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Lavento, Mika

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Mika Lavento

Introduction

The Bronze Age is a period of the past that is both evident but also problematic to define in Finland. While the appearance of the new period is relatively easy to observe on the basis of archaeological remains in the coastal zone of the country, it is not that easy to separate from the Late Neolithic in inland areas or particularly in the northern part of the country. The same problem is apparent in the northern part of Scandinavia, the Baltic countries as well as in the Kola peninsula. The many changes observed in the archaeological material, as well as in the populations and their structure, make this period complicated and challenging.

Research on the Bronze Age has a great deal of possibilities despite the fact that the availability of archaeological material is variable and opens only some parts of the past cultures to analysis. This means that questions can be posed to the material and the material can be researched using varying methods. Although the Bronze Age has already been studied from many perspectives in Finland, much still remains to be researched; what I can do here is to give a general overview of the situation right now.

The aim of the article is to describe the Bronze Age and the Early Metal Period in Finland. As a period, the Bronze Age has been dated between c. 1700-500 BC, while the Early Metal Age began c. 1900 BC (Figure 1) and continues as late as c. AD 300/400. The Early Metal Age has been defined as a period in eastern and northern Finland, Karelia and the northern part of European Russia. Already during the late decades of the nineteenth century, archaeologists in Finland saw the Bronze Age in the country divided into two areas. The coastal zone was connected to the Scandinavian Bronze Age, but inland culture had its roots in the east. This was important, because the origin of the language of Finland lay to the east and archaeologists focused on locating the origins of material culture in Russia. As a result, the western Bronze Age was separated from the eastern Bronze Age, which later was given the name Early Metal Period.

Questions and material

First, I will briefly examine the research situation and the most essential issues that indicate how and why the settlement pattern and population of these Early Metal Age cultures changed. It will be questioned which archaeological characteristics indicate new influences in the area. I will then discuss which characteristics are essential and how they differ from the neighbouring countries during the second millennium BC and slightly later, focusing on settlement, economy and material culture to reconstruct patterns of interaction and boundary creation, thereby tracing the different influences which were active in what is now Finland during this period. Here, I will first give a brief introduction to the kinds of data available.

The most numerous and evident new Bronze Age structures are the stone cairns. Most of them are known in the coastal zone of south-west and western Finland. In total, the number of cairns is larger than c. 10,000. They have been built on the bedrock shore cliffs. The building of cairns in southern Scandinavia began largely at the beginning of

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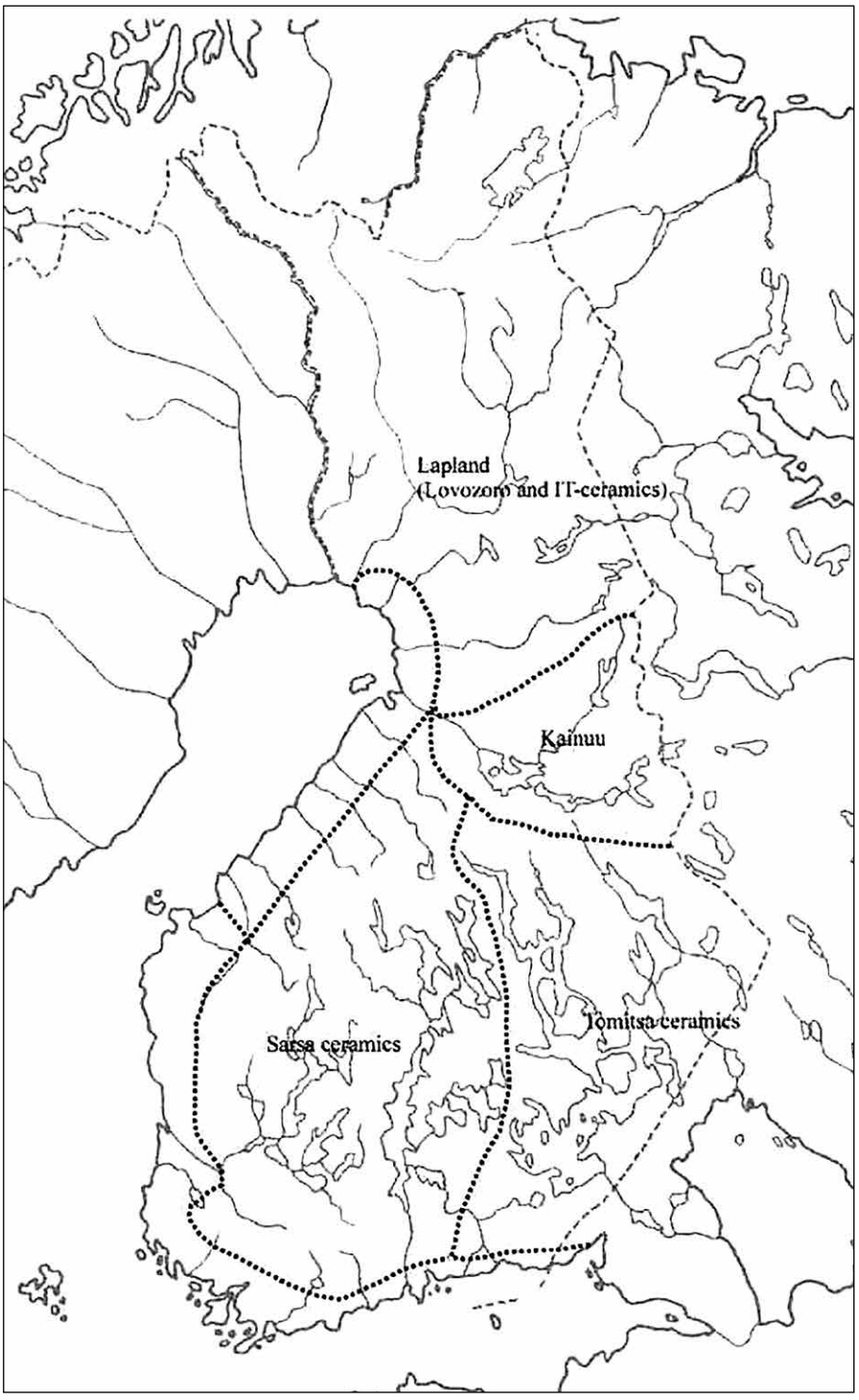

Figure 1. Bronze Age and Early Metal Period in Finland. Distribution of textile ceramic types during the early part of the second millennium BC in Finland (figure: M. Lavento).

the second millennium BC. Although the Bronze Age in Finland began in the coastal zone c. 1700 BC, the earliest cairns may have been built on the western coast of the Baltic Sea, on the north-west coast of Finland, in the late third millennium BC (Okkonen 2003) or even at the end of the fourth millennium BC (Mökkönen 2013). Nevertheless, cairns were mostly built after the first Scandinavian Bronze Age period.

