2004, 378). At this period the amount of coastal settlements on the Baltic coast increases (Gerasimov et al. 2010, 40) – and the eastern part of the Gulf of Finland region is no exception. The chronological interval 3600–2800 BC is considered as dry and cold climatic episode of the Holocene (event “4200 <sup>14</sup>C BP”). It seems that climatic oscillation had a significant influence on global sociocultural processes (Kul’kova 2007, 324).

In the eastern part of the Gulf of Finland region, the development of population during this period accelerated significantly. It means that at 4000 BC settlement pattern was transforming and village-like habitation appeared, evidence of farming is becoming more and more distinct (Nordqvist et al. 2015, 138). At around 3600 BC with the beginning of the Early Metal Period, new groups of ceramics are spreading along with the Typical Comb Ware, which continues to exist.

In the northwestern regions of Russia many diverse groups and types of organic-tempered ceramics appeared after 3600 cal. BC (e.g. Gerasimov et al. 2003; Nordqvist et al. 2008; Seitsonen et al. 2012; Kholkina 2017). Here have been defined shell-tempered ceramics with comb decoration as the 1st group of Estonian Late Comb Ware (Kriiska 1995, 113), porous ceramics with textile imprints (Krijnska & Lavento 2007), ceramics decorated with comb stamp and tempered with shell and feather resembling the Volosovo Ware (Gusentsova & Kholkina 2015; Kholkina 2016), various groups of asbestos-tempered ceramics (Nordqvist et al. 2008), groups of vessels attributed to Pyheensilta (Nordqvist et al. 2008, 295), Kiukainen (Pesonen 1999; Nordqvist et al. 2008, 303), Vojnavolok-XXVII and Orovnavolok-XVI Ware (Sorokin et al. 2009a; 2009b). They all have a few properties common with Late Comb Ware as described by Europaeus-Äyräpää (1930, 188): organic temper, sparse and shallow decoration, straight or slightly profiled walls.

From the whole amount of materials it is worth separating a group of ceramics, which resembles the first group of the Late Comb Ware (Uskela Ware, Ka III: 1) according to the descriptions provided by Europaeus-Äyräpää. These vessels are of considerable interest for the study as, primarily because of their shape and decoration, they are typologically similar to the previous pottery type of the Middle Neolithic period with which they coexist for a certain time (Vikkula 1981, 66; Lang & Kriiska 2001; Pesonen 2004, 87; Seitsonen et al. 2012).

Overall, in the current article the terms “Uskela Ware” and “Late Comb Ware” are not totally synonymous, at least for the Karelian Isthmus region. The first expression is understood as a certain specific group of the Late Comb Ware according to the descriptions given by Europaeus-Äyräpää. The second term has

a wider meaning and is used as an “umbrella term” for the Uskela Ware and for similar pottery as well (Gerasimov et al. 2003; Nordqvist et al. 2008; Seitsonen et al. 2012).

The purpose of the study is to describe a group of ceramics which resemble the Uskela Ware from the collections of archaeological sites on the Karelian Isthmus in the context of cultural and historical processes at the turn of the Neolithic period – beginning of the Early Metal Period (2nd half of the IV–III millennium BC). The tasks are to identify the complexes with ceramics similar to the Uskela Ware in the collections, to give a detailed description of the technology, shape and decoration of the vessels and to define chronological framework and areal of their distribution. On the Karelian Isthmus there are sites, where Europaeus-Äyräpää in 1930 attributed ceramics as Uskela although with some differences from the pure type of ware (Europaeus-Äyräpää 1930, 188). Therefore, the main questions are: whether there are more sites with such ceramics and what are its peculiar features on this very edge of the Uskela Ware areal.

### **Research history and features of Uskela Ware**

Neolithic Comb Ware was separated into two groups – the porous one and the other with mineral temper – firstly by A. A. Inostrantsev in his book published in 1882 and based on the results of his excavations carried out during the construction of the Novoladozhsky channel. Inostrantsev thought that these two groups belonged to the same population, but had a different functional use (Inostrantsev 1882, 189).

J. Ailio also pointed out the porous structure of ceramic sherd as a special feature for ancient pottery. He described porosity as a typical trait of ceramics primarily on the Åland islands, though it is also met on continental settlements (Ailio 1909, 83).

In 1930, A. Europaeus-Äyräpää presented in his work a three-part classification for the pottery of the Stone Age from Finland and the Karelian Isthmus. The system includes Early (Ka I or Sperrings), Typical (Ka II or TCW) and Late Comb Ware (Ka III or LCW). According to Europaeus-Äyräpää each of these stages was subdivided into two periods – the early and the late one. With regard to the Late Comb Ware these periods were named Uskela (Ka III: 1) and Sipilähaka (Ka III: 2). However, the second pottery group was discovered only on few archaeological sites near Turku in western Finland (Pesonen 1999). As a separate type of pottery, Late Comb Ware, Ka III: 1 (Uskela Ware) was firstly defined primarily on the base of materials from western Finland – from Nyland till southern Ostrobothnia. Later the geographical distribution of this pottery type turned out to be much wider – until the Karelian Isthmus (the archaeological sites Häyrynmäki, Säkkijärvi, Pitkäjärvi) and western Karelia (Kurkijoki Kuuppala, Otsoinen, Koirinoja) to the east.

According to Europaeus-Äyräpää the main features of Uskela Ware (Ka III: 1) are:

