ЗАПИСКИ ИИМК РАН

• 2019 •

TRANSACTIONS

OF THE INSTITUTE
FOR THE HISTORY OF MATERIAL CULTURE

No. 20

St. Petersburg
2019

ЗАПИСКИ

ИНСТИТУТА ИСТОРИИ МАТЕРИАЛЬНОЙ КУЛЬТУРЫ РАН

№ 20

Санкт-Петербург
2019

ББК 63.4

Записки Института истории материальной культуры РАН. СПб.: ИИМК РАН, 2019. № 20. 204 с.

ISSN 2310-6557

Transactions of the Institute for the History of Material Culture. St. Petersburg: IHMC RAS, 2019. No. 20. 204 p.

В № 20 «Записок ИИМК РАН» публикуются научные исследования, представленные на российско-финляндском симпозиуме «Торговля, обмен и взаимовлияния в доисторическое время и средневековье/историческое время». В разделах «Новейшие открытия и разработки ИИМК РАН» и «Из истории науки» представлены статьи Н. Ф. Соловьёвой и А. В. Полякова, посвященные полевым открытиям на Йылгынлы-депе в Южном Туркменистане и анализу данных радиоуглеродного датирования фёдоровской культуры на Енисее, а также работа С. О. Ремизова, обобщающая информацию об изучении памятников каменного века Волгоградской обл.

Издание адресовано археологам, культурологам, историкам, музееведам, студентам исторических факультетов вузов.

The 20th issue of the "Transactions of IHMC RAS" contains the Proceedings of the Russian-Finnish Symposium "Trade, Exchange and Contacts in Prehistory and in the Medieval/post-Medieval Times". The sections "Newest discoveries and developments" and "From the history of science" present the papers by N. F. Solovyova and A. V. Polyakov devoted to field discoveries at Ilgynly-depe in South Turkmenistan and to the analysis of radiocarbon dates obtained for the Fyodorovo culture on the Yenisei river, respectively, as well as the work by S. O. Remizov who summarizes the information about the Stone Age sites of the Volgograd oblast.

The volume is intended for archaeologists, culturologists, historians, museum workers, and students of historical faculties.

ISSN 2310-6557

СОДЕРЖАНИЕ

СТАТЬИ

Торговля, обмен и взаимовлияния в доисторическое время и средневековье/историческое время

Новейшие открытия и разработки ИИМК РАН

ИЗ ИСТОРИИ НАУКИ

ХРОНИКА

AD MEMORIA

CONTENTS

RESEARCH PAPERS

Trade, exchange and contacts in prehistory and in the medieval/post-medieval times

EARLY METAL AGE BRONZE AXES IN FINLAND: AN OVERVIEW[1]

M. LAVENTO[2]

Keywords: *Akozino-Mälar axes, Ananino culture, bronze analysis, casting moulds, Maaninka axes, Sär 2 -ceramics, Seima axes, Textile ceramics.*

The article describes the over twenty Early Metal Age bronze axes of eastern origin that have been found Finland and provide their dates. The chronological focus is ca. 1900–200 BCE. Most of the early metal finds the Finnish inland are socketed axes. On a general level, these follow a typology, even if each individual axe was a piece of the handicraft and differed from all the others. According to research tradition in Finnish archaeology, the very restricted number of bronze finds from the period does not preclude drawing conclusions about cultural connections. Obvious signs of the Scandinavian Bronze Age in the coastal zone of the modern Finland are stone cairns and certain bronze items. In the inland, ceramic studies give plenty of archaeological footprints of eastern connections to north-western Russia in the Early Metal Age.

Axes of the Seima type have been found as stray finds in Finland (Table 1). Lacking archaeological find contexts, no dates can be provided for the individual items. Judging by the fact that early Textile ceramics in the area dates to the 20th century BCE, there is a strong reason to suggest that the Finnish Seima axe finds are as old as the Seima-Turbino phenomenon in Russia (Fig. 1). The local production of bronze implements might have begun in Finland at the end of the 2nd millennium BCE, which is the suggested date for the axes of Maaninka type (Table 2). The axe is the result of a challenging bronze technology, made by a skilled handicraftsman (Fig. 2). The very restricted distribution of this specific axe type suggests that it could be a local innovation. At the end of the 2nd millennium BCE, Akozino-Mälar axes spread over a large area: they are found all the way from central Sweden to the Middle-Volga region, including Finland (Fig. 3, Table 3). A few casting moulds of these axes are known in Finland, too. Only one bronze axe of Ananino type has been found in Finland and has the title of the youngest bronze axe in the country. However, a few axes of Ananino type were probably cast in the inland in the second half of the 1st millennium BCE, as a few casting moulds have been found (Fig. 4).

Copper and bronze were imported goods that could not be mined anywhere in Finland in prehistoric times.

DOI: 10.31600/2310-6557-2019-20-35-52

---

[1] The article is published in the author's edition.

[2] Department of Cultures, University of Helsinki, Archaeology, Unioninkatu 38, Helsingin yliopisto, 00014, Finland.

Introduction

The article discusses Early Metal Age bronze axes from Finland and gives a full list of finds (including the Karelian Isthmus, ceded to the Soviet Union after World War II). The types discussed are Seima, Maaninka, Mälar (Akozino-Mälar) and Ananino axes.

Attention is paid on axes, because they are better preserved than more fragile prehistoric items such as pins and brooches. Axes have been found in several districts throughout Finland, and casting moulds indicate some local production of these tools in the area. They illustrate the west / east division in the material culture of the time and follow a relative chronology. Axes indicate cultural contacts and changes, which are also observable in the distribution and local variation of clay vessels.

Finland can be described as a border zone between Scandinavian and eastern cultural phenomena during the entire Early Metal Age (Bronze Age). In the first centuries of the 2nd millennium BCE bronzes, pottery making tradition and ideological impulses were brought by visitors or immigrants both from the West and the East.

Even the terminology for the two first millennia of prestigious metals is twofold in Finnish archaeology. The terms *Early Metal Age* (EMA, ca. 1900 BCE–300 CE) and *Bronze Age* (BA, ca. 1800–500 BCE) are used to refer to the Finnish inland and the Finnish western and south-western coasts of the Baltic Sea. The terminology is rather modern, though. Older researchers like A. M. Tallgren and C. F. Meinander did not apply these terms like the author in the present article does.

Textile ceramics connects Finland with the Middle Volga region (and Estonia), not with Scandinavia (Fig. 1). At the same time, inland ceramics without any textile impressions belong to the heterogenous but rather local group of Sär 2 (= Säräisniemi 2) pottery. In this article, emphasize is put to the county of Kainuu, the north-east Finland, where water routes connect the area with the White Sea and Karelia. Western axes or other BA artefacts of Scandinavian / Central European types are beyond the scope of the present overview.

The Bronze Age and Early Metal Age

The characteristic phenomena for the BA of Finland are massive stone cairns at high elevations on the ancient seashores and bronze artefacts of Scandinavian or central European origin. The number of cairns at BA shore levels by the south-western and western coast is very high, exceeding 10,000. Some of these are graves, probably not all of them and most of these monumental sites hide a secret for scientific archaeology to solve.