The cairns were also built inland, where they have been called “Lapp cairns”. The reason for the name are the populations that lived in a large part of Finland during the Bronze Age and during the Early Metal Age. The name “Lapp cairns” refers to the hunter-gatherer populations that lived in the region during the Neolithic and Bronze Age. In the coastal zone, the last part of the third millennium BC saw the development of the local Kiukainen culture, an amalgamation of populations from southern Scandinavia and local groups (Meinander 1954a; 1954b). This means that the new Bronze Age culture mostly developed in the coastal area. When looking at the social system in more detail, we can observe several essential changes in the area – these will be discussed in later sections.

A first general point is that the number of dwelling sites during the Bronze Age-Early Metal Period is considerably smaller than during the Stone Age. It is also smaller than the number of dwelling sites during the Iron Age. In Finland, “dwelling site” is defined as any place where humans have stayed for a time. This can include house remains, but depending on the case, even two or three artefacts can be enough. Bronze Age sites have been difficult to find so far. These observations can be connected with the variation in the population in the study area. Basically, the population decreased in the Final Neolithic, but began to increase at the beginning of the second millennium.

Archaeological research methods in Finland have been based on fieldwork, but have tried to use new methods where possible. As is normal in archaeology, the methods used in other sciences have been borrowed extensively because they can bring important information to archaeological research.

In Finland, every municipality has generally been surveyed, but practically, almost all areas would require more detailed fieldwork, such as the survey of Bronze Age cairns carried out during a project by Turku University in south-western Finland in 1980-90s (Salo *et al.* 1992). There have also been excavations, but the number of sites has not been considerable and as a result the amount of material of the Bronze Age and Early Metal Age is not as large as what is known from the Stone Age, Iron Age and even from the Middle Ages and Historical Period.

In spite of this, some material groups dating to the study period have been studied relatively comprehensively (Carpelan 2003; Lavento 2001). This is possible with those materials found in many areas and phases of the Bronze Age, namely ceramics, some metal object types and even some stone items. More interest has recently been directed to the scientific analysis of archaeological material. For example, thin section microscopy or scanning electron microscopy (SEM) have been applied, as have other forms of spectroscopy such as EDS/WDS, XRF or AAS analyses, in cases were machines were available (Ikäheimo 2014; Lavento and Hornytzkyj 1996; Pääkkönen *et al.* 2020).

A considerable part of research is based on analysing bioarchaeological materials from dwelling sites or cemeteries. This means in practice taking into consideration the results of macro-fossil and osteological analysis of the bones of humans and animals when reconstructing the economy and its changes in the Bronze Age. Among these analyses we can also number pollen analysis, which has had an important role in dating the appearance of agriculture (Alenius *et al.* 2008; Vanhanen 2019; Vuorela and Hicks 1996).

Research history

The first archaeological research on the Bronze Age in Finland was carried out already in the 1870s and in particular in south-western Finland and Åland. The interest concentrated on areas where the Finnish language, carried by Finno-Ugrian groups, may have migrated to northern parts of the Baltic Sea. Already the linguist M.A. Castrén carried out field research in Siberia in the 1840s, which he published beginning in the 1850s. Soon after this, the first Finnish archaeologist J.R. Aspelin visited Altai, in the western part of Siberia, and suggested after his fieldwork in the 1870s that the origin of the Finns was there and that a migration to the eastern part of the Baltic Sea had taken place during the Bronze Age (Aspelin 1877-84).

In Finland, the first large-scale collecting of Bronze Age material began during research for *Die Bronzezeit Finnlands* by Alfred Hackman (1897). Hackman had a central role in Finnish archaeology, because he presented the hypothesis that the Finns migrated to the southern coast of the country from Estonia at the beginning of the Iron Age, during the period 1-200 AD (Hackman 1917). The idea was based on the assumption that the populations that used Fenno-Ugric languages migrated to the northern part of the Baltic countries – and first of all to Estonia – already during the Bronze Age.

From then on, the Bronze Age played an essential role in Finnish archaeology as the new period of interest. A.M. Tallgren was instrumental in its investigation. His research argued that the Fenno-Ugrian cultures had formed in the river Volga area and even in the western part of Siberia. Tallgren wrote his PhD thesis on the Copper and Bronze Age in 1911, but he continued his archaeological research in this area until the revolution (Tallgren 1916) and indeed long after, as for instance evidenced in the early publication *Eurasia Septentrionalis Antiqua* (ESA), which was published by Tallgren until 1938. In contrast, his successor Professor Ella Kivikoski focused on the Iron Age, which was then seen as the most important period in Finnish archaeology at Helsinki University. Nevertheless, the young archaeologist C.F. Meinander wrote his seminal PhD thesis on *Die Bronzezeit in Finnland* (1954b) and the same year published a book about the Final Neolithic in the coastal area of Finland, *Die Kiukaiskultur* (1954a). In his books, Meinander presents an overview of the period in Finland and Åland between c. 2500-500 BC.

At Turku University, Unto Salo organised much practical fieldwork on Bronze Age sites and cairns along the south-west and west coast of Finland. Salo himself knew the region of Satakunta best, where the river Kokemäenjoki is running from the province of Häme to the Baltic Sea. He worked as a head of the Satakunta museum in the 1970s but became the professor of archaeology at Turku University in 1971. He had earlier carried out some archaeological excavations at the Bronze Age sites in Rieskaronmäki in Nakkila district (Salo 1981). In Turku, archaeological research under Salo invested much energy into the Bronze Age but in particular the Iron Age. The idea was to survey the south-west of Finland, find new sites and carry out field research at the most interesting of them. As a result, Tapani Tuovinen (2002) wrote a PhD dissertation concentrating on the Turku archipelago. Central in his PhD are the Bronze Age cairns. Henrik Asplund (2008) wrote his dissertation about the island of Kemiönsaari in the Baltic Sea, in southern Finland. This work goes through all the prehistoric periods in the area, but the important role is played by the Bronze Age and Iron Age.

One viewpoint on the Bronze Age in eastern and northern Finland defines this as the Early Metal Age between c. 1900 BC-AD 400 (see above). Investigations began by locating dwelling sites with both ceramics and some bronze material of this period. Christian Carpelan (1965) wrote his licentiate thesis about the Säräisniemi 2 (or Sär 2) ceramics and he divided the material found in Finland first into three and later into four subgroups. He continued his studies on the river Kemijoki, northern Finland, and excavated at Sirnihta in Kesälahti, on the eastern shore of lake Saimaa, in 1971. Carpelan investigated large areas and dated many ceramic types by AMS-dating (Carpelan 2003). This had a considerable value where researching contact with Russia, making use of linguistic research (Carpelan and Parpola 2001). During the Early Metal Age, the languages in the north and Russia were based on Fenno-Ugrian languages. His work was also important for the archaeology of Saami groups and their development during the Early Metal Age, the Iron Age and the Historical Period.