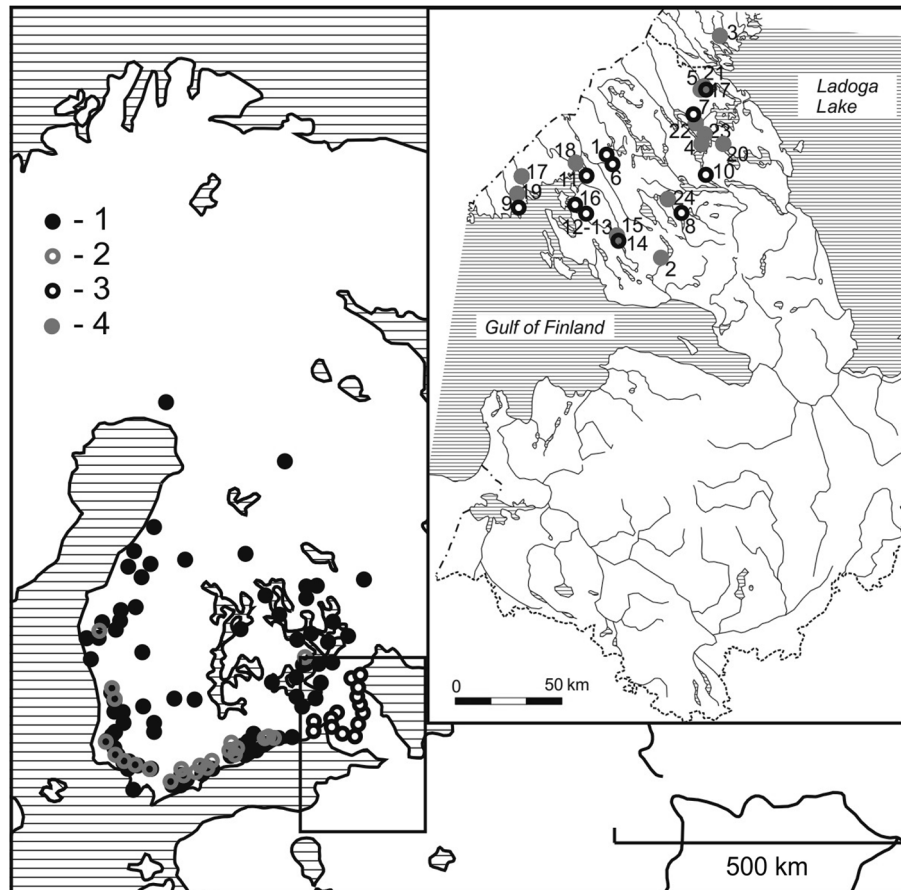
- porous structure of the sherd after the temper of limestone/crushed shells/burned bone was leached out;
- round or slightly pointed bottom;
- evenly thick walls, with rim not thickened;
- smooth, almost glossy surface;
- pits prevailing in the decoration instead of comb stamp imprints;
- decoration consisting of horizontal rows of sparse pits, supplemented with shallow pits, incisions, imprints of 2–3-toothed comb stamp, strokes;
- a lot of space left empty without decoration (Europaeus-Äyräpää 1930).

Already in 1930 Europaeus-Äyräpää mentioned some differences between the ceramics from western Finland, taken as a standard, and the similar one from Karelia. In Karelia, decoration of porous ware is denser – and on the whole it resembles “Central Russian Late Pitted Ware” (Europaeus-Äyräpää 1930, 188).

Later A. Vikkula presented a detailed description of Uskela Ware from the archaeological sites Maarinkunnas and Stenkulla in Finland (Vikkula 1981). She points out that the descriptions given by Europaeus-Äyräpää are rather schematic – and such ceramics is actually quite diverse. The distinctive feature of Uskela pottery is, again, its porous structure, left from the limestone temper (sometimes combined with quartz sand or crushed stone), in some cases a temper of burned bone and imprints of shells of freshwater mollusks were traced. Vessels were made in coiling technique with coils of 3–5 cm wide, beginning from the bottom. On average, the Uskela-type vessels are between 11–50 cm in diameter and therefore a bit smaller than those of the previous Typical Comb Ware. They have rounded bottoms. The rims are straight or slightly beveled inside. Though pits are dominant in the decoration, there are also shallow pits of different shapes and sizes, nail incisions, drawn lines and comb imprints (Vikkula 1981, 29).

Vikkula separated homogeneous impurity-free complexes of Uskela Ware and outlined the range of its distribution. It covers only the southern coastal part of Finland (Fig. 1): from the Åland islands to the modern Russian border (Vikkula 1981, 63, fig. 9). The archaeological sites containing the ceramics similar to Uskela ware were also discovered in south-western Ostrobothnia. They were defined by the researcher as a transitional type from the late phase of Typical Comb Ware to the Uskela Ware itself (Vikkula 1981, 65).

After the works of Vikkula the term “Uskela Ware” was used rather rarely. In papers devoted to typological diversity of ceramics (e.g. Nordqvist 2015) or in catalogs of archaeological sites (e.g. Gerasimov et al. 2003; Huurre 2003; Nordqvist et al. 2008) and in papers dealing with chronology (e.g. Mökkönen 2008; Seitsonen et al. 2012) it is usually replaced by a broader term “Late Comb Ware (Ka III)”. It seems that the typology of Europaeus-Äyräpää nowadays can be used only for the coastal sites in Finland (Carpelan 1979; Vikkula 1981; Pesonen 1999; Nordqvist 2015). However, even there it “may no longer be totally relevant or precise enough” (Leskinen 2003) – and for example imprints of comb stamp



**Fig. 1.** A map of archaeological sites with the Late Comb Ware. 1 – distribution of Late Comb Ware according to Pesonen 1999, 2 – archaeological sites with the Uskela Ware according to Vikkula 1981, 63, 3 – archaeological sites with the Uskela-like Ware mentioned in the text, 4 – archaeological sites with Late Comb Ware (Ka III) on Karel'ian Isthmus (1 – Gvardejskoe-1, 2 – Johannes Kaijala Väntsi, 3 – Johannes Kaijala Myllykangas, 4 – Kankaanmäki 1–2 (Kaukola Kankaanmäki)), 5 – Kyöstälänharju 1, 2, 3 (Kaukola Kyöstälänharju), 6 – Kanneljärvi-1, 7 – Kurkijoki 52 Kuuppala Kalmistomäki Räkköläinen, 8 – Kaukola Nököpelto, 9 – Novoselki-5 (Seppälä 2, 4), 10 – Ozernoe-3, 11 – Räisälä 18 Virtsola Pitkäjärvi, 12 – Johannes Rokkala Mutala, 13 – Muolaa Telkkälä Silino, 14 – Säkkijärvi Ravi-1, 2, 15 – Sovinlahti, 16 – Viipuri Kärstila Häyrynmäki, 17 – Nevskoe-4 Riukjärvi P. 13 (Kaukola Tiitunmäki Varpa), 18 – Viipuri Selänkangas, 19 – Säkkijärvi Meijermäki (Kirkonkylan osuuskauppa), 20 – Torfyanoe (Pyhäjärvi Konnitsa Äijö, Antti Äijö), 21 – Kaukola Lavamäki, 22 – Ozero Sinee-1 (Räisälä 8 Kökkölä), 23 – Mel'nikovo-2, 3 (Räisälä 27 Hovi Kalmistomäki), 24 – Klimovo-1 (Muolaa Kannilanjoki).

which were rare but possible in Uskela Ware according to Europaeus-Äyräpää (e.g. Europaeus-Äyräpää 1930, 188, abb. 79), later seemed as a completely Typical Comb Ware attribute (Leskinen 2003, 10).

But we want to emphasize that on the Karel'ian Isthmus porous ceramics of the Early Metal Period is very diverse and as in Finland there are yet groups of

pottery with no label at all (Mökkönen 2008, 129; Nordkvist & Mekkenen 2015, 155). In this case, it seems important to separate and analyse a group of vessels which are more or less alike the Uskela Ware with its concrete unique properties and local peculiarities and can be attributed as Late Comb Ware according to Europaeus-Äyräpää.

