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AN IRON FURNACE FROM THE EARLY METAL PERIOD AT KITULANSUO IN RISTIINA, IN THE SOUTHERN PART OF THE LAKE SAIMAA WATER SYSTEM

Abstract

This article briefly describes an iron furnace excavated at the dwelling site of Kitulansuo in Ristiina, on the southern part of Lake Saimaa Water System in 1995. A rectangular stone 'box' ca. 70 x 50 cm in size was made of large but thin slabs for reducing bog iron. Similar structures have also been found in northern Finland and in the Karelian Republic. On the basis of the form of the furnace and Luukonsaari ware in its finds context it can be connected with the type dating to the Early Metal Period and Early Iron Age.

Keywords: iron production, furnaces, Luukonsaari ware.

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INTRODUCTION

Archaeological information on prehistoric metalworking in Finland has grown considerably during the 1990s. The main reason for this is that several important new dwelling sites with iron furnaces have been found and at least partly excavated in eastern Finland. Interestingly, the earliest findings pointing to the use of iron furnaces have not come from western Finland from where a considerable collection of iron implements already from the Pre-Roman Iron Age has been recovered. Although the number of metal objects from the same period is small in eastern Finland, the places where iron making was conducted are known from there. The reason may be accidental, but also other explanations have to be taken into account.

In this short article I focus on eastern Finland, and particularly on the Southern Lake Saimaa area. Briefly presented in the following are the results of an excavation of a rectangular box-shaped iron furnace at Kitulansuo in Ristiina. Some light will also be shed on its neighbouring areas in attempting to establish its position among the Early Iron Age cultures in Finland.

The dwelling site of Kitulansuo in Ristiina belongs to the Eastern Bronze Culture as defined by its find material and Lapp cairns found on an outcrop bedrock

close by the dwelling site. Excavations in 1995 revealed an iron furnace (Lavento 1996a). A monograph of articles will be soon be published on the dwelling site and some of its neighbouring sites. Therefore, only the most important information will be presented here. Also, comparisons with other synchronous finds will be conducted more thoroughly at a later stage.

EARLY IRON WORKING IN EASTERN FINLAND AND NEIGHBOURING REGIONS

In Finland the first early iron furnace was not excavated until the early 1980s, at Äkälänniemi near the town of Kajaani (Schulz 1986), but already in the beginning of 1970s Aimo Kehusmaa pointed to iron working at the dwelling site of Neitilä 4 at Kemijärvi (Kehusmaa 1972). ¹⁴C dates of the Äkälänniemi furnace fixed the beginning of iron production in eastern Finland to the beginning of our era.¹ Surprisingly enough, no ceramics was found at the site in connection with iron smelting. This was unexpected, because archaeologists have normally used Sarsa-Tomitsa, Anttila, Luukonsaari, Kjelmo or even Lovozero ceramics as a sign of Early Metal Period occupation.

Hannu Kotivuori excavated iron furnaces at two

sites by the small Lake Sierijärvi in Rovaniemi (Kotivuori 1996:108-111). Kotivuori unearthed at Riitakaranta and Kotijänkä two different types of iron furnaces. The first type represented the same kind of rectangular "box", very similar to the Äkälänniemi furnace. The second type, is a "cupola" furnace, with no definite analogies in Scandinavia. It mostly resembled shaft furnaces found in later contexts in Sweden or even in Central Europe (Kotivuori 1996:409-410). Kotivuori has connected iron smelting at Sierijärvi with the Kjelmøy type of pottery. It is conspicuous that the ^{14}C dates of both sites and furnaces are well in accordance with the dates from Äkälänniemi.²

Against all expectations there is so far no direct evidence of early iron production in Western and Southern Finland. Despite this, iron slag has been found in cairns and dwelling sites. It is thus evident that iron smelting was also known also there, but archaeologists so far have not been fortunate enough to localize furnaces.