Recent research on the Early Metal Age and Bronze Age has concerned dwelling sites and cairns. It has been carried out by the Universities of Turku and Oulu and mostly in the coastal area. Research in Turku has concentrated on the coastal zone of south-west Finland. At Oulu University, PhD dissertations on the Early Metal Age and Iron Age have mostly focused on the lower part of the river Oulujoki, but also on the northern coast of the Bothnian Bay (Kuusela 2013; Kuusela *et al.* 2017). Fieldwork was carried out

in Oulujoki and the coastal area (e.g. Okkonen 2003; Ikäheimo 2005), but studies in the wider environment were based on the material collected by the Finnish Heritage Agency (Muinaisjäännösrekisteri).

In northern Ostrobothnia and Lapland, inland areas have been researched since the 1960s because of water engineering works along the large rivers in the north. The water rationing caused a considerable fluctuation of the water level and made it possible to find new sites and large quantities of prehistoric material. When the surveys began in the Kainuu region in the 1960s, a large number of new sites were found by Matti Huurre (1959; 1982; Huurre and Keränen 1986). The survey along the river Kemijoki was begun in 1955 and continued as late as 1980; many rescue excavations were carried out in the area (Huurre 1983, 42-46). Among the archaeologists involved were M. Huurre, A. Kopisto, C. Carpelan, A. Siiriäinen and P. and A. Sarvas.

At Helsinki University, fieldwork with the purpose of locating new Early Metal Age sites was carried out in the lake Saimaa area and afterwards in the Karelian Isthmus in the framework of several projects. One result was a PhD dissertation on Textile ceramics in Finland (Lavento 2001). Dwelling sites have proven problematic to identify during rescue excavations, while inland cairns have been researched through excavations, normally with financial help from local foundations (Saipio 2011; 2017). Work with these questions is continuing.

Settlement and economy

An essential feature of the Bronze Age has for a long time been the small number of dwelling sites when compared to the Neolithic and Iron Age. This has been the case particularly in the coastal zone of the Baltic Sea in Finland. Inland, the number of dwelling sites is larger during the Early Metal Age. Recently, new dwelling sites have also been found on the coast, largely due to several surveys (Asplund 2008; Lavento 2001; Okkonen 2003; Tuovinen 2002).

The prehistoric material database of the Finnish Heritage Agency (Muinaisjäännösrekisteri) lists 414 Bronze Age dwelling sites in Finland. The number of Early Metal Age dwelling sites is so far 391. We should not consider this as a reliable starting point, however, because much information is missing and the classification system is problematic – several relevant sites may have been assigned to a period other than the Bronze Age or Early Iron Age.

A considerable number of Bronze Age dwelling sites on this list are in the northern municipalities of Enontekiö, Inari and even Utsjoki, over 60 altogether. The number of Early Metal Age dwelling sites – which have been used already in the Stone Age – is 59 in total. The numbers of sites are perhaps not very reliable in all municipalities. In Suomussalmi in Kainuu, the number of Early Metal Age dwelling sites is 15 and for the Bronze Age there are four sites. This is evidently a problem, because these figures do not correctly reflect the number of sites dating to these periods. The problem is best illustrated with the results from the municipality of Vaala. The Muinaisjäännösrekisteri list contains neither Bronze Age nor Early Metal Age sites for Vaala, although Säräisniemi 2 ceramics were first observed and defined there (Ailio 1909). The number of dwelling sites dating between 2000 BC and AD 400 was thus evidently larger than the database suggests. If using only the database records, one would get a wrong impression about settlement in the area.

One of the central aims of analysing dwelling sites is to establish differences between types of occupation (Carpelan 2003; Lavento 2001). This shows that earlier sites were used again, but in different ways. While dwelling sites were often large in the Middle Neolithic and included several dwelling depressions, most sites during the Early Metal Age were smaller and dwelling depressions were rarely found (Halinen and Mökkönen 2009). The number of known sites dated through various methods decreases during the Final Neolithic (Lavento 2001; Tallavaara and Seppä 2012). On the basis of current information, several areas in Finland were not inhabited during the Final Neolithic. For this reason,

new populations could easily migrate there. In contrast, in other regions there were still people and both new and old groups had to be in contact with each other in some ways. Settlement was then continuous from the Late Neolithic Kiukais group (Asplund 2008; Meinander 1954a) to the Bronze Age in the coastal zone as well as in northern Finland, in Lapland (Halinen 2005).

On the western coast of Finland, one of the most well-known Bronze Age dwelling sites so far is Rieskaronmäki in Nakkila. Unto Salo excavated the site in the 1970s and developed a considerable number of interpretations based on the archaeological observations made during the fieldwork. Although the site included only a few ceramics, according to Salo (1984) it was still possible to assume that the site was used for living in the final part of the Bronze Age, during Period V of the Scandinavian Bronze Age. This dates the site roughly between 800-600 BC. Remains of Bronze Age houses were also observed there. According to Salo, the house was reminiscent of the buildings known in southern Scandinavia. The building had two different parts, one inhabited by people and another reserved for animals. The size of the area for people in Rieskaronmäki was c. 20 m^2, but together with the section for the animals the length of the building was c. 17 m (Salo 1984, 115-17).

The same type of building was excavated in Kaunismäki in Harjavalta. The most notable difference between this and the Rieskaromäki building is the large hearth built of stones. The Kaunismäki building is not as well known as the Rieskaronmäki building and the archaeological finds are fewer there. Different kinds of Bronze Age buildings were also excavated in Otterböte on the island of Kökar in Åland. They were found already in 1947 by Mats Dreijer (1947) but were researched later by Meinander (1954b) and for Kenneth Gustavsson's PhD thesis (1997). The buildings at Otterböte are small, more or less round depressions 2.5 x 3.5 m in size that were used during the spring by the fishers and hunters of grey seals.

Hunting and fishing played a central role at dwelling sites along the western coast of the Baltic Sea in Finland. Examples of these sites are Rieskaronmäki in Nakkila and Peltomaa and Viirikallio 1 in Laihia municipality (Holmblad 2010; Miettinen 1994). The house structure may have evident connections to southern Scandinavia, but at the dwelling sites in Laihia one can also see the cooking pit distribution and some possible pavements which are not known from many other sites in the eastern part of the Baltic. Their location close by the sea made it possible to utilise the area for fishing and hunting in the most favourable seasons. The sites vary in size, with some quite large ones, and

Figure 2. South-west part of the sandbar Kalmosärkkä in northern Suomussalmi (photo: M. Lavento).

they indicate constant settlement from the Neolithic to the Bronze Age also in the coastal zone of western Finland.