### Chronology

A. Europaeus-Äyräpää described Uskela Ware as a late phase of Comb Ware, that “degraded” in comparison to “the high style” (Ka II). However, nowadays the two groups of Comb Ware are not regarded as following each other after the appearance of the new data of radiocarbon dating. Whereas Typical Comb Ware is dated 3900–3400 BC on the territory of Finland, the Late Comb Ware existed between 3600 and 3200 BC (Asplund 2008, 52), which means that they partly coexisted. At the same time, in eastern Finland Late Comb Ware could have existed much longer – until as late as 2800 BC (Seitsonen et al. 2012, 111; Nordkvist 2015, 257). Sometimes the beginning of Late Comb Ware is dated to 3800 BC (Leskinen 2003, 24; Pesonen & Leskinen 2011, 300).

There is very little data on the absolute chronology of Late Comb Ware from the archaeological sites of Karelian Isthmus. In the summary paper, in which all the available chronological data for 2012 were listed, there are four datings made on crust samples from Ka III ceramic sherds (Mökkönen 2008; Seitsonen et al. 2012). On the whole, all the dates correspond to the chronology of Late Comb Ware for the territory of Finland (Table 1).

### Materials and methods

A. Europaeus-Äyräpää indicated the presence of Uskela Ware on the following sites: Pitkäjärvi, Häyrynmäki, Kurkijoki Kuuppala Kalmistomäki, Säckijärvi (Europaeus-Äyräpää 1930). Ceramics of Late Comb Ware (Ka III) was found later on several more sites, including Johannes Rokkala Mutala, Johannes Kaijala Väntsi, Johannes Kaijala Myllykangas, Kaukola Kankaanmäki, Kaukola Kyöstälänharju, Kaukola Tiitunmäki Varpa, Kaukola Lavamäki, Räisälä 8 Kökkölä, Räisälä 27 Hovi Kalmistomäki (Nordkvist et al. 2008), Muolaa Kannilanjoki, Pyhäjärvi Konnitsa Äijö, Säckijärvi Meijerimäki, Viipuri Selänkangas (Huurre 2003).

**Table 1.** Radiocarbon dates of Late Comb Ware from Karelian Isthmus (Asplund 2008, 52; Seitsonen et al. 2012, 111; Nordkvist 2015, 257)

Kaukola Riukjärvi Kyöstälänharju	4780 ± 70	Hela-359	3650–3380
Viipuri Häyrynmäki	4550 ± 60	Hela-358	3370–3100
Virolahti Meskäärty	4535 ± 35	Hela-1613	3360–3110
Virolahti Meskäärty	4520 ± 40	Hela-1615	3350–3110

Selection of materials for the detailed study was made with an emphasis on the sites, which were excavated during the recent years. For these sites, we have planigraphic and stratigraphic data and the results of some scientific analyses making it possible to separate archaeological complexes of different periods. The study was based on 370 ceramic sherds of 23 vessels from the archaeological sites Gvardejskoe-1, Kanneljärvi-1, Nököpelto, Seppälä 2 and 4, Muolaa Telkkälä Silino, Sovinlahti, and Ozernoe-3 (Fig. 1, Table 2).

More than a half of the materials come from Ozernoe-3 archaeological site, located 13 km north-east from Vyborg. This site was excavated in 2006 under the supervision of D. V. Gerasimov on an area of 150 sq. m. The main part of the artefacts was found under the turf and rich in coal and slags anthropogenic layer in reddish sand with a thickness of about 20 cm. Sediments of the Littorina Sea transgression (5350–4850 BC) underlaid the cultural layer. The emergence of the settlement complex here is coincided with the draining of this area after the regression of the Littorina Sea (the end of IV–III millennium BC) (Sapelko et al. 2008, 162).

The cultural layer was rich in fragments of Typical and Late Comb Ware (sherds from at least 81 and 15 vessels respectively were found). Two ceramic

**Table 2.** The amount of the studied material

Site	Vessels, pcs.	Fragments, pcs.	Other ceramic types	Studies
Gvardejskoe-1	1	4	Pölja Ware, Corded Ware	Belskij, S. V., 2003 (survey); 2007 (excavations); Gerasimov, D. V., 2006 (excavations)
Kanneljärvi-1	1	1	Typical Comb Ware, Pölja Ware, Corded Ware, Late Comb Ware with shallow decoration	Timofeev, V. I., 1984 (survey)
Ozernoe-3	15	352	Typical Comb Ware	Lysitsyn, S. N., 2003 (survey); Gerasimov, D. V., 2006 (excavations)
Kaukola Nököpelto	1	1	Typical Comb Ware, Late Comb Ware with shallow decoration	Ailio, J., 1906 (survey); Tallgren, A. M., 1907 (survey); Ailio, J. – Pälsi, S., 1908 (excavations); Urban, U. N., 1978 (excavations); Timofeev, V. I., 1993; 2002 (survey)
Seppälä 2, 4	1	1	Kierikki Ware	Gerasimov, D. V., 2002 (survey)
Muolaa Telkkälä Silino	1	8	Sperrings Ware, Typical Comb Ware, Kierikki Ware	Timofeev, V. I., 1984 (survey); 2000 (excavations); Gerasimov, D. V., 2001 (excavations)
Sovinlahti	3	3	Typical Comb Ware, Late Comb Ware with shallow decoration	Lysitsyn, S. N., 2003 (survey)
<b>Total:</b>	<b>23</b>	<b>370</b>		

complexes are not clearly separated from each other in stratigraphy or planigraphy, and in most of large earth structures (ditches or pits, filled with cultural layer and rich in ceramic sherds and stone tools) both types of pottery were found. The site Ozerno-3 is the largest complex of the Uskela-like ceramics in the eastern part of the Gulf of Finland region among the archaeological sites excavated during the last decades and available to the author for detailed study.

Multilayered stratified settlement Silino is situated on the sand coast of Lake Pravdinskoe. It was excavated in 2000–2001 by V. I. Timofeev and D. V. Gerasimov. The total thickness of cultural layer here is not less than 2 metres. Layer 4, which contained the Late Comb Ware, is under deposits of Lake Saimaa transgression (around 3700 BC). The settlement of the studied period was formed apparently directly on the transgression deposits in a time of regression and relative stability of Lake Ladoga (Gerasimov & Kul'kova 2003; Takala 2004).