Already in the 1930s A. Ja. Brjusov noted metalworking at the dwelling site complex of Tomitsa, near the city of Petrozavodsk (Brjusov 1940:137-138, 38-243). The structures in question were most probably made for reducing copper. N. N. Gurina excavated an iron furnace at Orov-Guba, in the N area of Lake Onega (Gurina 1951:132-134). In 1961 A. V. Anpilogov carried out an archaeological excavation at the dwelling site of Kudoma X at Lake Sjamozero, in the southern part of Karelian Republic. Anpilogov uncovered three rectangular stone constructions intended for reducing iron from lake or bog ores. Stone constructions were made of 3-4 relatively large stone slabs which were placed on their sides. The rectangular structure was closed by large "floor" and "roof" stones (Anpilogov 1966:178-180). Both Anpilogov (1966:184) and Gurina (1951:132-134) have dated their furnaces to the end of the first millennium BC or into the beginning of the first millennium AD. In the Middle Volga area furnaces have been found which date back into the middle of the first millennium BC (Gurina 1963:187, 195).

At Kudoma XI, M. G. Kosmenko excavated a similar type of furnace in the late 1970s (Kosmenko 1980:113-118). Kosmenko has published four ^{14}C dates from the iron furnaces of Kudoma XI.³ At the beginning of the 1980s Kosmenko distinguished from the ceramic material of Kudoma XI Early Metal Period asbestos-tempered ware which he termed ceramics of the Kudoma type (Kosmenko 1980:113-118). Later he came into a conclusion that this type of ceramics can be connected with Luukonsaari ware (Kosmenko 1992:86). Re-

cently, four different kinds of furnace types have been distinguished in the Karelian Republic, dating from the Early Iron Age to the Middle Ages (Kosmenko & Manjuhlin 1999). The type of rectangular stone box, analogous to the Kitulansuo furnace, was in use over a long period. Its main area of distribution lies in the vicinity of Lake Sjamozero in the southern part of the Karelian republic.

The tradition of early iron smelting differs considerably in different parts of the Baltic Sea region. In Sweden very early remains of iron production have been excavated. Eva Hjartner-Holdar (1993:172-177, 190) suggests that the earliest furnaces in Sweden would have been in use as early as 1000-800 BC. Others (Magnusson 1986:219) have given later dates with warnings of the contamination of slag with older habitation layers. It is hard to imagine any contacts between the Scandinavian iron smelting tradition and the tradition observable in Kitulansuo. The Scandinavian furnace differs essentially from the eastern one. The Scandinavian structure is upright and open in its upper part, and it was made of clay. Achieving a good draft was an important element in reducing iron.

If comparing Estonian and Swedish finds with those in northern Finland we soon notice considerable differences. At the beginning of the Iron Age in the sphere of western culture, no small, rectangular, box-like structures were in use. Western furnaces are round and they stand in an upright position, a characteristic, explicitly adopted for maximizing draft and heat inside the furnace.

The earliest iron objects in Estonia are of Scythian origin, having come into use during the 6th century BC (Peets 1993:7). The earliest local iron smelting in Tindimuru, Central Estonia, has been dated from the 1st century BC to the 1st century AD (Peets & Visnap 1987).⁴ The smelting site of Puiatu in Northern Tartumaa also roughly belongs to the same period (Peets 1997:57-58).⁵ The iron furnace itself was not located, but the interpretation of iron smelting at the site was based on particles of magnetic ore. The early iron smelting furnaces of Estonia are small and low stone structures on the surface in which only small amounts of iron during one smelting could be handled. The amount of slag is also often small, rising not higher than 50 kg/smelting. Bog ore was used as raw material. In Latvia and Lithuania the furnaces are different. In Latvia it was a large stone above the surface, and in Lithuania the structure was on the soil surface (Jüri Peets, pers. comm. 15.4.1999). The smelting furnaces in the Baltic countries represent the eastern tradition although dif-