Most dwelling sites in inland areas indicate sporadic visits, rather than longer-term habitation. The populations were different than during the Middle Neolithic and site size was smaller than earlier. We know some large Early Metal Age dwelling sites, but they are still not frequent. One of the most considerable dwelling sites is Sarsa in Kangasala. Among the most important large sites are those located in Suomussalmi in Kainuu and in Joensuu in northern Karerlia. In Kainuu, there are several large well-known dwelling sites – Kalmosärkkä and Kellolaisten tuli – and in the northern part of Suomussalmi municipality there are also traces of bronze casting (Figure 2). At all three sites, the main activity phase with Textile ceramics (see below) dates to the Early Metal Age (Huurre 1982; Lavento 2001).

One should still remember that in Lapland and in particular in its northern part, there are dwelling sites which were inhabited for a long time – from the Mesolithic to the Early Metal Age – without a clear break. In the Early Metal Age only some things changed. Although copper was already known during the Middle Neolithic, some bronze items came into use during the Early Metal Age (Nordqvist and Herva 2013). The new item of material culture was ceramics, because during the Middle and Late Neolithic pottery production had ceased in Lapland (Halinen 2005). The economy is based on hunting and fishing during the whole Stone Age and the Early Metal Age. The sizes of the sites did not become larger, site numbers did not increase and the population was smaller in the Early Metal Age than earlier.

Already in the Late Neolithic slash-and-burn cultivation began to play some role in the economy of the hunter-gatherer groups in Finland (Alenius *et al.* 2017). Throughout the country, the economy was based on hunting and fishing, although slash-and-burn cultivation was known by all groups. Cultivation was carried out in small areas over a short period, only two or three years, after which the place was necessarily deserted for at least 25-30 years before it was possible to cultivate again. This meant that the groups had to change their residence often and the same dwelling sites were not inhabited for a long time.

The most typical starting point for trying to understand the beginning of agriculture has been palaeoecology and pollen samples. From them, it is possible to observe when slash-and-burn cultivation begins and what kinds of remains it has left. This work has been carried out in Finland by Irmeli Vuorela and Sheila Hicks (1996) and more recently Teija Alenius (e.g. Alenius *et al.* 2014). Alenius and colleagues have suggested that cultivation began in Finland as early as 4040 cal BC, but the number of available dates is still low (Alenius *et al.* 2017).

The second essential research method has been macrofossil analysis. It has mostly been carried out at excavated Iron Age sites, but in the past ten years interest has expanded to include Bronze Age and Stone Age sites, too. The samples have been taken at sites in all areas of Finland and they have been analysed mostly by Terttu Lempiäinen (1987) and recently by young PhD researchers. Mia Lempiäinen-Avci's 2019 dissertation at Turku University concentrated on the Middle Ages, but the Stone Age and partly the Bronze Age were researched using the same methodology in a University of Helsinki PhD by Santeri Vanhanen (2019). Although the Bronze Age has never played the main role in these macrofossil analyses, there is some research for this period, too. In southern Saimaa, at the dwelling site of Kitulansuo d, Ristiina, Pirjo Jussila found barley that was dated to 2990±60 BP (Hela-167) (Lavento 1998, 50).

For the Bronze Age, the most important plants grown were hulled wheat and naked barley. Einkorn (*Triticum monococcum*), spelt (*Triticum spelta*), oat and millet (*Panicum miliaceum*) also play a central role. Other new plants in south-western Finland were grass pea (*Lathyrus sativus*) and chickpea (*Cicer arietinum*) (Hjelmqvist 1997; Vanhanen 2019, 62-64). These are not clearly visible before the beginning of the Bronze Age in Finland.

During the 2000s, a comprehensive analysis of bone material from excavated dwelling sites and cairns was carried out. Both animal osteology and human osteology have brought much information about the economy of the Bronze Age and Early Metal Age. The first large analysis of archaeological bone material in Finland was carried out by Mikael Fortelius (1981) and after this by Pirkko Ukkonen (1996). The first archaeological doctoral thesis about Stone Age birds was written by Kristiina Mannermaa (2008) at the University of Helsinki. Bronze Age bird remains were also studied in the Baltic area. Now, a PhD thesis will concentrate on fish at Stone Age sites (Koivisto and Nurminen 2015), but such research is still missing for the Bronze Age.

Human remains have been investigated particularly for the Iron Age and the Middle Ages. Recently, the investigation of material from cairns has begun, although the number of individuals preserved there is not very large so far. Analysis of the Bronze Age material by Kati Salo is still actively going on, but information will soon be obtained about for instance age at death, the cause of death and nutrition.

Recently, aDNA analyses have also been carried out on human remains where possible. Some samples came from cairns from the coastal and inland areas. It has emerged that new groups migrated to Finland from the southern Baltic Sea area or southern Scandinavia or from the east, from the Middle Volga area, during the second millennium BC (Saag *et al.* 2019). This was probably because Scandinavian groups wanted to find cultivation areas and spread east during the Bronze Age; the populations from the Middle Volga may have been in search of copper as well as new land to cultivate. Good copper sources were known in Pegrema in eastern Karelia (Žuravlev 1991).

Material culture and knowledge transfer

Material culture, its details and changes hold a central position in archaeological research, because by tracing types of material – their dating and location – in detail, researchers have the possibility to reconstruct how the practical characteristics of a culture changed. Although the number of finds at the various sites is not very large, they have been found in several places and indicate in what way culture has changed during the Bronze Age.

The Early Bronze Age and Early Metal Age were periods when the material culture changed considerably over a large area. The essential issue is that metal, in particular bronze objects, came into use and small groups learnt to make metal objects by casting. The first metal artefacts and metalworking spread to Finland both from southern Scandinavia and from the Volga area (Lavento 2001; Meinander 1954b). The most important metal artefacts are bronze axes, different types of swords, spearheads and bronze ornaments. Although the number of bronze objects is not very large, it is still so considerable that, alongside other transformations, it indicates an evident culture change from the Stone Age to the Bronze Age and the Early Metal Age. They will hence be explored in some detail, before turning to stone items and pottery.

Metal artefacts

The metal axe types in Finland during the Bronze Age were the Seima-Turbino axes, Maaninka axes, Akozino-Mälar axes and Ananino axes. The Seima-Turbino axes appeared in northern Scandinavia at the beginning of the second millennium BC, although their appearance in the river Komi area was some centuries earlier (Yushkova 2012). They were in use in a very large area from eastern Siberia to Scandinavia. In Finland, Seima-Turbino axes appeared around the eighteenth century BC (Carpelan 2003, 54). The appearance of Seima axes indicates the spread of the Seima-Turbino phenomenon across a very large area, with Finland as its western border (Figure 3).

