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In Search of Hearths

A Book in Memory of Sven-Donald Hedman

Proceedings of the Seminar Dedicated to
the Memory of Sven-Donald Hedman

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Sven-Donald Hedman, Archaeologist and Friend

Petri Halinen & Bjørnar J. Olsen

Figure 1. Fieldwork in Russia in 2014. Sven-Donald in the camp on Sredniy Peninsula, Murmansk Oblast. Photo: Bjørnar Olsen.

This book is dedicated to the memory of Sven-Donald Hedman, a Swedish archaeologist whose professional interests were mainly in the north. Sven-Donald collaborated closely with Norwegian, Finnish and Russian archaeologists, and also with colleagues in Canada and the United States. His fieldwork trips were dedicated to the forest and mountain areas of Sweden, Norway, Finland and Russia – to almost every corner of Sápmi. The urge to find answers to new questions inspired him to head off the beaten archaeological track. Likewise, Sven-Donald's interests in archaeology were not confined to any narrow time span but extended from the time of Fennoscandia's first settlers to 20th-century archaeological sites.

This collection includes seven articles closely related to Sven-Donald's main field of research, written by authors with whom he collaborated over several years. Most of the papers focus on the so-called hearth-row sites, which can be dated to the Late Iron Age and the early medieval period. Sven-Donald directed and took part in several of the investigations discussed here, most notably at the two Pasvik sites, Brodtkorbneset and Steintjørna. In other projects, he was a highly valued collaborator. The volume is based on the proceedings of a seminar dedicated to the memory of Sven-Donald, held 4 March 2016 at the Centre for Sámi Studies of the University of Tromsø – The Arctic University of Norway. The seminar was very well attended, with Sven-Donald's family as specially invited guests. Talks and discussions took place in a pleasant atmosphere and thus well in his spirit as a scholar and person. The authors remember Sven-Donald as a generous and immensely gifted colleague, a person who always had a smile for you even in the toughest field conditions.

Sven-Donald Hedman was born 1953 in Arjeplog, Northern Sweden. His interest in archaeology began early. He was only 12 years old when he found his first stone arrowheads on the lake shore near his home in Stensund. He handed the finds over to the local museum (Silvermuseet) in Arjeplog and continued to search for more finds and sites. Already as a teenager he took part in several archaeological excavations near Arjeplog. His path to academic archaeology, however, was longer than for most of us. He had children as a young man and worked for several years as a carpenter in order to secure the economy of his family. Nonetheless, he never gave up his dream of ultimately becoming an archaeologist, and at the age of 30 he began his studies in archaeology at Umeå University. These studies were crowned by his doctoral thesis in 2003, *Boplatser och offerplatser. Ekonomisk strategi och boplatsmönster bland skogsamer 700-1600 AD*. It is based on material from numerous hearth and hearth-row sites, several of which he had excavated himself. Its main topic was the emergence of reindeer husbandry and whether there was a connection between changes in settlement pattern and transitions in the reindeer economy. One of Sven-Donald's conclusions was that the new environmental preferences characterizing the location of the hearth-row sites from the Late Iron Age onwards could be explained by new needs for pasture in a reindeer herding economy (Hedman 2003).

Sven-Donald was deeply engaged in Sámi archaeology, broadly defined. He carried out extensive fieldwork in the boreal forest zone, where also quite young sites drew his attention – sites that still were on their way to becoming what we traditionally think of as archaeological sites. They included so-called culturally modified trees, including traces of the removal of pine inner-bark for food but also drawings and other depictions – some of them from the 19th century, but also younger. Sven-Donald was interested in the diversity of traces left by humans in the past, irrespective of age, and he was a master in finding them. Together with his soil sampling probe, which always accompanied him, he was a familiar sight in both the forest and mountain regions. While hearth and hearth-row sites in the forest region probably were his foremost field of interest and expertise, the so called *stállo* sites in the mountain areas were also close to his heart. He surveyed extensively in high mountain areas to find and record new sites, in both Sweden and Norway, and above all in the Saltfjell area (Hedman 2015).