EMA cairns carry the Finnish name *lapinraunio*, "Lapp cairn". The term is misleading because these ancient monuments do not have any connection to Lapland or the Saami[3]. Lapp cairns are small, measuring ca. 6 × 6 metres in area and 1–2 metres in height on the average. They are built of stones and soil. A few of them are graves, but not all of them and numerous research questions are waiting for the answer here, too. Occasionally remains of cremation are found in the cairns (Saipio 2011; 2015).

In the inland, all axes and casting moulds for the axes are socketed axes, also known as celts. A wooden shaft was attached to the metal axe by pushing it deep into the socket from up to down and tightening it with thin wedges and rope.

[3] The Finnish word lappalainen (< lappi, gen. lapi-n) was used for "wilderness dwellers" in the early historical period, when they contributed to the taxation system by hunting fur animals.

Fig. 1. Textile ceramics in Finland: the areas of four subgroups. The coastal zone belonged to the Scandinavian Bronze Age culture. Map: M. Lavento

Рис. 1. Текстильная керамика в Финляндии. Четыре подгруппы. Береговая зона принадлежала скандинавской культуре бронзового века. Карта: М. Лавенто

Socketed axes are not of western origin in Finland. Any of the western or southern Bronze Age ceramics, which we know about Finnish archaeological sites, does not indicate a connection with the axe types mentioned above. All Scandinavian attributes of the Bronze Age culture — adzes, other metals, pottery, cairns, dwellings — concentrate on the coastal zone only.

In Denmark and southern Sweden, the new Bronze Age artefact type was the "shoulder" axe (Ge. Absatzbeil), which does not have any hole for the shaft. These heavy and prestigious axes were not likely to be useful for any everyday purposes.

Certain western bronzes have been found in BA graves in Finland. Some of them are stray finds, but only a few have a connection with a dwelling site or a house. The total number of BA metal finds does not exceed two hundred pieces in Finland. The 1300-year-long

the period is named after the south-Scandinavian chronology (Oscar Montelius) and shows contacts across the Baltic Sea both in prehistory and history of research. After the first bronzes were hidden in stone cairns on the western Finnish coast, the culture changed during the following 3–4 centuries from the Late Stone Age social system to the highly hierarchic societies and agricultural economy of the Bronze Age (Salo 2008: 92–99).

The division between the BA and EMA culture spheres is obvious in pottery finds, too. Textile ceramics spread all over the inland areas, including southern Lapland, while overseas contacts are obvious in the clay vessels from the Finnish western and south-western coasts.

The skill of bronze casting

To a Finnish researcher of the BA / EMA, bronzes open the world of the deceased but not the life of the living. In comparison to the Neolithic, we have found just a few settlement sites that could date to two millennia when metals started to be used. The most frequent sign of a dwelling place is Textile ceramics, often occurring in connection with other pottery types.

The most probable reason for this bias is climate change: after the maximum of average annual temperatures in the Middle Neolithic, the climate got cooler towards the end of the 3rd millennium BCE. Nevertheless, in the early 2nd millennium BCE newcomers from the west settled on the eastern side of the Gulf of Bothnia. At the same time, the makers of Textile ceramics and traders of Seima type metals reached Finland from the east. Of course, contact networks were not a novelty in either direction, but certain key features changed in the material cultures.

Still, climate hardly explains the "far too small" number of archaeologically known settlement sites for two millennia! The real reason for the lack of knowledge is we, the archaeologists, who are only learning in what kind of topographic and hydrological environments to seek the living places of those who once owned the bronzes. In subaquatic areas, we are too used to look for settlement at ancient shorelines.

What do we know about handicraftsmen, then? Do we have true knowledge about bronze casting on the northern periphery, where some sources of natural copper were available in the prehistory? In comparison to any rich and expansive bronze production in areas where rich copper sources were available to the prehistoric man, not single the *bronze casting centre* is known about Finland.

In a more local scale, we can argue that there was a casting centre Kainuu, the north-eastern Finland, and another in eastern Finland, not far from the town of Joensuu. The assumption is based on the distribution of early metals in these districts, and not on the discovery of a candidate for the actual metal working location. Trade contacts eastwards allowed locals to recycle bronzes and copy those examples that had been sold to them by visitors from faraway places.

Bronze casting connects the Finnish Lake District and the forest areas of the north-eastern Finland with the northern coniferous zone of the Russian territory. Individual metal artefacts were transported hundreds, even thousands of kilometres — or we may not know of the production of certain axe types in locations that are closer to the places where such metals are discovered by archaeologists today. Was it the glory of metal that made the ancestors take all this effort?

The shine of copper

A few fragments of copper have been found at dwelling sites with Typical Comb Ware in Finland. It seems that most of these are pieces of metal only, not the handicraft like jewellery. The oldest metal items are known about Asbestos Ware sites (Kierikki, Pöljä) that were inhabited in the 4th and 3rd millennia BCE (Nordqvist et al. 2012). There are small copper plates, the closed circles of copper (not suitable for use as bracelets or rings) and (arrow?) heads. A probable source of raw material can be found in Pegrema, the Petrozavodsk region (Журавлев 1991). There were also some sources of natural copper in eastern Finland, but the archaeological material is too small to convince us that those have been exploited in the EMA yet (Ikäheimo 2014).

A chisel made of pure copper has been found in north-eastern Finland (the Kukkosaari Island, in the Suomussalmi parish). It is a stray find, lacking a date. Analogies from the Lake Onega region are not exact enough, but they do suggest that the tool was made at the end of the 3rd millennium BCE (Huurre 1982: 16–21; 1992: 40–41).

Early Metal Age ceramics in Finland

Textile ceramics is known in a vast area across the taiga zone from the Ural Mountains to (eastern and northern) Fennoscandia, in Belarus, the Baltic countries, Poland and eastern Germany. It is the most widely distributed and most frequently found ceramic group in Finnish inland from ca. 1900 BCE onwards (Lavento 2001; 2016: 172–176). This gives a rough date for other new eastern contacts as well, such as the Seima axes.

So far, the oldest dates for Textile ceramics come from Baltic countries, where this pottery came into use in the early 3rd millennium BCE (Kriiska et al. 2005; Лавенто 2011). All recently published results are AMS dates (of charred crusts) that have a clear tendency to be older than traditional radiocarbon dates. In addition, the reservoir effect in the eastern coastal zone of the Baltic countries causes errors in the EMA dates. This is a known fact, but it is unclear how much the calibrated results should be corrected.

Judging from the dates, pottery with textile imprints spread across the Gulf of Finland from south to north. Simultaneously, the tradition to treat a clay vessel with a textile or textile-like material spread from east towards west. The processes are not fully understood yet.

In Finland, the local subgroups of Textile ceramics are named as follows: *Sarsa* (after the eponymous site in Pirkanmaa, near the city of Tampere), *Tomitsa* (eponymous site in Karelia, Russia) and *Kainuu* (named after the main distribution area). The subgroups are usually distinguished by their decorative motifs, although in some cases the sherds are too obscure for a secure definition. It is even not certain that all "Textile" vessels had a textile imprint, even if the overall character of the ceramics otherwise matches the criteria of "true" Textile pottery. The research history has been discussed by Meinander (1954), Lavento (2001, with cited sources) and by C. Carpelan (1965; 1999). The author of the present article is currently collecting the new material of comparison in Russia (see also Patrushev 1992).