The rest of archaeological sites with the studied group of the Late Comb Ware are located mostly on the terraced edges of lakes and channels. These sites are situated on different elevations: from the lowest ones that are located just on the modern water level – on the central (moraine) upland of the Karelian Isthmus (Kanneljärvi-1), till the elevation of 15–17 m above the sea level in the north-western part of the Isthmus (Ozerno-3, Häyrynmäki, and Gvardejskoe-1) and 20–24 m – in north-eastern (Seppälä 2, 4, Pitkäjärvi, and Nököpelto) (Gerasimov et al. 2003).

The choice of methods for the analysis of ceramic material was made according to the purpose of the study. The ceramic sherds from the sites excavated in recent years on Karelian Isthmus and kept in Museum of Anthropology and Ethnography, Russian Academy of Science were analysed according to the complete list of characteristics. Clay mass was analysed visually, with hand magnifier (x8) and scanning microscope Leica DVM 5000 (x35–x70) in “Geomodel” research park of Saint Petersburg State University. The technique of vessel-making was studied on sherds with broken edges in the places where the junctions of vessels' structure elements (coils or patches) were displayed. The reconstruction of the shape of the vessels was made according to the preserved profiled fragments, mainly rims and bottoms. The approximate diameter of the vessel was calculated according to the following formula  $d = \frac{b^2}{a} + a$  (Vygodskij 1965, 292), where b – a half of an arc chord; a – the height of the arc that is limited by the arc chord. The decoration was analysed through its structure: morphology of decoration elements, combinations of used elements, arrangement of elements in motifs and compositions.

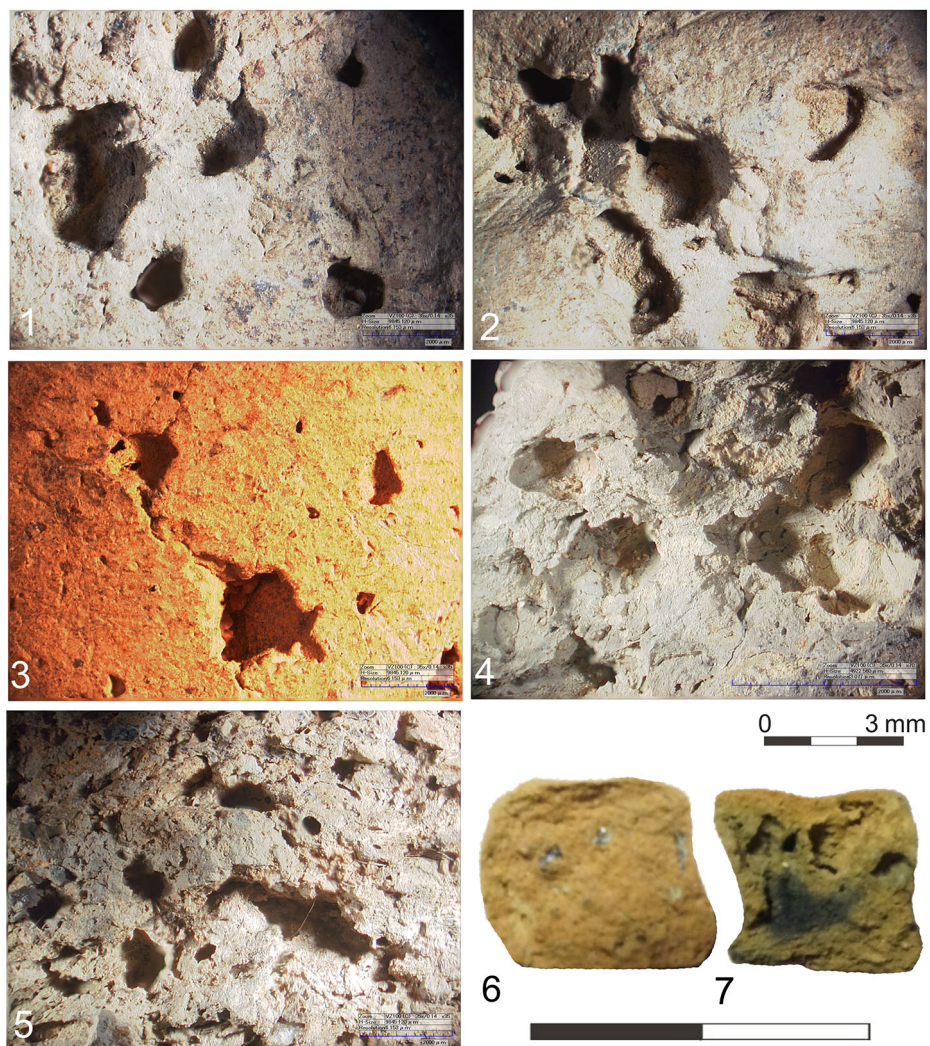
The author also had a chance to work with the collections of Late Comb Ware from Kaijala Väntsi and Räisälä Pitkäjärvi sites on the Karelian Isthmus from the National Museum of Finland (Helsinki). One more site in this list is Salo Sinivuori with Uskela Ware in complex with other pottery types from the coastal zone of Finland. These materials (more than 150 large fragments) were analysed as additional according to the short programme without making technological



analyses. The rest of materials were studied using the available literature about the sites on the Karelian Isthmus and the neighbouring regions.

### Results. Clay paste composition

One of the typical features of the Uskela Ware is its clay paste composition. All the examined fragments have a special porous structure, left after an unidentified substance was leached or “burned” out. The pores have amorphous rounded outlines; their size is 1–3 mm (Fig. 2: 1–5). As a rule, they are spread more



**Fig. 2.** A temper of limestone (?) in the studied ceramics. 1–5 – Ozernoe-3, 6 – a sample with tar-temper (before firing), 7 – a sample with tar-temper (after firing).

or less evenly across the body of the sherd without forming clear accumulations. During visual and microscopic examination neither substance left in the pores nor readable structure on their walls (f.e. tubulose – as for the calcinated bones) (Bobrinskij 1978, 105), which could help to define the type of temper, were traced. It is worth noting that in none of the cases the above-mentioned pores were combined with traces of any other kinds of temper, either mineral or organic.

Such traces have never previously been described on the ancient ceramics of north-western Russia's forest zone. None of the organic tempers used here for pottery making (feather, wool, plant remains, animal manure and bird dung, shells, organic solutions) does not correspond to the description of the existing porous structure.

At the same time, similar traces creating a steady equally “porous” sherd structure were described for ceramics from Sweden and western Finland. In this case, such traces are usually interpreted as those left from limestone (calcite) temper or burned bone (Europaeus-Äyräpää 1930, 183), which are not always possible to differentiate without special chemical analysis (Larsson 2009, 204). Swedish archaeologists defined the type of temper visually (Österholm 1989, 99), with a microscope (Bagge & Kjellmark 1939, 109) and with the help of petrographic investigation of thin sections (Löfstrand 1974, 136; Hulthén 1977; 1985, 334). In cases of good preservation (f.e. in calciferous soils of Gotland) the calcite temper itself left in the pores was documented (Löfstrand 1974, 121; Hulthén 1977, 144; Larsson 2009, 228).