As an archaeologist Sven-Donald worked in the early 2000s at the Norrbotten Museum, where he headed the project *Skog och historia* (Forest and History) and gained wide experience of all kinds of ancient monuments in the forest areas, skills that became important for his later projects. In 2007, he was appointed to a post-doctoral position at the University of Tromsø as part of the research project *Home, Hearth and Household in the Circumpolar North* (HHH) (Anderson et al. 2013). This was a large international project with subprojects in the United States,

Figure 2. Inspecting a newly found weight. Sven-Donald and Petri Halinen at Steintjørna, Pasvik, 2012. Photo: Bjørnar Olsen.

Figure 3. Taking a break on a sunny afternoon on the shores of Lake Lovozero. Sven-Donald and Anton Murashkin, Lovozero, Russia, 2007. Photo: Petri Halinen.

Canada, Alaska, Russia, Finland, Norway and Sweden, and Sven-Donald fitted easily into the international atmosphere of the large research group. His extensive knowledge of dwelling sites and the environment was very important for the success of the project. The discovery and first excavations of the rich hearth-row sites in the River Pasvik area in Eastern Finnmark, Norway, took place as part of the HHH project and became a milestone in Sven-Donald's research career (Hedman and Olsen 2009, Halinen et al. 2013).

In 2012, he became the leader of the project *Hunters in Transition*, financed by Riksbankens Jubileumsfond (The Swedish Foundation for Humanities and Social Sciences). This project continued earlier studies of the hearth-row sites in the River Pasvik area, now focusing on the Steintjørna site, which was excavated in 2012 and 2013. It also included the excavation of a hearth-row site at Östra Hobergträsk, Västerbotten, Sweden. This project was multidisciplinary, utilizing the methods of environmental archaeology, metallurgy, osteology and genetics. Its results were important for Swedish, Norwegian and Finnish archaeology, and, needless to say, very important for Sámi archaeology. The last article of the project was published in *Rangifer* (Hedman et al. 2015), slightly more than a month before Sven-Donald passed away – and more was to come (Jerand et al. 2016). The research group has continued to publish articles in which Sven-Donald's impact and research are still highly visible (Røed et al. 2018). This impact continues with the publishing of this volume.

Sven-Donald was a very social person, a person with a big heart. In the field, he often brought an additional heart with him, a smoked and dried reindeer heart. He carried it with him for that irresistible treat during breaks – coffee breaks, lunch breaks, chatting breaks, whatever breaks. Wherever we dug or surveyed he generously shared both of his hearts. It was always enjoyable to discuss, talk – or just be silent with Sven-Donald. In the midst of the northern wilderness, deep in the forest, just being with him – in search of something interesting. A pit, a marked tree, a dwelling, a hearth. Two hearths, then a hearth row. If it was there, he would find it.

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Brodtkorbneset and Steintjørna: Two Hearth-Row Sites in Pasvik, Arctic Norway

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Abstract

During the Viking Age and the early medieval period, hearth-row sites became a distinct feature of Sámi settlements over the vast interior region of Northern Fennoscandia. Consisting of large, rectangular hearths organized in a linear pattern, these sites represent a new way of organizing domestic space and also reflect new environmental preferences. In this paper, the author gives an overview of the investigations conducted at two hearth-row sites, Steintjørna and Brodtkorbneset, in Pasvik, Arctic Norway. Based on the excavated material, the author discusses changes in settlement pattern, reindeer economies, and the organization of domestic space. He also discusses the role that the hearths themselves may have played in negotiating internal social dynamics and in inter-ethnic contacts of the Late Viking Age and the early medieval period.

1 Introduction

The Viking Age and early medieval period (c. 800 – 1300 AD) brought some remarkable changes to the indigenous Sámi societies in Northern Fennoscandia, including changes in settlement pattern, organization of domestic space, ritual manifestations, exchange networks, economy, and animal relationships. The perhaps single most conspicuous example of these changes is the emergence of the so-called hearth-row sites containing large rectangular hearths organized in a distinctive linear pattern (Halinen et al. 2013; Hamari 1996; Hedman 2003; Hedman & Olsen 2009; Hedman et al. 2015). Emerging in the Late Iron Age, hearth-row sites are found over the vast interior of the current Sápmi region that includes Northern Finland, Sweden and Norway, and the Kola Peninsula in Russia. While their presence until recently was not archaeologically verified in the latter area, a hearth-row site, Liva 1, has now been found and investigated in the south-western part of the Kola Peninsula (Muraskin & Kolpakov, this volume). More intriguing, however, is the discovered hearth-row site at Aursjøen, Lesja, in Oppland County, which suggests that their distribution even included the mountain areas of interior Southern Norway, more than 1,200 km south-west of the north-easternmost known sites (Bergstøl 2008: 141-142; Reitan 2006).