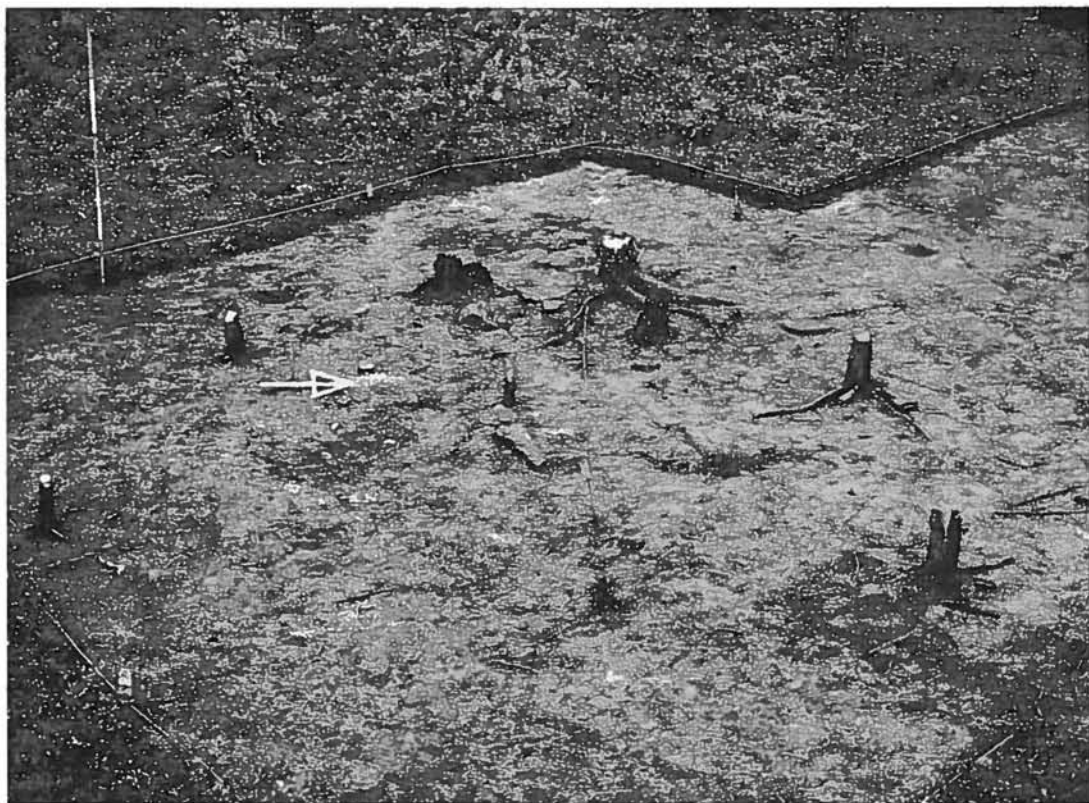


Fig. 1. Excavations at Kitulansuo. Layer 1. The first stones of the furnace are already visible. Photo: M. Lavento.

fering markedly from the Eastern Finnish and Karelian type of furnaces.

EXCAVATIONS AT KITULANSUO

The dwelling site at Kitulansuo in Ristiina was found during a field survey conducted by the Provincial Museum of Savonlinna at Ristiina in 1992. Timo Sepänmaa noted the scarp of a small gravel pit (Sepänmaa 1993a; 1993b). The Textile-impressed ceramics and Luukonsaari ware collected from the walls of the pit dated the site to the Early Metal Period. In 1993 the National Board of Antiquities carried out an excavation at the site under the leadership of Eeva-Liisa and Hans-Peter Schulz (1994). Excavations showed a dwelling site with Textile-impressed ceramics and Luukonsaari ware. Textile ceramics represented the majority of the find material. Also of interest was a possible house-floor

from historically recorded times that was discernible there (Schulz & Schulz 1994).

The Department of Archaeology of the University of Helsinki continued excavations at the site in the seasons of 1994 and 1995. The seminar excavations were carried out under the leadership of assistant Mika Lavento.⁶ The main question of the excavation was to study the dwelling sites of textile-impressed pottery (Lavento 1995; 1996a; 1996b). In trying to establish possible remains of subsurface prehistoric structures two geophysical investigations were carried out at the site. Under the direction of Arto Julkunen, MSc. in Technology, a magnetic resistivity survey was conducted at the site (see Lavento 1995). For developing the geophysical survey methods for the needs of archaeological trial excavation also measurements of Near-Infrared Spectrophotometric analysis were conducted under the direction of Rainer Bärts, MSc. in Technology. The excavation areas of 1995 were chosen on the basis of



Fig. 2. The rectangular stone box-furnace after excavation. Photo: M. Lavento.

the anomaly maps of a magnetic resistivity survey. Two of the most conspicuous anomalies proved to belong to the remains of a constructions built for iron smelting (Lavento 1996b).