The Maaninka axe is a local type which is more or less circumscribed in its distribution; it has been found in central Finland and in some cases in Norrland in Sweden, too. It came into use during the twelfth to tenth centuries BC and groups in central Finland learnt to cast the axes from local material found in eastern Finland and the Republic of Karelia (Ikäheimo 2014; Lavento 2019, 40-42). The Maaninka type had already been defined by

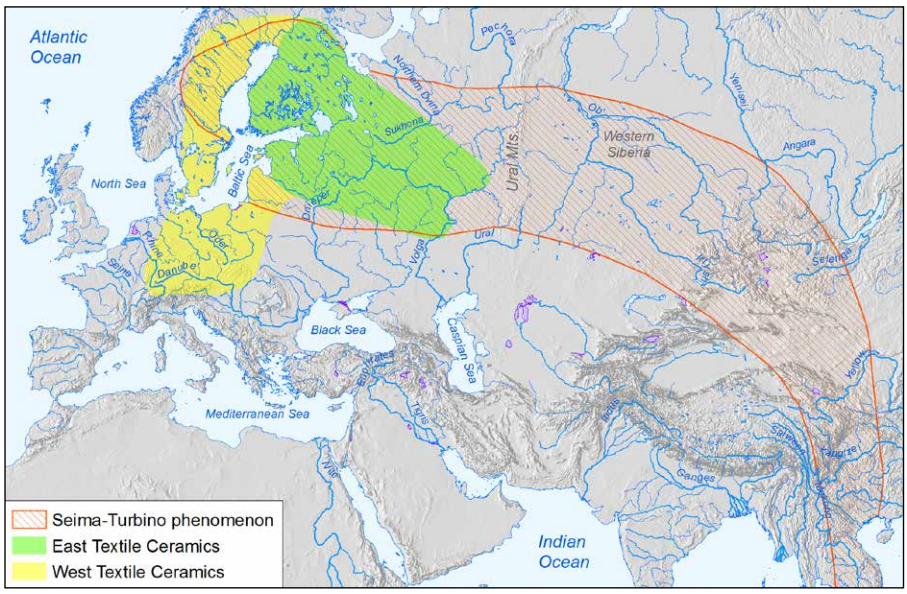

Figure 3. Seima-Turbino phenomenon, the distribution of Textile ceramics in the northern part of Europe and Siberia, and the areas of the western textile impressed ceramics (figure: M. Lavento).

Alfred Hackman (1910, 6-7) and A.M. Tallgren (1911, 190). The Maaninka axe does not belong to any clear local culture, but one problem with the type is that is has not been much researched so far. It evidently forms the beginning of the local casting of bronze axes in Finland (Lavento 2019).

The Akozino-Mälar axes have been found over a large area and the two largest concentrations of the type are in southern Sweden (Mälar) and in the Middle Volga (Akozino cemetery). These areas were researched by Evert Baudou (1960) in Sweden. The Mälar axe was studied recently by Lene Melheim (2011; 2012). V.A. Gorodtsov (1916, 150) discussed Akozino axes in the Middle Volga region. In Finland, the type was first noted by Hackman (1897, 390) but particularly by A.M. Tallgren (1911, 170-83), who also researched it in the Fenno-Ugric area in Russia; he dated the appearance of this axe type to between the thirteenth and eleventh centuries BC, but they stayed in use as late as the ninth to seventh centuries BC (Tallgren 1937, 34-40). V.S. Patrushev (1975) and S.V. Kuz'minykh (1996) continued this research in the 1980s. The question about the relation of the Akozino and Mälar axes remains open today, although the material shares many qualities. Establishing a common culture is not possible using axes alone, but some connections evidently existed.

The last Bronze Age axe type in the northern coniferous zone of Europe is the Ananino axe, which came into use between the eighth and third centuries BC (Forsberg 2012, 41). Only two Ananino axes are known in Finland: one in Haihu in Maria and one in Lusmasaari in Inari (Carpelan 2003, 53-55). The type was moulded actively in settlements in Suomussalmi, in eastern Finland (Huurre 1982; 1992; Lavento 2019). The earliest Ananino axes are found in the Middle Volga area and date to the eighth century BC (Chernykh 1992, 73-76). Although Finland was located on the western border of the distribution area of the Ananino axes, their use was intensive and the bronze axes were needed. Copper and other metals during the Bronze Age were used for moulding new Ananino axes. Thus, some connections from Finland to the Middle Volga area are visible in metal making. In contrast, the ceramic types (see below) were local and indicate production by small groups in Finland and eastern Karelia. It seems that migrations are not essential to explain axe distribution in the second part of the first millennium BC.

Yet not all metal items have eastern inspirations. Flanged and socketed axes are of Scandinavian origin. At least 19 of these types are known in Finland altogether; they came into use in Scandinavia c. 1300 BC (Meinander 1954b, 19-22). These objects were in

use only on the south-west coast of Finland (Lavento 2001, 123-24). They have not been found at dwelling sites but mostly as stray finds. The axes were not made in Finland, but they reflect the arrival of new people into the area.

Other important find groups are bronze swords and spearheads. There are 17 examples from 12 sites in Finland. Almost all of them are of different types and come from different areas in Scandinavia and central Europe. The swords were mostly found in the coastal zone of south-west and western Finland. However, the hoard of Petkula in Sodankylä in central Lapland is of particular interest. It consists of four bronze swords. A.M. Tallgren (1906, 79) suggested that their origin was in Britain, but this has not been confirmed. The dating of the swords could be around 900-700 BC.

Almost all swords are stray finds in wetlands or swamps. This is typical for Bronze Age and Early Metal Age metal finds in Finland; later on, the places and environments where items were hidden changed. In Tapaninkylä in Helsinki, two swords dating to Scandinavian Bronze Age period II have been found; they have been interpreted as a hoard (Salo 1984, 142-43). The Nappari sword in Kokemäki can probably be interpreted as a treasure trove. It dates to period V of the Scandinavian Bronze Age and belongs to the Möringen type, the origin of which is in Switzerland.

Most bronze spearheads have come to Finland from southern Scandinavia, from Denmark and southern Sweden. However, the origin of the types may lie in central Europe. Their distribution in Finland concentrates in the south-western and western parts. The earliest find came from Santala near Nakkia and dates to Scandinavian Bronze Age period I. The objects from Ojala near Kokemäki and Panelia in Kiukainen date to Scandinavian Bronze Age period V. There is one example in Anttila in Lestijärvi which may have come to Finland from the southern part of central Europe (Salo 1984, 150-51). This meant that bronze artefacts came to Finland through long-distance trade. Metal was important during the whole Iron Age and Early Metal Age.