This paper deals with two hearth-row sites, Brodtkorbneset and Steintjørna, situated on the Norwegian side of the River Pasvik, forming the border between Russia and Norway (Fig. 1). The sites were excavated in 2008 –2009, and 2012 –13, and the investigations conducted under the direction of Sven-Donald Hedman are more extensive, detailed, and geographically focused than any previous investigations of sites of this kind (Halinen et al. 2013; Hedman & Olsen 2009; Hedman et al. 2015; Jerand et al. 2016). The retrieved material is also remarkable in several respects, including

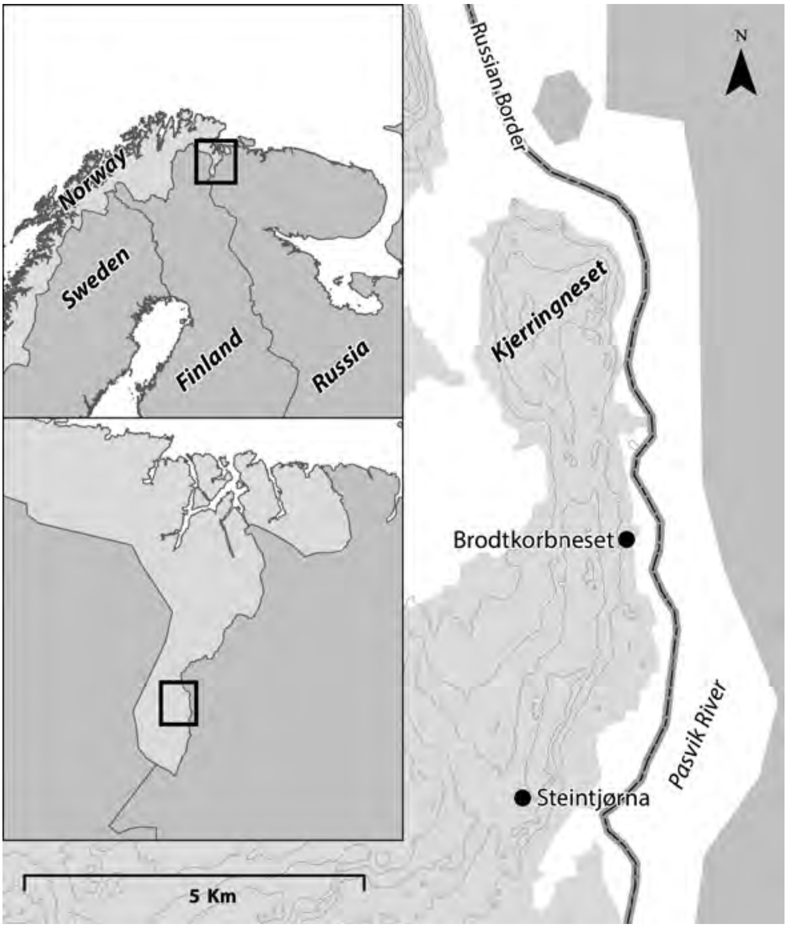

Figure 1. Location of the study area and the two investigated sites. Map: Johan Eilertsen Arntzen.

well-preserved hearths and rich artefact assemblages, and is unique within this corpus with respect to the number and preservation of faunal remains. This makes the sites important for advancing understanding of the changes that took place during the period in question, but also for more detailed studies of processes at a more site-specific level with respect to issues such as the organization of domestic space, craft specialization, economy, consumption, animal relations, and material agency.

In this paper, I present the material from the two sites and discuss some of the issues mentioned here (for more detailed discussion of some aspects of this material, see papers in this volume by Henriksen, Jerand & Linderholm, and Vretemark).