The heterogenous ceramic group *Säräisniemi 2* (or *Sär 2*) can be found in Finland and Karelia (core area), as well as in northern Sweden and northern Norway. The eponymous site Nimisjärvi in the former parish of Säräisniemi (today Vaala) is located close to the western shore of Lake Oulujärvi (Carpelan 1965). The oldest subgroup of Sär 2, *Luukonsaari* ceramics, is characteristic of the Lake Saimaa water system and Lake Päijänne in central Finland. It is also known in the north-east Finland, in Kainuu. This pottery was made between the 11th and 7th centuries BCE (Lavento 2016: 195–197). *Anttila* ceramics is

named after a find location in southern Finnish Lapland and dates for the beginning of the last millennium BCE. In the northernmost Lapland, *Kjelmøy* subgroup was introduced in the 8th century BCE and was in use for over a millennium, until the 4th century CE (Carpelan 2003: 53–55).

Axes of Seima type

Six Seima axes have been found in Finland (Table 1). They are made of tin bronze. No casting moulds for the Seima type axes have been found in Finland so far, but one crucible can be connected with the bronze technology of Seima phase (Carpelan 2003).

The examples of Seima type from Finland are on average 8 cm in length. Their cross-section is quadrangular or hexagonal. The edge of the blade is somewhat broader than the mouth of the axe which may suggest that the item could be used as a tool. The Finnish examples do not have any use wear resulting from hard impacts or recurrent use. We suppose that these axes were rarities and rather kept as treasures, so-called status objects. None of six Finnish finds have decoration.

The first axe of this type was catalogued in the year 1900. It was the first bronze axe ever found in the Grand Duchy of Finland. The find place, the Pielavesi parish in the northern Saimaa water system, gave the axe the typological name *Pielavesi axe*. Scholars were not familiar with the Seima-Turbino material yet (Tallgren 1926: 82–86).

The Finnish research of the Seima-Turbino phase accepts the hypothesis of a trader network. C. Carpelan (1999: 268–271) supports the assumption that domestication of sheep / goat could belong to this period and wild reindeer was put in front of a sledge for the first time. A good motivation for travelling long distances was the search for metals.

The core areas of the Seima-Turbino phenomenon are the Lower Kama and Middle Volga regions. EMA pottery from Finland is a solid argument that eastern connections were vivid in that time. In addition to axes, one spearhead of Seima type has been found in Finland. Other Seima items, such as daggers, are missing from the Finnish find material. Northern Scandinavia and Finland are on the westernmost edge of the distribution area Seima-Turbino artefacts which have been found also in Siberia, the Pacific Coast of Russia and even northern China (Linduff, Mei 2009).

There is much variation in the chronologies for the Seima-Turbino items: for example, the date 1950–1620 BCE has been suggested for the River Oka and ca. 2200–1700 BCE applies for the Lower River Kama (Yushkova 2012: 134). As far as the accuracy of dates is concerned, we shall keep in mind that AMS dates almost always differ from traditional radiocarbon dates. As rule, the new AMS results give older dates than the radiocarbon method has been before. In the Kama-Volga region, Seima weapons are found in graves. All Finnish examples are stray finds that can be dated only by analogies from Russia. The rough date of ca. 1900 BCE can be given the oldest Seima axes in Finland (Carpelan 2003: 54). According to available dates, there is no reason to assume that any of the Finnish Seima axe finds would be younger than the 17th century BCE.

Maaninka axes

This axe type is specific for Finland and Sweden only. Maaninka axes are heavier than those of Akozino-Mälar type and more decorative in their profile (Fig. 2). A decorative zone is located close to the mouth, accompanied by an elevated horizontal line below it and vertical lines on the blade. The cross-section is hexagonal.

Table 1. **The find places of Seima axes in Finland (total = 6)**

Area in Finland	District	Water route	Municipality	Site	Find context	Published in	Catalogue number
South	Uusimaa East	Gulf of Finland West	Perniö	Rentselinnummi	Cache	Tallgren 1930: 1	KM 9138:2
West	Satakunta	Gulf of Bothnia South	Pori (Noormarkku)	Teinpakka	Stray find	Hackman 1897: 385	KM 3033:1
West	Satakunta	River Kokemäenjoki	Nakkila	Kaasanmäki	Stray find	Salo 1981: 251–255	KM 16545:1
Central (Lake District)	Central Finland	Lake Päijänne North	Laukaa	Simuna	Stray find	Hackman 1897: 394	KM 10551:1
Central (Lake District)	Savo N	Lake Saimaa North	Pielavesi	Taipale	Stray find	Hackman 1900: 55; Tallgren 1911: 72	KM 10815:1
North	Lapland S	River Kemijoki	Rovaniemi	Niskala (Niskanperä 1)	Stray find (close to an excavation)	Purhonen 1973: 33	KM 14699:3187

Table 2. **The find places of Maaninka axes in Finland (total = 6)***

Area in Finland	District	Water route	Municipality	Site	Find context	Published in	Catalogue number
South West	Varsinais-Suomi	Gulf of Finland West	Paimio	Oinila	Stray find	Kivikoski 1936: 53	KM 10454:1
West	Ostrobothnia South	Gulf of Bothnia South	Uusikaarlepyy (Jepua)	Asplandet	Stray find	Miettinen 1994: 5–7	KM 26618
West	Pirkanmaa	River Kokemäenjoki	Nokia (Tottijärvi)	Laukko	Stray find	Kivikoski 1942: 22	KM 10811:1
Central (Lake District)	Savo N	Lake Saimaa N	Maaninka	Halola	Stray find	Hackman 1910: 6	KM 5311:1
Central (Lake District)	Savo N	Lake Saimaa N	Lapinlahti	Jokiniemi	Stray find	Edgren 1918: 22–24	KM 18351:1
East	Karelia N	Lake Pielinen	Lieksa (Pielisjärvi)	Viekijärvi	Offering?	Kivikoski 1942: 22	KM 11313:1

* Two Maaninka axes are known from Sweden. The find places are Lake Mälaren (Uppland, Frölunda), published in: Hallström 1929 and the Öland island (Högsby, Hörns Kungsgård), published in: Åberg 1923: 53–54.

Fig. 2. Maaninka axes. Photo: the Finnish Heritage Agency

Рис. 2. Маанинкские топоры. Фото: Финское бюро культурного наследия

The eponymous find location is in the Maaninka parish in the northern Saimaa water system, north-west from the town of Kuopio. The item was found in the 19th century (Hackman 1910: 6–7). The total number of known Maaninka axes in the world is eight (Table 2). In addition, C. F. Meinander (1954: 41–44) mentioned three more axes that are of the same size and shape but lack decoration. The latter were found on the southern coastal zone of Finland (Karjaa and Porvoo in the Uusimaa county).

Maaninka axes are easy to separate from all other bronze axe types. The very restricted distribution calls for the interpretation that the axe was a local innovation in the northern Saimaa area. This statement by C. F. Meinander (1954) is repeated in Finnish literature since its initiation. Meinander did not find it possible to date the Finnish Maaninka axes because they are all stray finds. According to him, the axe belongs to "the latter half of the Bronze Age" (the 12th century BCE or younger). N. Åberg (1923: 55–56) had dated the axe from the Island of Öland to the IV period of the Scandinavian Bronze Age (from 12th to 10th century BCE). Meinander and Åberg were not mistaken, at least not seriously. The author of the present articles supports the date from the 12th to 8th century BCE (Montelius Periods IV and V; Lavento 2001: 122).