The Ananino period was an active period of contacts across the large coniferous zone in north-western Russia and Finland was in its western border. Bronze was still not very much in use in northern Scandinavia, although it was very much used in the river Volga area. The Ananino type of spearhead has been found in Rantsilannummi in Perniö and indicates that the coastal zone also had contacts far to the east as well.

It is of particular interest that so far the earliest Bronze Age weapon in Finland is the dagger that has been found in Hangaskangas in Muhos, on the lower part of the river Oulujoki, a composite between an eastern knife and scraps of a Scandinavian dagger (Ikäheimo 2019). It dates at least to 1900-1800 BC and may have come to Muhos from the east, from the area of the Middle Volga (Lavento 2015, 181). The influence of the spread of eastern bronze artefacts continued during most of the Early Iron Age. Daggers are Bronze Age weapons, but only four are known in Finland. The earliest bronze find comes from Djagsfjärd, Kemiö and dates to Scandinavian Bronze Age period II. Three others were found on the south-west coast and date to Scandinavian Bronze Age periods II or III (Salo 1984, 150).

Several other bronze items are known, but appear to have been less important. They were ornaments, buckles, star-shaped buttons and spiral needles, used between Scandinavian Bronze Age periods III and V. Knives and tweezers have been found particularly in the coastal area of the Baltic Sea in Finland. They were in use from Scandinavian Bronze Age periods III to VI. Among the jewellery are ring-shaped pendants and hand-shaped pendants (Lavento 2015, 181-83; Salo 1984, 144-47).

Stone artefacts

Bronze and copper are not the only materials that were used during the Bronze Age and the Early Metal Age. The making of stone objects continued during the whole period, as in Scandinavia and northern Europe, and their relevance only decreased considerably in the Iron Age, after c. 500 cal BC. People's ability to knap stone axes or other stone objects decreased and the axes were not as good as they were earlier. However, stone artefacts

dating to the Bronze Age have not yet been carefully studied, providing a future research opportunity.

Based on earlier research, we have five types of stone axe in Finland in the Bronze Age. They were defined by Meinander (1954b, 67-84). Since then, much new material has been found which would repay renewed study, not yet undertaken.

One important kind of item are straight-based arrowheads. This type has been found in all parts of Finland, but their concentrations are in eastern Kainuu and northernmost Lapland. In the north, the stone used was quartzite, but in southern Finland most were made from quartz and other siliceous rock types. Christian Carpelan (2003, 48-50) has divided the straight-based arrowheads into six subtypes and altogether at least 180 examples were known in Finland at the beginning of the 2000s. Their use in northern Scandinavia began at the start of the second millennium BC and continued to the beginning of the Iron Age. Most examples were quartzite (Lavento 2001, 128-29).

Pottery

Textile ceramics are the first pottery type that came into use at the beginning of the Bronze Age. Textile impressions were already in use during the Late Neolithic and can be found on other ceramic types. However, the ceramic type that is now called Textile ceramics emerged in the Baltic countries and Russia during the third millennium BC; in Finland, its use began at the start of the second millennium BC (Lavento 2001).

Textile ceramics can be separated into subtypes that have local distribution areas and dates. One question is, should we separate the local types from the main type? This is sensible if we are interested in the details; but in this case, we are interested in large areas and long-term change, so it is useful to keep in mind the wider context. In Finland, the Early Bronze Age Textile ceramics were first separated into the Sarsa and Tomitsa groups (Meinander 1954b, 180-95). Later, they were divided into four subtypes by adding Kainuu ceramics and finally the Kalmistonmäki ceramics of the Karelian Isthmus (Lavento 2001, 82-87). The three first-mentioned types date mostly to the second millennium BC, although their use continues to the mid-first millennium BC. The Kalmistomäki ceramics belong to the first millennium BC. Research on Textile ceramics has continued in the region of the Middle Volga in particular (Lavento and Patrushev 2015; Patrushev and Lavento 2019).

In northern Finland and in the western part of the Kola peninsula, Lovozero ceramics came into use at the beginning of the Early Metal Age. Lovozero ceramics were the first ceramic type in Lapland which came into use after the Middle and Late Neolithic. The ceramic type spread into Finland from the east, from Karelia or the Kola peninsula. The other ceramic type in Lapland was the IT (Imitated Textile) type that shows remains of textile impressions which are only vaguely similar to those of Textile ceramics. IT ceramics are also known in Finnmark in Norway and in Norrbotten in Sweden and came into use already c. 1600 BC. Several other ceramic types, such as Sorsele and Vardö, were in use, too (Carpelan 2003, 51-52). Dates are not yet available for all of these types.

Figure 4. Säräisniemi 2 ceramics at Nimisjärvi in Vaala. From left to right: Anttila ceramics (KM 4050: 12); Luukonsaari ceramics (KM 4050: 24, 67); Kjelmøy ceramics (KM 4080: 15, 42).

Soon after 800 BC, new locally made asbestos ceramic types belonging to the Säräisniemi 2 group came into use in Finland. These ceramic types have been found particularly in inland areas of Finland but also in the Karelia Isthmus and eastern Karelia. Subtypes have been defined by C. Carpelan (Carpelan 1965; Carpelan and Parpola 2001). The sequence begins with Anttila ceramics, soon followed by Luukonsaari and Kjelmøy pottery (Figure 4). The last type is Sirnihta pottery. These types are in use in archaeology, but they have not been researched in much detail.

Ceramics have played a key role when archaeologists have tried to separate different cultures in the Bronze Age or Early Metal Age. Other archaeological material has not been found in similar quantities and often has very large distribution areas. Although the changes in bronze artefacts indicate changes of culture, they seem to cross the boundaries of smaller-scale human groups assumed to be reflected in pottery. However, to separate these possible human groups one needs to include many more kinds of archaeological material. Cultures and their definition cannot be based on ceramics only.

Despite these problems, ceramics have in practice been used to define human social groups. Whether this is the case is a question that needs further discussion. Pottery distribution areas are still much smaller than is the case with the metal types. This smaller extent is more indicative for the hunter and fisher groups than the larger distribution patterns of other artefacts, and ceramics are locally easier to differentiate in the archaeological material than metal artefacts, which were exchanged over a large area. These archaeologically defined groups persist for some hundreds of years before pottery types and the extent of their distribution changed.

Boundary creation and patterns of interaction

It is essential in archaeology to interpret several kinds of boundaries using different archaeological material. Archaeology gives the possibility to approach past social structures and the remains of the groups and people who left the material we now study. In this section, I will try to draw together the conclusions reached on the basis of cairns, settlement sites and material culture to interpret patterns of interaction.