When the sherds were washed with hydrochloric acid (which when contacting with limestone causes its “boiling” (Löfstrand 1974, 136; Bobrinskij 1978, 80; Sementovskij 1999, 6) no visual reaction was observed. This means either that the temper is not connected with limestone, shell or bone, or that it has been totally leached or “burned” out during the firing or “dissolved” in the archaeologization process.

In this case, it seems that petrographical method, the main aim of which is to define the mineral composition of various components in a ceramic sherd in a thin section (Kul'kova 2011, 164; 2012, 103), is less effective in defining the type of temper that has left no traces in pores. It appears that chemical analysis (Larsson 2009, 204) may be more effective in further research if there is some substance left in pores. Another solution is the tomographic study of sherds: it provides an opportunity for a very detailed and large-scale visualization of pores (Kul'kova et al. 2016, 216).

In order to elucidate the question of the temper type, an experimental modelling of the ceramic samples containing the assumed types of temper was undertaken. They were later compared with the archaeological samples. First, we analysed the existing collections of experimentally made ceramic samples in the laboratory of Povolzhye State Humanitarian and Social Academy in Samara experimental expedition and then in the laboratory for ancient pottery study in Institute of Archaeology, Russian Academy of Science in Moscow. While

comparing the studied ceramics with the available experimental samples in Samara experimental expedition, the greatest similarity in all the distinctive features was noted for the tempers of wax and resin.

During the experiment, samples of clay paste with an addition of two assumed components – dry granular conifer resin and crushed limestone – were made. Concentration of temper in the experiment was close to the archaeological examples – 3/1 and 5/1 (clay/temper).

Based on the results of the conducted experiment, we found out that after the firing the experimental samples get the porous structure (Fig. 2: 7) similar to the one traced on in the archaeological sherds: these pores also have irregular rounded shape. The probable conclusion is that resin and limestone react similarly during the firing: they burn out, increasing in size (with gas extraction?) and creating specific “bladdery” pores of irregular shape. Therefore, we can admit that the microscopic analysis did not help to clarify the type of temper. Based on the fact that in Sweden and western Finland a tradition to use calcinated clay and a temper of calcite-limestone was confirmed for sure during the existence of the Pitted Ware, gives a possibility to assume that this particular kind of temper was also used by potters on the Karelian Isthmus. At the same time, the use of resin as temper cannot be completely denied.

### **Results. Morphology**

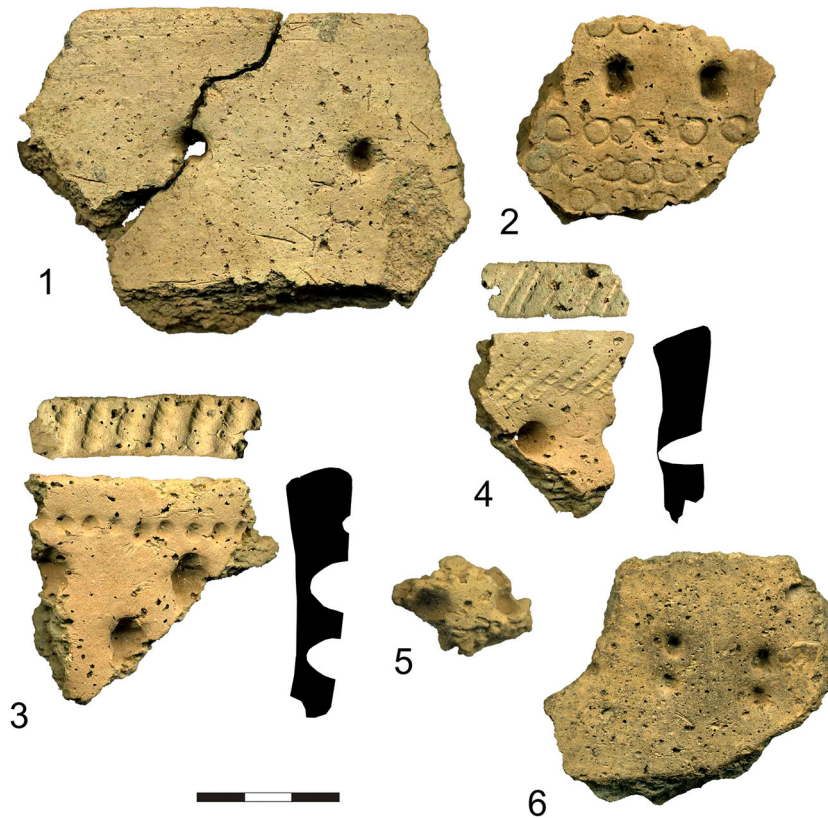
For the seven of examined vessels we can conclude that they were made in coiling technique, and coils were connected in N-manner slightly overlapping each other.

Almost all of the examined vessels (19 out of 23) have a very smooth, slightly glossy, outer surface without any traces of special technological treatment (Fig. 3). The inner surface of the sherds can be either glossy or with traces of smoothing. These traces look like very thin parallel mostly horizontal lines with a very low relief that were left by papillary finger patterns or some soft tool (a wooden knife?).

Among all the examined materials, there are preserved fragments of bottoms of six vessels. They are all rounded or slightly pointed, without thickening.

We can come to a certain conclusion regarding the size of the vessels according to the preserved parts of the rims. Hence, there are noted middle-sized vessels (with the rim diameter of 35–45 cm, three cases) and small ones (15–17 cm, two cases).

Among the analysed fragments of the rims, the following profile types can be distinguished: straight (12 cases), reclined inside (nine cases), thickened and reclined inside (seven cases), thickened from the inside (six cases), T-shape (one case) and dihedral (one case). Overall, we can conclude that the mouth of the vessel is in most cases slightly closed or straight, but it is neither turned outside nor has an S-shaped profile.



**Fig. 3.** Fragments from different vessels of the Uskela and Uskela-like Ware. 1–4 – Ozernoe-3, 5 – Gvardejskoe-1, 6 – Nököpelto.

Most of the rims are decorated with inclined imprints of comb stamp (16 cases). Two more vessels have pits on their rims and another two do not have any decoration on the rim. In this case, it is interesting that even if the body of the vessel is not decorated with comb stamp (only with pits or shallow pits) its rim may still be covered with comb imprints (Fig. 3: 3). Almost regular decoration of the rim using comb stamp is very characteristic for Typical Comb Ware and becomes its distinctive feature (Europaeus-Äyräpää 1930; Pesonen 1999). This fact can indirectly prove the similarity of the studied ceramics not only to Uskela but also to Typical Comb Ware.