THE IRON FURNACE AT KITULANSUO

The context of the iron furnace clearly differed from the Early Metal Period dwelling site, which was mostly characterized by Textile-impressed ceramics of the Sarsa type.⁷ Luukonsaari ware was also found at the dwelling site, but in a much smaller amount than Textile-impressed ceramics. As a curiosity, some sherds of Bronze Age ceramics of the Western Bronze culture were also found. The dwelling site itself can be considered to a short period camp with no dwelling structures pointing to a sedentary type of habitation.

The furnace was situated “within” the dwelling site, in broader perspective, but outside the richest concentration of finds and cultural layer (Fig. 1). Only a few sherds of Textile-impressed ceramics of the Sarsa type were found close to the structure. It was conspicuous that, although the ceramics in general were found in only small amounts around the furnace, Luukonsaari ware represented the majority of these finds. The great majority of finds in area 6 of the excavation naturally consisted of iron slag (Lavento 1996a).

Otherwise, at the stoneless glaci-fluvial heath of the site large and medium-size stone cobbles and fragments of burnt stones showed evidently that they had been brought intentionally to the location by humans. The first stones already appeared after uncovering the turf in the area. Also iron slag and heavily burnt stone fragments were already found at the beginning of the excavation.

As the excavation continued, more and more of the rectangular stone structure was uncovered. It was ca. 70 x 50 cm in size and made of large but thin slabs (Fig. 2). The slabs were laid on their edges. Three sides of the structure closed the rectangular "box" while one side remained open. No roof or floor slabs were observed during the excavation. The floor was made of clay. Its function was to keep the smelted iron inside the box after firing. Burnt clay was found partly smelted together with iron slag. More than 9 kg iron slag were dug from the oven. In addition to a rectangular setting also a side structure was found (Fig. 2). Its function remained unclear. It might have been used for producing a draft of blown air into the glowing heart of the furnace. Another possibility is that it was also a furnace, but was emptied and partly dismantled after smelting. The small amount of slag and burnt clay does not support the last-mentioned hypothesis.

It does not probable that the Kitulansuo furnace was been a forge for the local smith. This suggestion is countered by some fragments of iron ore which were found around the furnace; also the magnetism of the ore supports this assumption.

DATING

One AMS ^{14}C date has been obtained from the ST ceramics at the site suggesting an early period of use already between 1600-1400 calBC.⁸

Only one ^{14}C date is so far available for dating the furnace.⁹ In the light of dates for other find material at the site the result - between 440-600 calAD - is unexpected young. According to archaeological finds, this period has been traditionally considered as representing very small amount population in eastern Finland. Another ^{14}C sample, from charcoal just below the turf layer,¹⁰ gave an almost recent date. The result refers to a later fire(s) not in connection with iron smelting. This may, however, seriously affect also the first sample by making it too young. Therefore, one should be critical when using the dates for the Kitulansuo furnace. According to Dr. Högne Jungner (pers. comm.), director of the dating laboratory at the University of Helsinki TL-dates could not been obtained because the temperature in the furnace was too high during its use.

Referring to analogous furnaces in northern Finland and the Karelian Republic one can very roughly date the use of the type to between the middle of the first millennium BC and the middle of the second millennium AD. The most probable chronological relationship, however, is with Luukonsaari ceramics, possibly its latest period of use in the 4th century AD. Also a date obtained for Kotijänkä at Rovaniemi was analogous with the Kitulansuo furnace (Kotivuori 1986:410).