The innovation of a new bronze axe type in an area where there is a little evidence of previous bronze technology is very peculiar. The only available raw material was other bronze artefacts that were recycled to produce this novelty. A decorated axe is not an item for a new beginner to make — a socketed axe is not an easy task *per se*. No casting moulds for this axe type have yet been found (Huurre 1983: 484).

Akozino-Mälar axes

There are no finds to prove a continuation in bronze trade to the Finnish inland after ca. 1600 BCE. The chronology of the bronze axe breaks, and the first Akozino-Mälar axes date to the 13th century BCE. The number of Akozino-Mälar axes from Finland is 12 (Fig. 3; Table 3). All of them are stray finds that were discovered before engine-aided forestry and agriculture, in other words in the 1950s or earlier.

Two Mälar axes have been found in the Åland archipelago, which is not surprising if Lake Mälaren in central Sweden was the area of origin of these weapons. In addition,

Table 3. **The find places of Akozino-Mälar axes in Finland and on the Karelian Isthmus (total = 12)**

Area in Finland	District	Water route	Municipality	Site	Find context	Published in	Catalogue number
Archipelago	Ahvenanmaa	Baltic Sea	Saltvik	Bertby	Stray find (field)	Dreijer 1939: 3, 18	?
Archipelago	Ahvenanmaa	Baltic Sea	Sund	Domarböle	Stray find	Meinander 1954b: 210	KM 8940:1
South-West (archipelago)	Varsinais-Suomi	Gulf of Finland W	Kemiönsaari (Kemiö)	?	?	Hackman 1897: 382	KM 800:1
South-West (archipelago)	Varsinais-Suomi	Gulf of Finland W	Västanfjärd	Norkulla Östanå	Stray find (field)	Meinander 1954b: 212	KM 11588:1
West	Satakunta	Gulf of Bothnia S	Eura (Kiukainen)	Toriseva	Stray find	Tallgren & Lindelöf 1916: 156; Hackman 1916: Taf. 9	KM 6690:1
West	Satakunta	River Kokemäenjoki	Harjavalta	Taalperi	Cairn	Tallgren 1906b: 43	KM 4123:1
West	Satakunta	River Kokemäenjoki	Nakkila	Järviranta	Stray find (field, a drained lake)	Hackman 1897: 389	KM 2151:571
West	Ostrobothnia South	Gulf of Bothnia S	Uusikaarlepyy (Jepua)	Jungar	Stray find	(not published)	KM 20650:1
West	Ostrobothnia South	Gulf of Bothnia S	Laihia	Kyläpää	?	Hackman 1897: 389	(lost)
South	Uusimaa	Gulf of Finland W	Lohja	Jalassaari	Stray find	Meinander 1954b: 212	KM 8330:1
—	Karelian Isthmus	Lake Ladoga	Sevastyanogo (Kaukola)	Rokosina	(not known)	Hackman 1897: 390	KM 2535:1
—	Karelian Isthmus	River Vuoksi	Michurinskoe (Valkjärvi)	Uusikylä	Stray find	Hackman 1897: 390	KM 2298:193

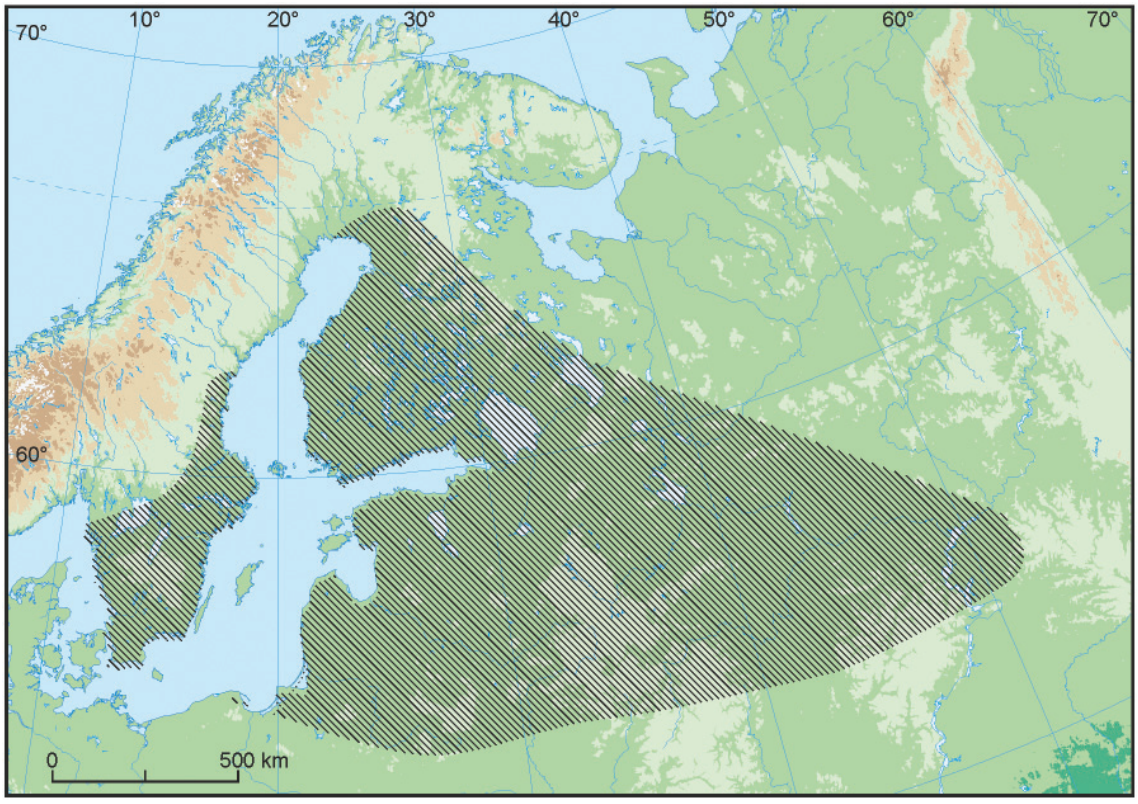

Fig. 3. The distribution of Akozino-Mälar axes in Europe. Map: M. Lavento

Рис. 3. Распространение топоров акозинско-меларского типа в Европе. Карта: М. Лавенто

moulds for such axes are known from western Finland, not far from the Baltic Sea coast (the counties of Southwestern Finland, Satakunta and Central Ostrobothnia). Still, the origins of this axe type remain a question mark to Finnish research, and internationally, too. Thus, the "double" name *Akozino-Mälar* is sometimes used in Finnish literature. In addition can a single axe type have two areas of origin in prehistory?

We know that the core areas of distribution of these axes are 1) the Middle Volga (from western Mari El to the Rivers Kama and Vyatka) and 2) the great Swedish Lakes Vänern, Vättern and Mälaren.

In the former area, 285 "Akozino" axes have been catalogued and 18 casting moulds are known (Yushkova 2012: 137, Fig. 7, *3*). The distribution in the latter area is poorly known, because modern research is missing. According to the most recent data, the total number of finds exceeds one hundred pieces. Thirdly, the distribution of Akozino-Mälar axes in the Baltic countries, Poland and Belarus is worth noting (Kuzminykh 1996: 6–9).

The first scholar to discuss "Akozino and Mälar" in Finland was A. M. Tallgren (1911: 170–183). One axe had been found in Sevastyanovo (Kaukola), the Karelian Isthmus, already in the 1880s (Hackman 1897: 390).