Speaking about the decoration of the vessels themselves, we can mention the following essential elements: pits (64 cases), imprints of comb stamp (44 cases), small shallow pits (six cases), imprints of a hollow rod/grass stalk/bone (two cases), drawn lines (five cases). Pits that dominate in the decoration have different shapes: round and conical, oval, 8-shaped with a narrowing in the middle, square-like (marked with a butt of a rod – Fig. 3: 2).

The main ornamental motif of the vessels is a horizontal row of separate elements. In individual cases there are geometric motifs made with comb stamp – zigzags, dashed and contoured rhombs, dashed zigzag stripes.

In general, speaking about the compositional construction of the decoration on the studied group of the Late Comb Ware on the Karelian Isthmus we should note that a significant amount of space is left empty. In the collections from Ozernoje-3 and Kaijala Väätsi there are vessels decorated with only one row of pits under the rim (Fig. 3: 1). In other cases, pits can be arranged in several horizontal rows in a “chess manner”. In addition, the rows of pits are sometimes separated from each other with one or several rows of imprints of hollow rod, comb stamp or shallow pits. Comb imprints can be either short or wide – in this case they are usually arranged in a row – or long and thin, forming geometric motifs. In some cases pits on the upper part of the vessel are linked by a wide drawn line.

In some of the examined ceramic complexes, pottery similar to the Uskela Ware is combined with Typical Comb Ware. During the study, an attempt was made to compare the decoration of Typical Comb Ware and Late Comb Ware from the Ozernoje-3 archaeological site, where the collections of these groups of vessels are the most representative (81 vessels of the first type and 15 – of the second). The difference is particularly distinct when it comes to the ornamental motifs. Typical Comb Ware has geometric patterns (triangles, rhombs and more complicated geometric motifs) on more than a half of the vessels, while only one fifth of Late Comb Ware has such a pattern.

As a conclusion of the analysis we can separate all studied ceramics into Uskela Ware (eight vessels) and Uskela-like or “Uskela” (15 vessels). The second and the largest group has some peculiarities such as comb stamp in decoration, inclined inside and decorated rim. Except for the decoration and the rim shape, all other properties of both groups are the same: porous structure, glossy surface, unprofiled walls, a lot of empty undecorated space and the dominance of pits. All that means these vessels belong to the same pottery tradition, which is much alike Uskela, but has some differences. Therefore, we may call it a group of Late Comb Ware resembling Uskela. The mentioned differences make a part of this ceramics look like Typical Comb Ware and may be caused by hybridization – superficial imitation of Typical Comb Ware exterior with the preservation of Late Comb Ware technology.

### **Discussion. Technological features**

Vessels of the studied group of the Late Comb Ware stand out quite distinctly from the rest of the pottery of the Late Neolithic and the Early Metal Period in the eastern part of the Gulf of Finland region. They are distinguished by a special porous structure of the sherd, its glossy surface, special shape and decoration of the pots.

Considering the mentioned period we can speak not only about the spread of many local styles and types of pottery, but also about some integration processes among certain population groups. This idea is based on the spread of mixed multicomponent receipts of clay paste composition and in some common tendencies such as shallow ornamentation, disappearance of deep conical pits, textile imprints, S-profiling (Meinander 1954, 162; Yanits 1959, 148; Vikkula 1984; Timofeev 1993, 30; Lavento 2001, 33, 112; Krijnska & Lavento 2007, 243; Zhul'nikov 2008; Kholkina 2017). Such features are typical, for example, for Volosovo Ware, which is spread on the vast territory to the east from the Gulf of Finland between the Volga and the Oka rivers (Krajnov 1981; 1987) – and sometimes they are seen as a kind of epoch-making traits (Vikkula 1984; Chalikov 1986). The mentioned features, with a few exceptions (for example, for asbestos-tempered Kierikki Ware that is decorated with pits (Siiriäinen 1984), are typical for organic-tempered Ware in Finland (f. e. Pyheensilta Ware) and Karelia (Vojnavolok-XXVII and Orovnavolok-XVI). The shallow, and therefore mainly stamped ornamentation, is often associated with the special technological features of porous and asbestos-tempered ceramics (Gurina 1961, 50; Zhul'nikov 1999, 41).

At the same time, we should mention that the Uskela-like group of ceramics from the Karelian Isthmus might have not been porous for the people who made and used it (e.g. Larsson 2009, 199). Limestone in ceramics is partly destroyed by heating at 600–650 °C, and completely burns out while fired at the temperature above 800 °C (Hulthén 1977, 157; Bobrinskij 1978, 80; Rye 1981, 98). Experiments have shown that such temperature can be achieved in a simple hearth as well as in a special kiln (Volkova & Tsetlin 2016, 76). However, the extensive firing at such high temperatures is not typical for the pottery of the Neolithic period in the Eastern Europe forest zone (Kul'kova 2012, 135) (temperature above 650–700 °C – is the temperature of clay incandescence (Bobrinskij 1999, 93).

Speaking about the reason for the limestone to “burn out”, we can give an example of the archeological site Podolje-1 in the southern Ladoga area (Gusentsova et al. 2014a; 2014b). In the ceramic sherds from Podolje-1 shell temper is traced by pores on the outer surface and on the old breaks, while on the fresh breaks it is seen as a white powdered substance – which is “unburned”. In this case, we can suppose that – at least sometimes – the shell temper is “burned out” not because of the firing while creating and using the pottery, but because of the deposition conditions of the sherds (Kholkina 2016, 54). On the Podolje-1 site, the shell has probably been preserved due to the special conditions of a peat bog. At the same time, the cultural layer on the majority of the archaeological sites on the Karelian Isthmus consists of sand deposit – and does not provide the same preservation conditions. A number of researchers made such remarks regarding limestone, relatively similar to shell in chemical composition (CaCO<sub>3</sub>) (f.e. Europaeus-Äyräpää 1930, 183; Larsson 2009, 91).

Therefore, the discussed group of ceramics according to its morphology (deep conical pits, rounded bottom, thickened decorated rim) and its technological features (single-component granulated solid temper – presumably limestone or resin) resembles the Typical Comb Ware. We can suppose that this ceramic type represents in itself a development line, different from other groups of Early Metal Period pottery.