Otherwise, the ^{14}C dates from the site show that it was used for a long period from the beginning of the second half of the second millennium BC into the Late Middle Ages (Lavento 1996a:72; 1996b). Some dates and the possible hut remains from the medieval period - together with one ^{14}C -date of the iron slag - could be interpreted as an argument that the furnace should be dated to the medieval period. However, its form, together with the presence of Luukonsaari ware does not support this possibility.

CONCLUDING REMARKS

There are many factors supporting the suggestion that the rectangular stone structure filled with iron and clay slag was a furnace for smelting iron. Also the magnetic ore points to smelting instead of smithing. Typologically, the furnace at Ristiina can be connected without hesitation with furnaces found in Northern Finland (Äkälänniemi, Riitakanranta and Sierijärvi) and the Karelian Republic (Kudama X, XI). Also the context in the area is very similar. In all cases, the ceramics found in the vicinity of the structure belong to the Sär 2 group, which provides a rough date for the furnace type. The ^{14}C -dates of the Kitulansuo furnace are problematic. Although the first date - falling in the "dark ages" of the Iron Age in the eastern and northern Finland could be acceptable, the second alternative, its connection with the dwelling site involving Textile-impressed ceramics of the Sarsa-Tomitsa type does not appear to be as likely. Therefore, despite contradictory dates, it appears most plausible that the Kitulansuo furnace is a phenomenon synchronous with the early Eastern furnace types, and is to be dated to the period from the beginning of the second half of the first millennium BC to the middle of the first millennium AD.

NOTES

- ¹ ¹⁴C dates for the Äkälänniemi furnace (Schulz 1986:172): 2220±100 BP / 400-170 cal BC (Hel-2098); 2180±90 BP / 380-160 or 140-120 cal BC (Hel-2101). All calibrations have been made by the program OxCal v.2.18 (Bronk Ramsey 1995).
- ² Furnaces at Riitakaranta (Kotivuori 1996:410): 2090±100 BP / 360-310 cal BC or 210 cal BC-20 cal AD (Hel-2955); 1820±110 BP / 70-340 cal AD (Hel-2956).
Furnaces at Kotijänkä (Kotivuori 1996:410): 1560±90 BP / 410-600 cal AD (Tku-034); 1750±90 BP / 140-170 or 190-390 cal AD (Tku-035); 1880±110 BP / 10 cal BC-260 cal AD or 300-320 cal AD (Hel-3173).
- ³ ¹⁴C dates of furnace at Kudama XI (Kosmenko 1992:87-89): furnace 1 1590±60 BP / 410-550 cal AD (TA-1014); furnace 5 800±80 BP / 1060-1070 or 1120-1140 or 1160-1280 cal AD (TA-965); furnace 7 1165±80 BP / 780-970 cal AD. These dates together with the earlier data point to very long period of use for iron furnaces, extending from the middle of first millennium BC to the Middle Ages.
- ⁴ Dates for the Tindimuru smelting site (Peets 1996:29): 1985±35 BP / 70 cal BC-70 cal AD (Tln-1008); 1925±35 BP / 20 cal BC-130 cal AD (Tln-1071).
- ⁵ Dates for the Puiatu smelting site (Peets 1997:58): 1812±50 BP / 125 cal BC-35 cal AD (Tln-2135); Puiatu 2 1861±53 BP / 75-250 cal AD (Tln-2138).
- ⁶ Assistant Anne Vikkula, Lic.Phil. was responsible for teaching field mapping and sampling methods. Oili Rähälä, MA (1994) and Derek Fewster, MA (1995) taught the drawing of excavation maps. Petro Pesonen, Lic.Phil. conducted the documentation of finds by tachymeter and Sirpa Leskinen, MA was responsible for drawing field maps. The students Risto Kesseli and Raija Ylönen were field assistants.
- ⁷ The subgroups of Finnish Textile-impressed ceramics are more thoroughly discussed in a forthcoming article (Lavento, in press) and therefore this question is omitted here.
- ⁸ Hel-104: 3220±68 BP / 1610-1560 or 1540-1420 cal BC.
- ⁹ Hel-3837: 1530±80 BP / 440-660 cal AD.
- ¹⁰ Hel-4149: 320±70 BP / 1490-1640 cal AD.

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