V. A. Gorodtsov (Городцов 1916: 150), L. I. Pozdeeva (Поздеева 1922) and G. von Merhart (1926) contributed to the discussion at the international level. Von Merhart observed a similar axe type on the Siberian side of the Ural Mountains. According to Tallgren, the oldest dates for the axe type in Sweden and the Middle Volga region do

correspond to each other. He stated that the axe type was new in both regions between the 13th and 11th centuries BCE and they were still made as late as in the 9th–7th centuries BCE (Tallgren 1937: 34–40).

The Finnish "grand old man" of the Bronze Age research, C. F. Meinander, studied the question of origin in his doctoral dissertation in the 1950s. He concluded that the "Mälar" axes, Textile ceramics and the Gorodishche culture could belong together, and date to the early 1st millennium BCE (Meinander 1954: 189–194). Modern AMS dates for Textile ceramics prove that Meinander was mistaken: Textile ceramics spread in the taiga zone at the beginning of the 2nd millennium BCE, even earlier (Lavento 2001: 97–107; 2009: 278–280).

According to the Finnish Bronze Age specialist U. Salo, the axes from Finland are closer to the typology of the Scandinavian "Mälar" axes than the "Akozino" type (Salo 1985: 245–290). For the research history of "Mälar" axes in Sweden we refer to E. Baudou (1960). Already in the 1870s, Oscar Montelius did pay attention on these axes in Scandinavian find material. He suggested that they could belong to "the beginning of the Younger Bronze Age" (ca. the 13th century BCE; Montelius 1870–1873: 216, 270–271, 340, 422 and Table A). The first typology for Sweden was presented by S. Lindqvist (1913). Today, we know that "Mälar" axes were in use in the Norrbotten county (along the rivers that flow to the Gulf of Bothnia) until the 9th century BCE (Baudou 1995: 104).

V. S. Patrushev (Патрушев 1975) outlined a typology for the "Akozino" axes in Mari El and the neighbouring areas. He argued that the Middle Volga region was the area of origin for this type and the axes found in Finland and the Baltic countries had been imported from the east. This interpretation became popular in the Soviet republics of Estonia and Latvia, as well as in Poland (Okulicz 1976). In Lithuania, A. Luchtanas (1981) argued that originally there had been two separate axe types, which had developed in the direction of assimilation through contacts and exchange. He also observed the influence of imported "Akozino and Mälar" axes on bronze technology in Lithuania.

A few casting moulds for Akozino-Mälar axes have been found in Finnish Northern Karelia (Joensuu) and the Karelian Isthmus (Melnikovo / Räisälä) and from Lapland (Rivers Kemijoki and Tornionjoki). Interestingly, casting moulds are known about the south-western and western Finnish coast, too (Lavento 2001: 120–126).

Ananino axes

A single bronze axe of Ananino type is known about Finland. It was found in Turku (the former parish of Maaria), south-west Finland. There is no explanation why the item got there and why there are no other Ananino axes or other artefacts of the Ananino type in the Finnish collections yet. C. Carpelan suggests that the small socketed axe from the Lusmasaari Island in Inari, the north-east Lapland, also belongs to the Ananino type (Carpelan 2003: 56 with endnotes).

In the Middle Volga area, the earliest Ananino axes date to the 8th century BCE (Chernykh 1992: 73–76). The spread of new artefacts was fast: metal trade from the Volga-Kama reached even northern Scandinavia (Baudou 1995: 104). Here, the Ananino axes date from the 8th to 3rd centuries BCE (Carpelan 2003: 53–55; Forsberg 2012: 41). Bronze casting was no longer a novelty, and soon the new Ananino axes were made in areas far from where the innovation was born.

Bronze analyses

From international material, we know that tin (Sn), zinc (Zn) and lead (Pb) were used to process natural copper into bronze. In some cases, antimony (Sb), arsenic (As), bismuth (Bi), nickel (Ni) and silver (Ag) were applied, too. Tin was the most favourable element to develop the casting properties of molten bronze, but it was not always available. Tin trade from the British Isles to continental Europe started in the Bronze Age. The availability of other elements was uncertain to the Bronze Age metal smiths, too, and the characteristics of natural bronze dictated the quality of the artefacts.

Archaeometallurgy was first studied in Finland by laboratory methods by E. S. Tomula at the University of Helsinki in 1917. The method was destructive: he cut off pieces and treated them with nitrogen and sulphuric acid (Tomula 1917). Nikula took his samples of five axes of the Zaoussailov Collection — a collection of ca. 9000 prehistoric bronze items that were bought to the Grand Duchy of Finland from Kazan in 1909. The initiative to make this purchase was launched by A. M. Tallgren, and he published the artefacts in French a few years later (Tallgren 1918). The collection is kept in the National Museum of Finland even now.

M. Kenttämaa (formerly Kampman) was the next scientist to use the Zaoussailov collection for archaeometallurgy. He took samples from 14 axes and treated them with strong sulphuric acid. His results were that nine (or ten) axes were made of tin bronze and one of the axes did not contain any tin. Impurities, such as iron, zinc and lead were discovered. The quantitative criterion for an impurity was as high as maximum 0.5 % of a sample (Kenttämaa 1934).

C. F. Meinander initiated a study of all prehistoric bronze axes (including western types) from Finland in 1953. For comparison, he took 33 axes of the Zaoussailov Collection. The project was a large effort, but the results did not say very much new. Most of the axes from Russia were made of copper (over 90 % of the total raw material) and tin (ca. 1–10 %). The Finnish find material was not much different: the axes consisted of copper and tin (ca. 0.5–12.5 %). This is consistent with what was known to Meinander about the copper and tin sources in the southern Ural Mountains.

Some impurities were reported, too. The latter might be the impurities of copper ore (Meinander 1954: 60–66; cf. Oldeberg 1933: 53). Eight axes from Russia and five Finnish finds contained some zinc. Meinander argued that zinc was added to liquid bronze to give the cast items a shiny colour. On the other hand, a relative amount of 12 % zinc had been observed in prehistoric bronze from Sweden.

The author of the present article and Veli-Pekka Salonen, a geologist, launched a project to analyse all bronze axes from Finland with LA-ICP-MS (Laser ablation inductively coupled plasma mass spectrometry). However, after a promising start, the plan was cancelled. Only one axe (Porvoo 3502A; see Meinander 1954: 61) was studied by the assisting technician Juhani Virkanen (University of Helsinki, Department of Geology). The Finnish Heritage Agency (formerly the National Board of Antiquities) no longer allows any destructive samples of bronze axes — each single microgram of these rare finds is strictly protected. The most interesting observation concerning the "Porvoo 3502A" was that the relative amount of lead is high, and zinc and arsenic were also reported. A probable explanation for the "tin and lead bronze" is the impurity of the original copper source.

The University of Helsinki applies a portable XRF (X-ray fluorescence) analyser for the element studies of metal artefacts, ceramics, etc. The method is non-destructive, but the

device does not match the requirements for an accurate analysis. We are looking forward to having better technical conditions to continue the laboratory studies of the Finnish BA / EMA.

Casting moulds

Any moulds for Maaninka axes are not yet known. It is possible that they were made of clay and, thus, already broken in the casting process (Huurre 1982: 26–28). Burnt clay would survive in the soil, of course, but such a stray find is difficult to recognize. We hope that mould fragments will come in the daylight together with a concentration of pottery sherds — or another axe! –in future. Some moulds of the Akozino-Mälar type have been found in different parts of Finland (see above).