2 The sites

The Brodtkorbneset and Steintjørna sites are located approximately 70 km from the coast and on the west (Norwegian) side of the River Pasvik in the municipality of Sør-Varanger. Brodtkorbneset is the northernmost of the two sites, consisting of seven linearly organized hearths placed at intervals of 8 to 15 m (Fig. 2). Though quite close to the River Pasvik (the nearest hearth is about 100 m away), the site is located away from the river bank on a sandy turf-covered terrace with lichen, moss, heather, and pine trees. Unlike earlier and later dwelling sites (cf. Simonsen 1963), the hearth row is not oriented parallel with the river bank but east-west and thus per-

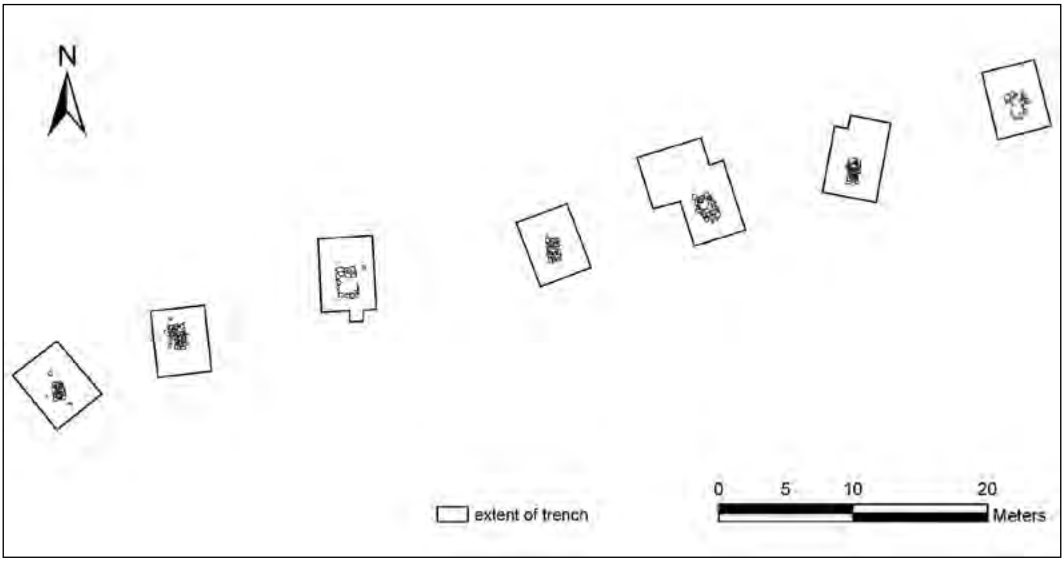

Figure 2. Outline of the hearth row site at Brodtkorbneset with excavation trenches marked.

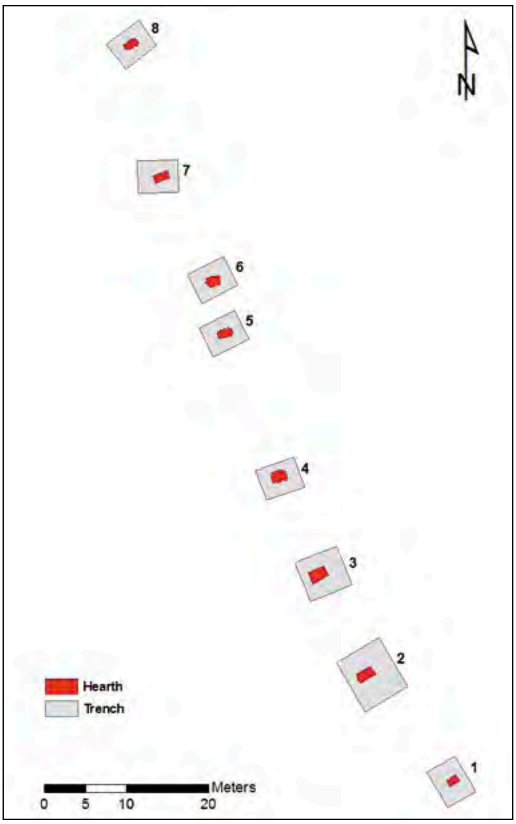

Figure 3. Outline of the hearth row site at Steintjørna with excavation trenches marked.

pendicular to the river. All the hearths are rectangular and contain packed and partly layered fire-cracked stones enclosed by larger frame stones. Oriented transverse to the linear outline of the site, they vary in length between 1.5-2.4 m, and between 1-1.2 m in width. A common feature of the larger hearths is that the northern end is built higher, creating a platform-like compartment extending up to 0.4 m above the surface (Hedman & Olsen 2009: 9). All the seven hearths were excavated, including the presumed tent-enclosed living areas around them, with trenches varying in size between 20 and 36 m². In addition to the main trenches, test pits were dug in areas intersecting the hearths.