### Distribution

The Karelian Isthmus region seems to be the easternmost periphery of the Uskela Ware areal (Europaeus-Äyräpää 1930, 188; Huurre 2003, 199; Nordkvist 2015, 257; Nordkvist & Mekkenen 2015, 155). Nowadays it seems that the ceramics called Uskela is spread on a rather limited area – on the narrow coastal line of Finland including probably the northern part of the Karelian Isthmus (Fig. 1). Such localization of archaeological sites can serve as an evidence of a particular narrow specialization on marine resources – seal hunting and fishing (Vikkula 1981, 130). At the same time the archaeological sites with the Typical Comb Ware are spread much wider, including the inland areas far from the coast of the sea – therefore, these people probably used a wider range of resources (Gerasimov et al. 2010).

The cases when Uskela Ware is found together with Typical Comb Ware as well as radiocarbon dates obtained for the materials from Finland prove that this ceramic type existed only in the 2nd part of IV millennium BC. Dating results falling into III millennium BC are rarely found.

All that means that for the north-western regions of Russia the existence of Uskela-like group of the Late Comb Ware is probably just a local phenomenon. The main distribution area of the Uskela Ware is the territory of modern Finland. This might be ascribed to the separate habitation of the bearers of this ceramic tradition, as well as to their economic specialization in marine resources. Similarly, for example, the spread of Pitted Ware with “eastern” traits in Sweden during the same period is seen as a part of a so-called “deneolitisation” – a return to the marine appropriating economy (Larsson 2017, 190). Perhaps, such a narrow specialization did not allow these people to spread on vast regions. This finally led to the fact that the tradition itself existed for a comparatively short time in this area.

On the Karelian Isthmus, deposits of limestone as well as calcinated clays are almost absent (Kiselev et al. 1997, 168, fig. V). At the same time, on the territory of modern Leningrad Oblast the largest deposits of limestone were found in its south-western and eastern parts – along the Baltic Klint (Geological map of the USSR 1989, 28). However, Late Comb Ware itself as well as any other limestone-tempered ceramics has never been found here. Moreover, the study of limestone-tempered ceramics has shown that this particular temper makes clay

vessels fragile – and in some cases it forced ancient people to add organic or bone to strengthen them (Hulthén 1985, 334). It means that the appearance of the limestone-tempered ceramics can hardly be seen as determined by environmental conditions – more likely as a part of a tradition. Here we can make a parallel with asbestos temper, which was first used in south-eastern Finland – the region where asbestos deposits were found – and then spread until the Karelian Isthmus and further to the east. It means that the tradition of adding limestone temper to clay must originate in the area with limestone deposits.

A custom of using limestone as a temper for the clay paste could have probably appeared on the territory of Sweden – on Gotland Island – where only hardly calcinated clays rich in limestone were present (Hulthén 1985, 334). Later this tradition, as well as the ancient potters who established it, spread wide along the territory of the Swedish mainland (Löfstrand 1974, 136) and the neighbouring parts of Finland (Larsson 2009, 199), and in the Early Metal Period it reached Ladoga Lake and Karelia (Europaeus-Äyräpää 1930, 186).

A. Vikkula in her work, published in 1981, discussed the question of similarity between Uskela Ware and Säter and Fagervik ceramic types found in eastern Sweden. They are similar in porous structure, predominance of pitted decoration and reclined inside decorated rim. Though there were certainly contacts between the two regions, the problem can hardly be resolved taking into account the lack of data for their chronological comparison (Vikkula 1981, 70). The question of direct contacts among the groups of people who made and used Uskela Ware and Eastern Swedish Pitted Ware is challenging. There are no clear traces of a new incoming population to the Gulf of Finland region during the studied period (Vikkula 1984, 58).

However, we cannot say that traces of cultural connections and common cultural and historical processes between the Karelian Isthmus and eastern Sweden were totally absent. Eastern parallels are taken into consideration when speaking about the origin of Eastern Swedish Pitted Ware (Timofeev 2000; Larsson 2017). Swedish Pitted Ware since Fagervik-1 phase has “eastern” traits: thickened from the inside rim, “stepping back shovel” decoration, diagonal rows of comb stamp imprints, rhombs, pits in a “chess-manner”. These parallels, although here we are probably talking about borrowing of eastern elements on western territories, allow the contacts between these two remote regions, suggesting a reverse movement of cultural traditions.

The similar pottery traits mentioned above began to spread since Fagervik-1 phase. Some similar motifs can also be observed on the later pottery with limestone temper. It is interesting that the temper of limestone firstly appears on the vessels in the very north-eastern part of Eastern Swedish Pitted Ware areal – and in these parts of the areal, the “eastern” traits in shape and decoration also spread first. Their distribution falls on the period 3600–3400 BC and is synchronous with the time when the Late Comb Ware appeared in Finland and on the Karelian Isthmus (Larsson 2017).



On the base of the mentioned typological peculiarities, we can conclude that a group of Uskela-like ceramics from the Karelian Isthmus has much in common with the previous traditions – Typical Comb Ware and Swedish Pitted Ware. Nevertheless, it can hardly be seen as a kind of a transitional stage between them and the later types – this pottery has not much in common with the other groups of the Early Metal Period ceramics. It is possible to presume that the discussed group of pottery disappeared from this territory as the last example of “Neolithic” ceramics – with its large vessels with rounded bottoms and mineral temper, smoothed glossy surface, decorated with deep conical pits and geometric motifs.

### Conclusions

1. In the three-phase periodization of A. Europaeus-Äyräpää, Uskela Ware was described as an early stage of the latter phase of the Comb Ware. However, with the appearance of new data including radiocarbon dating the place of the Uskela Ware in the context of Neolithic and Early Metal Period pottery traditions has changed (f.e. Nordkvist & Mekkenen 2015). Now it should probably be considered as a separate independent type of ceramics within the Comb Ware tradition. Europaeus-Äyräpää in 1930 described vessels of Uskela Ware from the sites on Karelian Isthmus. The current analysis shows that there are some similar vessels, but most of them also resemble the Typical Comb Ware.
2. The studied group of the Late Comb Ware has a few common traits with other groups of organic-tempered ceramics of the Early Metal Period such as porous structure of the sherd and “degradation” of ornamentation. But if the porous structure here is a trace of the “burnt out” limestone temper (a mineral one) or of crushed solidified resin – then this technology is more similar to the use of crushed stone as a temper (for the Typical Comb Ware) than traditional technology of porous ceramics using feathers, plants, shells. At the same time, it is interesting to note that in the decoration of the Uskela-like ceramics from the Karelian Isthmus pits are the dominating element, whereas in many other traditions of the Early Metal Period stamp imprints replace pits.
3. From the chronological point of view the studied group of the Late Comb Ware is one of the earliest groups of the Early Metal period pottery (as well as Kierikki and Vojnavolok-XXVII types in more northern and eastern parts of Finland and Karelia). For a long time it coexisted with Typical Comb Ware and has much in common with it. In this way, drawing the boundary between the Neolithic and the Early Metal Period, it would be more appropriate to define it as Neolithic pottery together with the Typical Comb Ware according to its chronological position and typological features.
4. Finally, the Uskela-like group of the Late Comb Ware of the eastern part of the Gulf of Finland region can probably serve as one of the few evidences of the influence coming to this area from the territories situated far to the west.