For Ananino axes, 18 moulds are known in Finland (Carpelan 2003: 56) (Fig. 4). An explanation for altogether five moulds from the River Oulujoki water system in the

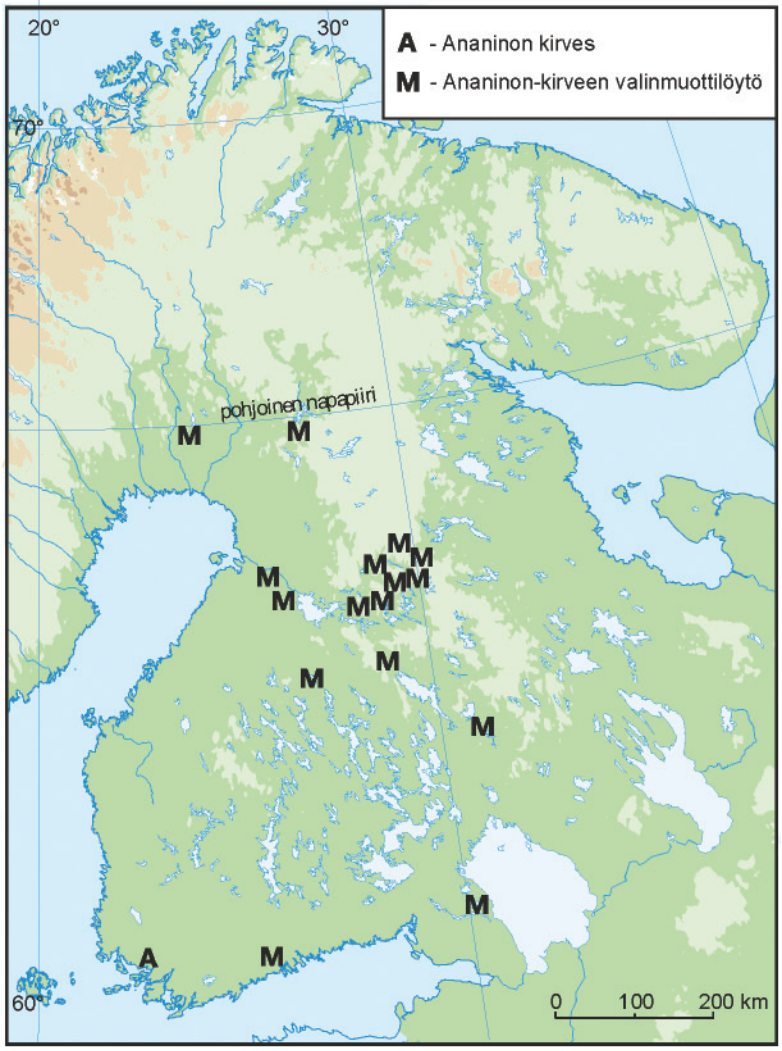

Fig. 4. The find places of casting moulds for Ananino axes in Finland (M). The only Ananino axe (A) was found in south-western Finland (city of Turku). Map: M. Lavento

Рис. 4. Места находок литейных форм для ананьинских топоров в Финляндии (М). Единственный ананьинский топор (А) был найден в Юго-Восточной Финляндии (г. Турку). Карта: М. Лавенто

Kainuu county (the parishes of Suomussalmi, Hyrynsalmi, Vaala) is the exceptionally good availability of soapstone (Fi. vuolukivi) in the area (Huurre 1983: 100–105). In a global perspective, soapstone is a rare raw material. It can be found in south-eastern Finland, in the roots of the Svecokarelian orogeny. Soapstone is very suitable for making artefacts, because it is fine-grained and easy to split, cut, finish and polish very accurately, without any sharp edges. It is heat-resistant but too soft for cutting tools or weapons. Today, the trademark *NunnaUuni* advertises ovens made of soapstone that withstand extreme temperature changes. When such an excellent stone was not available, EMA casting moulds could be made of clay, slate or other metamorphic stone (Lavento 2001: 124–126).

Lake Kiantajärvi in the Suomussalmi parish, Kainuu, is known for several EMA bronzes and casting moulds. Soapstone is available there, and water routes connect the area with the east. Numerous surveys were carried out in the area by the Finnish expert in the prehistory of the North, M. Huurre, who also writes about the Lappish Rivers Kemijoki and Tornionjoki (for casting moulds, see Huurre 1986: 98–105; 1992: 64–76).

The dawn of the Iron Age

During a few centuries, the knowledge of bronze casting spread in the territory of what is Finland today. The first socketed axes of western type were probably not made before the 6th century BCE. This is already the first stage of the Iron Age: lake and bog iron got exploited and axes started to be made locally from this iron (Salo 2008: 112–115). Since the era of the Roman Empire, bronzes such as brooches, were imported to the northern coastal zone of the Baltic Sea probably as trade goods. To illustrate the volume of this flow of artefacts, we mention that one shield boss of bronze has been found in a Roman Iron Age context from south-western Finland and the number of certain brooch types is counted with fingers.

Judging by the find material from the Finnish inland, no bronze axes or weapons were cast after the last centuries BCE. In places, stone tools and weapons were replaced by iron ones. The oldest date of an iron furnace in Finland dates back to the 5th century BCE (Schulz 1986). Interestingly, this furnace is also located in Kainuu (Äkälänniemi site close to the modern centre of Kajaani), the same area where traces of early bronze technology have been found.

Literature

Городцов 1916 — *Городцов В. А.* Культуры бронзовой эпохи в Средней России // Отчеты Исторического музея 1914 г. М., 1916. С. 121–228.

Журавлев 1991 — *Журавлев А. П.* Пегрема (поселения эпохи энеолита). Петрозаводск: Изд-во КНЦ АН СССР, 1991. 205 с.

Лавento 2011 — *Лавento М.* Новые АМС-датировки текстильной керамики Среднего и Верхнего Поволжья // ТАС. 2011. Вып. 8 (1). С. 263–272.

Патрушев 1975 — *Патрушев В. С.* Акозинско-меларские кельты Марийского Поволжья // СА. 1975. № 3. С. 28–43.

Поздеева 1922 — *Поздеева Л. И.* Предметы бронзового века в Казанском Центральном музее // Казанский музейный вестник. 1922. № 2. С. 120–130.

Åberg 1923 — *Åberg N.* Kalmar läns förhistoria. Södra Kalmar län. Vol. 1. Kalmar: Appeltofft's bokhandel, 1923.

Baudou 1960 — *Baudou E.* Die regionale und chronologische Einteilung der jüngeren Bronzezeit im Nordischen Kreis. Stockholm: Almqvist & Wiksell, 1960.

Baudou 1995 — *Baudou E.* Norrlands forntid — ett historiskt perspektiv. Bjästa: Cewe-förlaget, 1995.

Carpelan 1965 — *Carpelan C.* Sär 2. Alustava katsaus erääseen rautakautiseen keramiikkaryhmään ja siihen liittyvään problematiikkaan. Unpublished Licenciate Thesis. Helsinki: University of Helsinki, 1965.