Although the number of stone cairns is very large, the number of dwelling sites is relatively small so far in the coastal area. Finding them on the coast is not an easy task for archaeologists and less than 50 sites have been found in the coastal zone. One should still not assume that this is their real number; it evidently indicates that we have not yet found them. This is the case because interest into the Bronze Age only grew after the 1990s (Asplund 2008; Lavento 2001; Okkonen 2003; Tuovinen 2002). The situation has begun to change during the past twenty years.

Inland, the number of dwelling sites is slightly higher than on the coast, even taking into consideration the size of the area. Now we know c. 250 Early Metal Age dwelling sites. In contrast, the number of cairns inland is much smaller than on the coast and they are mostly called Lapp cairns. A new type of cemetery dating to the earlier phase of the Early Metal Age has been found in Ristiina municipality, in the north-western part of lake Saimaa (Saipio 2017).

The dwelling sites that are known inland illustrate some features that were characteristic of the populations of the Early Metal Age. Almost all the sites are smaller in size than during the Neolithic in the same areas. The smaller size indicates smaller groups. It is possible that the number of inhabitants is now 20-30 whereas the larger sites during the Neolithic had 100-150 inhabitants. This number is based on the number of habitations at excavated dwelling sites in the different areas of Finland; the size of dwelling pits was also compared (Halinen 2005; Halinen and Mökkönen 2009; Lavento 2001, app. 1).

What was the reason for the small population during the Early Metal Period? The population was already decreasing during the final phase of the Neolithic. This has been observed since the early 2000s (Lavento 2001; Sundell 2014; Tallavaara 2015) and is reflected in archaeological, DNA and demographic research. One essential factor has

been the fluctuation of the temperature, which had an important effect on the number of people.

In the late 1990s, I realised that the number of finds decreased considerably in inland Finland in the second half of third millennium BC, when the Pöljä and Jysmä types of Asbestos ceramics virtually vanished and Textile ceramics spread (Lavento 2001, 176-77). According to the model by Tallavaara (2015, 44-47), which is based on the known AMS-dates, a population bottleneck dates to the period c. 4000-3500 cal BP, and this is possibly connected to the cooling climate. The genetic model suggested by Sundell (2014, 22-23) dates the worst bottleneck between 4100-3800 BP.

As mentioned, in Finland habitation continued in the coastal zone of the Baltic Sea and in the northern part of Lapland. Settlement also continued inland, but only in some places. Yet we see the migration of some new populations that came both from the east and from the south – from the region of the Baltic countries. In the coastal zone, the migration came from southern Scandinavia (Meinander 1954a; 1954b) and to the Ostrobothnian coast from northern Scandinavia. In Ostrobothnia, cairns were built before the beginning of the Bronze Age, between 3500 BC and AD 500 (Okkonen 2003, 146-60). The dating is based on shoreline displacement. Although the archaeology indicates continuation, migration changed the culture in these areas. The Kiukainen culture was amalgamated into the Bronze Age in the south-western coastal zone of Finland at the latest c. 1500 cal BC (Asplund 2008, 55) or 1300 BC (Tuovinen 2002, 52).

Societies defined using archaeological material are small both in coastal and in inland areas. Their small sites do not indicate stable settlements which were used over a long time. In some cases, the sites on the western and south-western part of the coast resemble sites in southern Sweden, but inland the sites are visited only for short periods.

One of the essential features was contact with other populations. This took place in two ways. Because slash-and-burn cultivation was a part of the economy, cultivation was carried out in some places only for a short time and then groups relocated after two or three years. In addition, hunting and fishing caused groups to change places several times per year.

The second essential factor that caused small groups to move was the need for new raw materials and metal implements. They initiated the exchange of material and trade. It is important to realise that the Seima-Turbino axes eventually spread over a very large region in the north, from northern Scandinavia to eastern Siberia or even to coastal areas in China (Linduff and Mei 2009). The appearance of Seima-Turbino axes, daggers and spearheads in the Middle Volga area dates as early as 2200 cal BC, although they began to spread only after the beginning of the second millennium BC (Yushkova 2012, 134).

The Akozino-Mälar axes indicate relations of the same kind between groups that appeared at the beginning of the Middle Early Metal Age / Bronze Age, i.e. the beginning of the second millennium BC, but are distributed in the smaller area with Seima-Turbino axes (Kuzminykh 1996, 6-9). In this situation, the boundaries between the populations did not develop along predictable lines and they are not easy to observe. Groups lived in the areas that belonged to them in a general sense, but populations were so small that ownership of the land did not have to be strongly asserted; this is particularly the situation inland, where agriculture played a secondary role in the economy.

In the later part of the Early Metal Age, more bronze came into use. An important technology was the casting of bronze axes in those areas where it was possible to make moulds from suitable stone. One possibility was soapstone, which can be found in eastern Finland, particularly in the municipality of Suomussalmi. These axes were of Ananino type and they date to the period c. 700-300 cal BC (Lavento 2019, 143). When axes were cast in eastern Finland, they began to be traded over a smaller area – in particular eastern Finland and Karelia (Lavento 2019, 122-23). Though making the bronze axes was important in the area, the population could not have been large.

In the coastal zone, the situation was slightly different. Despite the small number of dwelling sites, some share common features with southern Scandinavia. These

Figure 5. A Lapp cairn inland in Hietaniemi, Ristiina in Mikkeli (photo: M. Lavento).

characteristics are not only visible in the bronze materials, but also the structure of house types known in western Finland. Importantly, these house types consist of a quadrangular building for both humans and animals – mainly sheep and goat (Salo 1984, 115-17). Bronze Age house structures were later also found in Porvoo (Strandberg 2002) and even in Oulu (Alakärppä *et al*. 1998).

Changing populations brought new rituals both to the coast and inland. This involved building a new type of cairns and Lapp cairns. Their aim was to claim the land ownership of these Bronze Age groups. This was needed because agriculture began to play a greater role in the economy. One and the same fields stayed in use for tens of years. However, another essential purpose of building cairns in the coastal zone and Lapp cairns inland was to enable the deceased to continue their life in the otherworld (Figure 5). This was the place for the deceased to remain close to the living.

Scholar of Religion Veikko Anttonen (1996) paid attention to this in his PhD thesis when he researched the cairns and the appearance of a new religion in Finland. This is also reflected in the names of these sites including *pyhä* (or "holy place"). These names may have come into use during the Early Bronze Age and clearly indicate how important the ownership of these areas came to be. Although these *pyhä* place names are more frequent inland, they came into use there later than during the Bronze Age.

The sites which can be classified as *pyhä* are rare in Finland so far, but they indicate culture change. Because the coastal and inland sites were of other kinds and show how different the Bronze Age and Early Metal Age populations were to the Neolithic ones, they indicate how different the inhabitants are, too. The populations moved over a large area, especially inland, while central places were more important in the coastal zone (Lavento 2001, 177-80).