The Steintjørna site is located 4 km SSW of Brodtkorbneset, next to a small tarn (Steintjørn) 700 m west of the River Pasvik. It contains eight hearths and is situated on moraine ground in mixed birch and pine forest. The distance between the hearths varies between 5 and 18 metres, and the general layout, size, and morphology of the hearths is close to identical to the Brodtkorbneset site (Fig. 3). One hearth, H7, however, sets itself apart by being constructed prima-

Find	**H1**	**H2**	**H3**	**H4**	**H5**	**H6**	**H7**	**Testpit1**	**Testpit2**	**Testpit4**	**N=**
Ironfragment		12	3	2	13	1	4				32
Nail of iron		1	1	1	1						4
Ironfragment,rivet		1			1						2
Ironring			1								1
Rivet iron					1						1
Strike a light					2						2
Fishhook, iron					1						1
Axe			1								1
Ironrod							1				1
Arrowhead		1			3						4
Scraper					1						1
Knife				1	1						1
Bronze pendant				1			1				2
Copper alloy	8	4	7	7	12	2	1			1	42
Copper alloy, trapetzoid			2	2	3	1			1		9
Copper alloy, axeshaped	1							1			2
Copper alloy, pendant		1									1
Rivet copper	1		1								2
Flint		6	9	2	29	3					49
Mica			3								3
Whetstone	1	2			2	2	1				8
Quartz	1	1	2	2							6
Quartzite		1	2								3
Pumice stone, polished		1									1
Hammerstone							1				1
Asbestosceramic	1	1	5				2				9
Comb			1								1
Melt					1						1
Total	13	32	38	18	71	9	11	1	1	1	=196

Table 1. The artefacts from Brodtkorbneset.

rily of slate slabs in contrast to the stones/rocks otherwise used. All the hearths were excavated also at this site, with trenches comparable to those at Brodtkorbneset. At both sites, the size and construction of the hearths exhibit some differences; some of the hearths are bigger and more elaborately built than others. Interestingly, these hearths also yielded more, and more varied, finds. Another noteworthy feature is their placement, in the sense that the larger and richer hearths never terminate the rows. At Brodtkorbneset in particular, these larger hearths cluster in the central part of the row.

Twenty-nine radiocarbon dates have been obtained from bone and charcoal samples from Brodtkorbneset, and twenty-three from Steintjørna (Fig. 4). Apart from one unburnt sheep bone, the bone samples consist of burnt and unburnt reindeer bones, while the charcoal samples are mostly from selected branches and outer growth rings of pine, the only tree species present in the material. With few exceptions, the dates cluster rather nicely and suggest that the sites most likely were occupied sometime between the 11th and late 13th century. Some further aspects regarding contemporaneity of the sites, and the hearths, are addressed below in this paper.

Find	H1	H2	H3	H4	H5	H6	H7	H8	n=
Iron fragment	1	4	10		5		1	1	22
Knife	2	4		1		1			8
Rivet		4	1		2				7
Arrowhead	1	2?	1?						4
Chain, part of		1	1						2
Iron blank		2							2
Iron rod			1						1
Hanger/iron		1							1
Weight			1						1
Horsehead/bronze			1					1	2
Needle/bronze		1							1
Copper alloy		25	4	3	3	3	2	1	41
Copper alloy/trapetzoid								1	1
Slag		32						1	33
Plano convex slag					1				1
Hammer scale		2			3				5
Burned clay					2				2
Bead					1				1
Flint	1	4	7	9	3	2	1		27
Rounded stone		1							1
Mica			1						1
Whetstone			1						1
Quartz					1				1
Chewing gum/hartz								1	1
Bone awl				1					1
Total	5	83	29	14	20	6	4	6	=167

Table 2. The artefacts from Steintjørna.