Carpelan 1999 — *Carpelan C.* Käännekohtia Suomen esihistoriassa aikavälillä 5100…1000 eKr. // Fågelberg P. (toim.) Pohjan poluilla: suomalaisten juuret nykytutkimuksen mukaan. Helsinki: Suomen Tiedeseura, 1999. S. 249–280.

Carpelan 2003 — *Carpelan C.* Inarilaisten arkeologiset vaiheet // Lehtola V.-P. (toim.) Inari — Aanaar. Inarin historia kivikaudesta nykypäivään. Inari: Inarin kunta, 2003. S. 28–95.

Chernykh 1992 — *Chernykh E. N.* Ancient Metallurgy in the USSR: the Early Metal Age. Cambridge: Cambridge University Press, 1992. xxiv + 335 p., 28 pl., 106 figs.

Dreijer 1939 — *Dreijer M.* Fornfynd på Åland under år 1939 // Åländsk odling. 1939. Vol. 3. S. 14–23.

Forsberg 2012 — *Forsberg* L. Assymetric Twins? Some Reflections on Coastal and Inland Societies in the Bothnian Area during the Epineolithic and Early Metal Age // Anfinset N., Wrigglesworth M. (eds.) Local Societies in Bronze Age Northern Europe. Sheffield: Equinox, 2012. P. 31–55.

Hackman 1897 — *Hackman A.* Die Bronzezeit Finnlands // Suomen Muinaismuistoyhdistyksen Aikakauskirja. 1897. Vol. 17. S. 349–408.

Hackman 1900 — *Hackman A.* De senaste fynden från vår bronsålder // Finskt Museum. 1900. Vol. 17. S. 53–61.

Hackman 1910 — *Hackman A.* Förvärv till Historiska Museet år 1909 // Suomen Museo — Finskt Museum. 1910. Vol. 17. S. 1–15.

Hackman 1916 — *Hackman A.* Förvärv till Statens Historiska Museum II. Bronsåldern. III. Järnåldern // Finskt Museum. 1916. Vol. 23. S. 54–72.

Huurre 1982 — *Huurre M.* Suomussalmen varhaista metallikautta // Suomen Museo. 1982. Vol. 88. S. 10–30.

Huurre 1983 — *Huurre M.* Pohjois-Pohjanmaan ja Lapin esihistoria. Pohjois-Pohjanmaan ja Lapin historia, I. Kuusamo: Pohjois-Pohjanmaan ja Lapin maakuntaliiton yhteinen historiatoimikunta, 1983.

Huurre 1986 — *Huurre M.* Esihistoria // Huurre M., Keränen J. (toim.) Kainuun historia, I. Kajaani: Kainuun maakuntaliitto, 1986. S. 5–184.

Huurre 1992 — *Huurre M.* Suomussalmi esihistoriallisella ajalla // Huurre M., Turpeinen O. (toim.) Leipä luonnosta. Suomussalmen historian kymmenen vuosituhatta. Helsinki: Otava, 1992. S. 15–76.

Ikäheimo 2014 — *Ikäheimo J.* Suomen kivikautisten kuparilöytöjen metallin alkuperästä // Muinaistutkija. 2014. Vol. 2. S. 11–26.

Kenttämaa 1934 — *Kenttämaa M.* Analyyttisiä määrityksiä muutamista siperialaisista ja itävenäläisistä pronssikautisista pronssiesineistä // Suomen Muinaismuistoyhdistyksen Aikakauskirja. 1934. Vol. 40. S. 41–42.

Kriiska et al. 2005 — *Kriiska A.*, *Lavento M.*, *Peets J.* New AMS Dates of the Neolithic and Bronze Age Ceramics in Estonia: Preliminary Results and Interpretations // Estonian Journal of Archaeology. 2005. Vol. 9 (1). S. 3–31.

Kuzminykh 1996 — *Kuzminykh S. V.* Osteuropäische und Fennoskandische Tüllenbeile des Mälartyps: ein Rätsel der Archäologie // Fennoscandia archaeologica. 1996. Vol. 13. S. 3–27.

Lavento 2001 — *Lavento M.* Textile Ceramics in Finland and on the Karelian Isthmus: Nine Variations and Fugue on a Theme of C. F. Meinander. Helsinki: Suomen Muinaismuistoyhdistys, 2001. (Suomen muinaismuistoyhdistyksen aikakauskirja 109).

Lavento 2016 — *Lavento M.* Pronssi- ja varhaismetallikausi // Haggrén G. Halinen P., Lavento M., Raninen S., Wessman A. Muinaisuutemme jäljet. Suomen esi- ja varhaishistoria kivikaudelta keskiajalle. Helsinki: Gaudeamus, 2016. S. 123–212.

Lindqvist 1913 — *Lindqvist S.* De svenska holkyxorna från bronsåldern // Opuscula archaeologica Oscari Montelio septuagenario dedicata. Holmiae: Haeggtström, 1913.

Linduff, Mei 2009 — *Linduff K., Mei J.* Metallurgy in Ancient Eastern Asia: Reprospects and Prospects // Journal of World Prehistory. 2009. Vol. 22 (3). P. 265–281.

Luchtanas 1981 — *Luchtanas A.* Žalvario apdirbimas antkstyvuosinose rytų Lietuvos piliakalninose // Lietuvos Archeologija. 1981. T. 2. P. 5–17.

Meinander 1954 — *Meinander C. F.* Die Bronzezeit in Finnland. Helsinki: Suomen Muinaismuistoyhdistys, 1954. (Suomen muinaismuistoyhdistyksen aikakauskirja 54).

von Merhart 1926 — *von Merhart G.* Bronzezeit am Jenissei: ein Beitrag zur Urgeschichte Sibiriens. Wien: Schroll, 1926.

Montelius 1870–1873 — *Montelius O.* Bronsåldern i norra och mellersta Sverige // Antiqvarisk Tidskrift för Sverige. 1870–1873. Vol. III. S. 173–433.

Nordqvist et al. 2012 — *Nordqvist K., Herva V.-P., Ikäheimo J., Lahelma A.* Early Copper Use in Neolithic Northeastern Europe: an Overview // Estonian Journal of Archaeology. 2012. Vol. 16 (1). P. 3–25.

Okulicz 1976 — *Okulicz Ł.* Osadnictwa srefy wschodnio-bałtyckiej w i tysiącleciu przed neszą erą. Wroclaw, 1926.

Oldeberg 1933 — *Oldeberg A.* Det nordiska bronsåldersspännets historia: med särskild hänsyn till dess gjuttekniska utformning i Sverige. Stockholm: Kungl. Vitterhets Historia och Antikvitets Akademie, 1933.

Patrushev 1992 — *Patrushev V. S.* Textile-impressed Pottery in Russia // Fennoscandia archaeologica. 1992. Vol. 9. P. 43–46.

Purhonen 1973 — *Purhonen P.* Rovaniemen Niskanperä 1. Helsinki: Helsingin yliopisto, 1973.

Saipio 2011 — Saipio J. Lapinrauniotradition kehitys ajoitusten valossa // Muinaistutkija. 2011. Vol. 4. S. 19–35.

Saipio 2015 — *Saipio J.* Lapinrauniokaivaus Ristiinan Kitulansuolla // Hiisi. 2015. No. 1. S. 21–26.

Salo 1981 — *Salo U.* Satakunnan historia I, 2. Satakunnan pronssikausi. Rauma: Satakunnan maakuntaliitto, 1981.