Inland, the Lapp cairns are stone cemeteries that are sometimes so small that they are difficult to observe. In some cases, they are located on cliffs by lakes (Saipio 2011). In addition to Lapp cairns, a new rite of cremation of the dead has been attested in southern Saima (Saipio 2017). The example in Hietaniemi in Mikkeli comes from the Piikinperse D site and it has been excavated by Jarkko Saipio in 2017. The cemetery comprises other Lapp cairns and a pit which is not easy to observe on the surface of the gravel soil. Its find material consists of bones, quartz and ceramics. This new kind of feature dates to the Final Neolithic (Saipio 2018). Lapp cairns and other cremation cairns are not known in south-western Finland and in the northern part of Lapland (Lavento 2015, 160-70).

Bronze axes and spearheads circulate during the first part of the second millennium BC. Also, ceramics had already begun to spread from east to west from the end of the third millennium (Lavento 2019; Lavento and Patrushev 2015). The changing of material culture continued during the whole Bronze Age and Early Metal Age (Patrushev and Lavento 2019).

The use of Textile ceramics continued in a large area over two thousand years, but societies changed at the local level. Groups in each area began to change when some new migrations took place after the beginning of the second millennium BC and new populations influenced many areas. In spite of the different local groups, active trade between them over a large area caused common culture changes.

Some bronze material spread quickly and widely, such as Seima-Turbino axes, Akozino-Mälar axes and Ananino axes. However, despite their local distribution these types reach several different groups in Finland, although they remain on the periphery of them. Despite the development of local groups, some people moved across the north and west in different phases of the Early Metal Age. Members of the different groups thus visited the areas of other groups, because fishing and hunting need different environments and mobility was necessary for that reason.

In the Bronze Age and Early Metal Age, societies changed because of internal and external influence. The reasons for these changes need more research than has been carried out so far. Studies have been focused on separating local ceramic types and comparing them to the larger types (Lavento 2001). The largest ceramic type is the Textile ceramics (Patrushev and Lavento 2019), which is known from the Middle/Upper Volga to northern Fennoscandia, the Baltic countries and eastern Europe. It suggests a change of cultures in the larger Fenno-Ugrian area, but this now needs to be complemented with studies on other materials.

Textile ceramics influenced Finland for over 1500 years, which is an unusually long period for ceramics in the north. Its local types may have lasted for c. 1000 years, but in some cases less than 500 years. The chronology of the types is based on a large number of AMS dates. On the basis of ceramics and metal types, local groups have been preliminarily suggested in these areas (Lavento 2011; 2015, 194-97).

The small populations had their origin in four main sources. One source was the local groups that continued their life in different parts of Finland. These groups are the most visible in south-western Finland and in northernmost Lapland. Some continuity is also evident in the central part of the country, although populations were very small. The dwelling sites with both Textile and Sär 2 ceramic types can be dated by shore displacement and AMS and indicate how long pottery traditions were in use. The making of some of the types belonging to Sär 2 continues into the fourth century AD (Lavento 2001, 99-107).

The second source was a small group spreading to southern Finland from Estonia during the final phase of the Neolithic. This is visible in the Middle Zone ceramics (Carpelan 1979, 9-15) that influenced southern Häme in the middle of the second millennium BC or slightly earlier. After this, the new arrivals mixed with local populations. Although the group declined soon, it maybe influenced the southern part of the Textile ceramics in Finland.

The third origin of the Bronze Age in Finland developed when the Kiukainen culture influenced south-western Finland at the end of the second millennium BC. Small groups from southern Scandinavia migrated to the coastal zone and intermingled with the local population. The Kiukainen population used textile impressions, but does not belong to the Textile ceramics populations. After the appearance of the new population from southern Scandinavia, the textile impression disappeared. The ceramics were of a totally different type – the fine ware is Lausitz-influenced and the coarse types were defined using the material of Toispuolojanummi in Laitila. Meinander (1954b, 176-78) suggested that the Lausitz-influenced ceramics had their origin in the south-east Baltic and although the amount of ceramics has stayed scant in Finland, it indicates long contacts and the arrival of a new population. The coarse, local Toispuoloja ceramic type was investigated by Unto Salo (1984, 155). Still, neither of these two types has been extensively studied.

The fourth origin area lies in central and eastern Finland, which was reached by influences from the south-west and east, from the Middle and Upper Volga. In the archaeological material, Finland is a boundary zone between Textile ceramics and

Scandinavian Bronze Age culture, with the boundary running from the southern part of the Karelian isthmus to Oulu. The population was small before the new migrants arrived and changed material culture in the area, as visible through bronze material, Textile ceramics and straight-based arrowheads. Because the need for sites also changes, the remains of these cultures are more clearly visible. When we come to the end of the Early Metal Age, bronze loses its importance and iron takes its place soon after 500 BC; soon after this the local people learnt to extract iron from the easily available local raw materials (Lavento 2013).

Conclusions

The people living in each group were in contact with other groups and this became much more important when copper and in particular bronze was needed as a new raw material. This new material was brought to Finland by the groups that arrived on the coast from eastern Scandinavia. Because populations were very small before the beginning of the Bronze Age, the arrival and settlement of new people in these areas proceeded without considerable problems which could be visible in the archaeological material. This also applies to the south-west coast of Finland, where the groups using Kiukainen ceramics still lived when the new groups migrated to the area in the second part of the second millennium BC.

What happened was the assimilation of the new arrivals with the Kiukainen culture; the resulting Bronze Age culture has a strong connection to the Scandinavian Bronze Age culture. The economy began to change, so that cultivation and animal husbandry played a more important role than earlier. Although the groups were small, they expanded in area and settlements became more stable than earlier. These changes took place slowly and can be traced at some dwelling sites on the coast.

The changes in the inland area began with the influence of the Seima-Turbino phenomenon and Textile ceramics. They both reflect the arrival of small groups from the east. These connections to the Middle Volga or sometimes even further away continued during the Early Metal Age. These relations brought the Fenno-Ugrian languages to Finland and Estonia, as has been recently discussed in detail by Valter Lang (2018). Many essential changes like the development of original proto-Saami and original Baltic-Finnish took place during the Early Metal Age and this is visible in the archaeological material.

The new arrivals found it easy to introduce new material to this sparsely populated area and start the Metal Age in all parts of Finland. One can observe, too, that DNA evidence indicates where each of these new groups of people came from and how they successively influenced the local groups. Both archaeological material and aDNA data show how people migrated to Finland from as far away as eastern Siberia and central Europe. They initiated the Bronze Age and Early Metal Age in northern Scandinavia and in the coniferous zone of northern Europe.

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