3 Things retrieved

The sites were rich in finds, and the most common artefacts were thin pieces of cut copper alloy and tinder flint. Of the 196 artefacts found at Brodtkorbneset (Table 1), cut pieces of copper alloy amounted to 42 specimens while 49 were tinder flint flakes. The Steintjørna excavations yielded 167 artefacts, of which 41 were copper allow and 27 tinder flint (Table 2). The flint debris is characteristic of flint struck by strike-a-lights in order to produce sparks and fire. Cut pieces of bronze or copper alloy are commonly found at both Sámi sacrificial sites and dwelling sites, and have a wide chronological distribution from the Late Iron Age to Early Modern Times (Odner 1992; Hedman 2003; see Henriksen this volume). Some of these were worked into ornaments such as trapezoid and axe-shaped pendants (Fig. 6.3), ten of which were found at Brodtkorbneset but only one at Steintjørna. At Steintjørna, most of the copper alloy pieces were found in association with H2, and in contrast to Brodtkorbneset the pieces are quite large.

Another significant difference in the assemblages from the two sites are the finds of iron slag from Steintjørna. Slag actually accounts for 20 % of the finds but was cu-

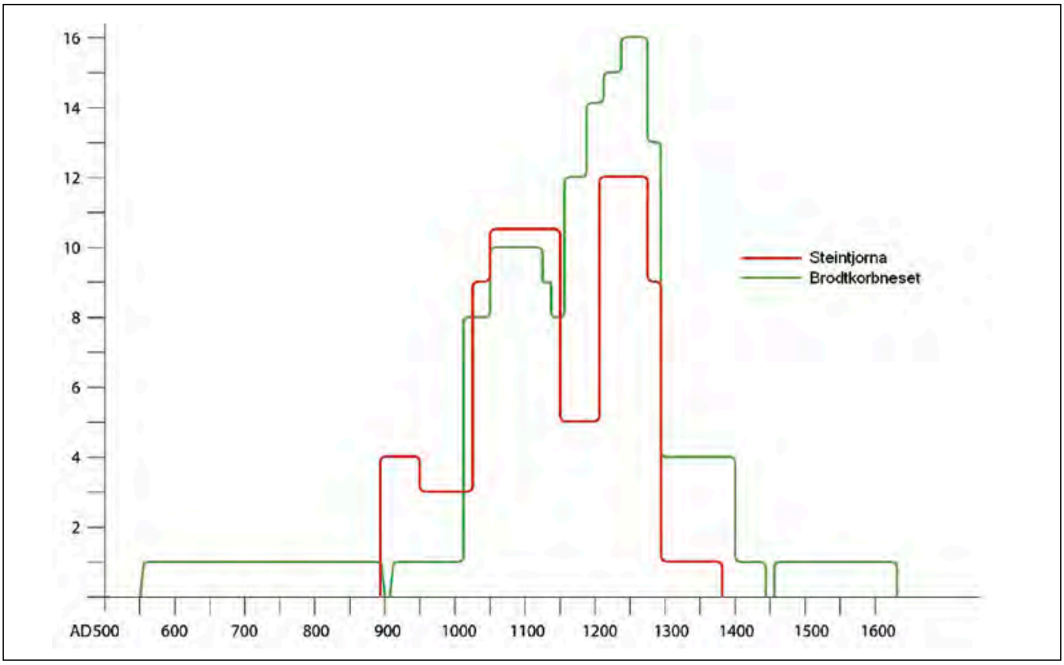

Figure 4. Diagram showing calibrated AMS radiocarbon dates from Brodtkorbneset and Steintjørna. Radiocarbon ages calibrated using OxCal 4.2 (Bronk Ramsey 2009).

riously not present at all at Brodtkorbneset (see Henriksen, this volume). As with the cut copper alloy pieces, most of the slag was found in association with H2 (more than 1 kg), and lesser amounts were also found at H5 and H8. The slag finds include hammer scales and plano-convex slag (Fig. 5), and the concentration of slag and large pieces of copper alloy may indicate specialist skills not shared by members of other households. The fact that the archaeo-metallurgical analysis of the slag indicated unusual and complex metal processing, involving a mixture of copper and iron (Grandin & Willim 2013), may further support this interpretation. It is also interesting to note the uneven distribution of yet another frequent and mundane artefact category, tinder flint flakes. At Brodtkorbneset, while numerous in the deposits from the central hearths, they are completely lacking from the two outermost hearths (H1 and H7). In the Steintjørna assemblage they are either lacking or represented by only one specimen in the outermost hearths.