### Acknowledgements

This work has been supported by the Russian Science Foundation grant No. 17-77-20041 (project “The impact of global, regional and subregional natural factors on the development of coastal morphosystems of the eastern Gulf of Finland as a human living environment”). The author is thankful to K. Nordqvist and D. V. Gerasimov for their help during the writing of the article and to anonymous referees for their comments to the paper. The publication costs of this article were partially covered by the Estonian Academy of Sciences, the Institute of History and Archaeology at the University of Tartu, and the Institute of History, Archaeology and Art History of Tallinn University.

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## **HILISE KAMMKERAAMIKA RÜHM KARJALA KANNASELT**

### *Resümee*

Neoliitikumi lõpul 4. aastatuhande teisel poolel eKr annab Soome lahe idaosas tüüpiline kammkeraamika (Ka II) aeglaselt teed erinevatele orgaanika- ja asbestilisandiga keraamikarühmadele ning -tüüpidele (Uskela, Kierikki, Pöljä, Orovnavolok-XVI, Vojnavolok-XXVII, Pyheensilta jne). Erinevalt tüüpilisest kammkeraamikast on uus keraamika üpris eripalgeline ja seda võib vaevalt ühtseks traditsiooniks pidada. Kogu materjalist väärib eraldi keraamikarühmana eristamist üks rühm, mis Aarne Europaeus-Äyräpää põhjal sarnaneb hilise kammkeraamika esimesele rühmale (Uskela tüüpi keraamika, Ka III: 1). Käesoleva uurimuse eesmärk on iseloomustada seda Uskela-laadset keraamikarühma Karjala kannase arheoloogilistes muististes: selle tehnoloogiat, morfoloogiat, kronoloogiat, levikut ja päritolu. Analüüs tehti 23 nõust pärineva 383 keraamikakillu põhjal Gvardeiskoje-1, Kanneljärvi-1, Nököpelto, Seppälä 2, 4, Muolaa Telkkälä Silino, Sovinlahti ja Ozernoje-3 arheoloogilistest muististest.

Uurimistöö järelalusena võime analüüsitud keraamikakillud eristada Uskela tüüpi keraamikaks (8 nõu) ja Uskela-laadseks või "Uskela" keraamikaks (15 nõu). Teisel ja suuremal rühmal on mõningaid erijooni, nagu kammtempli vajutised ornamentikas ja sissepoole pööratud ning kaunistatud serv. Peale ornamendimotiivide ja servakuju on mõlema rühma kõik ülejäänud iseloomulikud jooned samad: poorne struktuur, läikiv pind, profileerimata seinad, palju tühja kaunistamata pinda ja lohkude domineerimine ornamentikas. Kõik see tähendab, et nõud kuuluvad samasse keraamikatraditsiooni, mis on väga sarnane Uskelale, aga millel on ka mõningaid erijooni. Seetõttu võime seda nimetada hilise kammkeraamika rühmaks, mis sarnaneb Uskelaga, ehk Uskela-laadseks.

Europaeus-Äyräpää kolmeastmelises periodiseeringus on Uskela tüüpi keraamikat kirjeldatud kui kammkeraamika hilise faasi varast staadiumi. Uute andmete, sh radiosüsinikudateeringute valgusel, on Uskela tüüpi keraamika koht neoliitilise ja varase metalliaja keraamika traditsioonides muutunud. Nüüd tuleks seda tõenäoliselt pidada eraldi iseseisvaks keraamikatüübiks kammkeraamika traditsiooni sees. Europaeus-Äyräpää kirjeldas 1930. aastal Uskela tüüpi nõusid Karjala kannase asulakohtadest. Praegune analüüs näitab, et mõned nõud on sarnased, ent enamik meenutab tüüpilist kammkeraamikat.

Uuritud hilise kammkeraamika rühmal on teiste varase metalliaja orgaanikalisandiga keraamikarühmadega mõned ühised jooned, nagu poorne struktuur ja ornamendi "degradeerumine". Aga kui poorne struktuur on jälg "väljapõlenud" (mineraalsest) lubjakivilisandist või kuivanud ja purustatud vaigust, siis see tehnoloogia on sarnasem kivipurru kasutamisega lisandis (mis on iseloomulik tüüpilisele kammkeraamikale) kui poorse keraamika traditsioonilise tehnoloogiaga, kus savimassis kasutatakse sulgi, taimi ning karpe. Samal ajal on huvitav

tähele panna, et Karjala kannase Uskela-laadse keraamika ornamendis on lohud domineeriv element, samas kui paljudes teistes varase metalliaja keraamika-traditsioonides asendavad kammtempli jäljendid lohke.

Uskela tüüpi keraamika ja kõnealune hilise kammkeraamika rühm levivad üpris väikesel alal Soome rannikutsoonis ning Karjala kannasel. Seega võib antud keraamikat seostada teistsuguseid alasid asustavate kultuurikandjatega, kelle majandus spetsialiseerus merelistele allikatele. Selliselt nähakse "idapoolsete" joontega lohkkeraamika levikut Rootsis samal perioodil "deneolitiseerumise" osana – tagasiminekuks mereressursse kasutava majanduse juurde. Võib-olla ei võimaldanud selline kitsas spetsialiseerumine neil inimestel laiematele aladele levida. See viis viimaks asjaoluni, et traditsioon eksisteeriski regioonis võrdlemisi lühikest aega ja kadus siis jäljetult ning keraamiline materjal ei peegelda selle hübriidiseerumist teiste samaaegsete traditsioonidega.

Kronoloogilisest vaatepunktist on uuritud hilise kammkeraamika rühm üks varase metalliaja keraamika varasemaid rühmi (nagu ka Kierikki ja Vojnavolok-XXVII tüübid Soome ja Karjala enam põhja- ning idapoolsetes osades). Pikka aega eksisteeris see kõrvuti tüüpilise kammkeraamikaga ja neil on palju ühist. Nii oleks õigem seda rühma, lähtuvalt selle kronoloogiast ja tüpoloogilistest joontest, defineerida neoliitilise keraamikana ning koos tüüpilise kammkeraamikaga.

Soome lahe regiooni idapoolse osa hilise kammkeraamika Uskela-laadne rühm on tõenäoliselt üks väheseid tõendeid kaugelt läänepoolsetest piirkondadest lähtuvatest mõjudest.