Salo 1985 — *Salo U.* Pronssikausi ja rautakauden alku // Blomstedt Y. (toim.) Suomen historia 1. Kivikausi, Pronssikausi ja rautakauden alku, Keski- ja myöhäisrautakausi. Espoo: Weilin + Göös, 1985.

Salo 2008 — *Salo U.* Ajan ammoisen oloista. Satakunnan ja naapurimaakuntien esihistoriaa. Helsinki: Suomalaisen Kirjallisuuden Seura, 2008.

Schulz 1986 — *Schulz E.-L.* Ein Eisenverhüttungsplatz aus den älteren Eisenzeit in Kajaani // Edgren T. (ed.) Studia præhistorica Fennica C. F. Meinander septuagenario dedicata. Helsinki: Suomen Muinaismuistoyhdistys, 1986. S. 169–171.

Tallgren 1906 — *Tallgren A. M.* Tre nya bronsåldersfynd från Finland // Suomen Museo — Finskt Museum. 1906. Vol. 13. S. 42–48.

Tallgren 1911 — *Tallgren A. M.* Die Kupfer- und Bronzezeit in Nord- und Ostrussland I. Die Kupfer- und Bronzezeit in Nordwestrussland. Die Ältere Metallzeit in Ostrussland. Helsinki: Suomen Muinaismuistoyhdistys, 1911. 229 s. (Suomen muinaismuistoyhdistyksen aikakauskirja XXV).

Tallgren 1918 — *Tallgren A. M.* Collection Zaoussaïlov au Musée historique de Finlande à Helsingfors. Helsinki: Antellin valtuuskunta, 1918.

Tallgren 1926 — *Tallgren A. M.* Ett viktigt bronsåldersfynd från Lappmark. Finskt Museum 1926. Vol. 33. S. 78–88. SMY.

Tallgren 1930 — *Tallgren A. M.* Harvinainen pronssikauden löytö Perniöstä // Suomen museolehti. 1930. No. 1. S. 1–6.

Tallgren 1937 — *Tallgren A. M.* The Arctic Bronze Age // Eurasia Septentrionalis Antiqua. 1937. Vol. 11. P. 34–36.

Tallgren, Lindelöf 1916 — *Tallgren A. M., Lindelöf A.-L.* Satakunnan pronssikausi // Suomen Muinaismuistoyhdistyksen aikakauskirja. 1916. Vol. 27. S. 6–208.

Tomula 1917 — Tomula E. S. Pronssianalyyseja ja pronssien analytiskemiallisia tutkimuksia // Suomen Museo. 1917. Vol. 24. S. 13–20.

Yushkova 2012 — *Yushkova M.* North-Western Russia at the Periphery of the Northern European and Volga-Uralic Bronze Age. Regions, Globalization and Resistance // Anfinset N., Wrigglesworth M. (eds.). Local Societies in Bronze Age Northern Europe. Sheffield: Equinox, 2012. P. 129–147.

БРОНЗОВЫЕ ТОПОРЫ ЭПОХИ РАННЕГО МЕТАЛЛА В ФИНЛЯНДИИ: ОБЗОР

М. ЛАВЕНТО

Ключевые слова: *сейминские топоры, маанинкские топоры, акозинско-меларские топоры, литейные формы, эпоха раннего металла, текстильная керамика, керамика типа Сяр-2, даты, ананьинская культура.*

В статье описываются бронзовые топоры эпохи раннего металла, которые были найдены во внутренней части Финляндии. Определяется приблизительный возраст этих топоров. Основное внимание уделяется доананьинскому времени, то есть периоду от 1900 до 900 г. до н. э.

Можно сказать, что на протяжении всей эпохи раннего металла (бронзовый век) Финляндия была пограничной зоной между культурными феноменами Скандинавии и более восточных регионов. В первых веках II тыс. до н. э. бронзовые изделия попадали сюда с пришельцами и иммигрантами как с запада. так и с востока. Следы восточных связей, ведущие на Северо-Запад России, ясно видны в доисторической керамике, особенно в Кайнуу — области на Северо-Востоке Финляндии, соединенной водными путями с Белым морем и Карелией.

Большую часть находок ранних металлических изделий во внутренних районах Финляндии составляют топоры. В целом они укладываются в рамки определенной типологии, хотя каждый отдельный топор являлся произведением ручного ремесла и отличался от всех остальных. Согласно традициям финской археологии, весьма ограниченное число бронзовых изделий рассматриваемого периода не является препятствием для выведения заключений о культурных связях.

Несколько топоров сейминского типа представляют собой случайные находки, лишенные археологического контекста (табл. 1), и потому ни один из них, взятый сам по себе, не может быть датирован. Однако тот факт, что ранняя текстильная керамика в регионе относится к 20-му столетию до н. э., дает основания полагать, что финские находки сейминских топоров имеют такую же древность, как сейминско-турбинский феномен в России. Текстильная керамика соединяет финскую посуду со средневолжским регионом (и с Эстонией), а не со Скандинавией (рис. 1).

Местное производство бронзовых орудий могло начаться в Финляндии в конце II тыс. до н. э., о чем свидетельствует датировка топоров маанинкского типа. Эпонимный памятник Маанинка находится на севере Сайменской водной системы, примерно в 50 км к северо-востоку от города Куопио. Изготовление таких топоров требовало применения непростой технологии и было делом рук искусного ремесленника (рис. 2). Очень ограниченное распространение данного типа топора указывает на то, что он мог быть местной инновацией (табл. 2).

В начале I тыс. до н. э. широкое распространение получили топоры акозинско-меларского типа. Они встречаются повсеместно от Центральной Швеции до Средневолжского региона, в том числе и в Финляндии (рис. 3). В Финляндии известны и литейные формы этих топоров, но материалов, позволяющих утверждать, что здесь находился литейный центр, нет (табл. 3).

Единственный найденный в Финляндии бронзовый топор ананьинского типа до сих пор считается самым поздним бронзовым топором в стране. Среди финских археологических находок металлических изделий ананьинская культура представлена всего лишь одним топором и одним наконечником копья! Однако несколько топоров ананьинского типа было, вероятно, отлито во внутренних районах во второй половине I тыс. до н. э., на что указывают многочисленные находки соответствующих литейных форм. Некоторые из них также происходят из области Кайнуу (рис. 4).

Ни один из западных или восточных керамических комплексов бронзового века, известных в Финляндии, не имеет признаков связи с упомянутыми выше типами топоров. Все скандинавские атрибуты культуры бронзового века — тесла, другие металлические предметы, керамика, могилы (кэйрны) — концентрируются исключительно в прибрежной зоне. В то же время керамика внутренней части страны, не имеющая текстильных отпечатков, принадлежит к гетерогенной группе Сяр 2 (Сяряйсниеми II).

Медь и бронза являлись предметами импорта, они не могли добываться в Финляндии в доисторические времена. Столь редкий и ценный материал вряд ли использовался для изготовления предметов бытового назначения, таких как рабочие инструменты, а бронзовые топоры служили знаком высокого статуса и ранга. Поэтому после VI в. до н. э. бронзовые топоры в прибрежной зоне Финляндии не производились. Бронза была заменена железом, сырье для которого имеется в озерах и болотах по всей стране. Древнейшая в Финляндии каменная печь для плавки железа была открыта в Кайнуу (город Каяани) и датируется V в. до н. э.