Figure 5. Plano-convex shaped bottom slag from Steintjørna. Photo: Bjørnar Olsen.

Among the other artefacts from Brodtkorbneset were four iron arrowheads, two strike-a-lights, an axe, a hide scraper, a knife and a fishhook, all made of iron. The iron knife contained a partially preserved bone shaft (Fig. 6.5), otherwise bone/antler artefacts were not preserved apart from a frag-

Figure 6. Finds from Brodtkorbneset (6.1, 6.3, 6.4 and 6.5) and Steintjørna (6.2). Photos: Bjørnar Olsen and Tromsø Museum.

mented composite comb found at this site and a bone awl from Steintjørna. Iron rivets and nails, and unidentified iron fragments, are also quite well represented. In addition to the trapezoid and axe-shaped pendants, one copper alloy brooch with four knobs and one coin-shaped pendant with open-worked oblique lattice pattern were found at Brodtkorbneset (Fig. 6.1). The first has a North European distribution, while the latter is common in Novgorodian and Central Russian assemblages from the 12th to the 14th centuries (Henriksen, this volume). The assemblage from Steintjørna included four iron arrowheads (some of which are highly fragmented) and eight knives (four of these were from H2). Intriguing items are the finds of two small horse heads of bronze, which were originally part of a horse-shaped pendant containing two opposite facing heads (Fig. 6.2). The heads, however, were not found together. One was found in the trench of H8 while the other was found 60 m to the south, in the trench of H3; thus, we do not know whether they originally were part of the same pendant. Pendants of this type

Figure 7. The distribution of bones (weight units) in the H5 area, Brodtkorbneset.

are common in Russian Karelia, with Lake Ladoga as a possible area of production (see Henriksen, this volume). Another interesting find from this site is a round flat-poled lead weight with an outer covering of copper alloy found next to H3. The weight suggests trade or exchange of small object suitable to be measured with scales, possibly silver or other desired metals. Interestingly, four nearly similar weights were found at another hearth-row site, Rerbraur 1, in the Arjeplog woodland of Northern Sweden (Hedman 2003: 161; see also Muraskin and Kolpakov, this volume) and speak to the direct involvement of the Sámi in long-distance trade. The finds from Steintjørna also included a bronze needle, a fragment of a glass bead, iron rivets and tree resin 'chewing gum'.

4 Bones, bone deposition and organization of domestic space

The faunal assemblages from Brodtkorbneset and Steintjørna contain more than 17,000 bone fragments with a total weight of nearly 16 kilograms (Hedman et al. 2015; Vretemark, this volume). Given the generally poor preservation conditions in the common acidic soil of this region, this is an unusually large assemblage. The amount of bones found in each hearth, however, differs considerably, from around 50 grams to more than 7 kilograms. The reasons for this may to some extent be explained by unequal conditions of preservation. It is nevertheless interesting to observe that the tendencies in the artefact assemblages are repeated in the bone

Figure 8. Pole photo of H3, Steintjørna (scale 2 m). Note the concentration of bones at the (upper) end of the hearth. Photo: Bjørnar Olsen.

material, with the larger hearths (often situated in the middle parts of the rows) yielding the largest samples. The fact that larger accumulations contribute to their own conditions of preservation increases this bias in the retrieved material.

There is a clear predominance of reindeer in the assemblages (Vretemark, this volume). In the merged material from all the hearths, ca. 87 % of the identified fragments are of reindeer. The amount of fish bones is also significant, equalling around 12 %. Six different fish species were identified, with common whitefish and pike as the dominant ones. The remaining 1 % of the identified fragments represent birds, artic fox, wolf and sheep/goat[1]. The faunal material is presented and discussed by Vretemark in another article in this publication, and I concentrate here on some significant aspects of the deposition and distribution of the bone material at the two sites.

When we excavated the first three hearth areas at Brodtkorbneset in 2008 we observed that bones found outside the hearths, including some large deposits, showed a clear and systematic clustering on the north (short) side of the hearths (Fig. 7). Precisely the same pattern was observed when excavating the remaining four hearth trenches in 2009, and also when later excavating the eight hearths at Steintjørna, where the bones were found to cluster next to the east end of the hearths (the hearths here are oriented E-W) (Fig. 8). Only some few fragments were found scattered at the long sides or next to

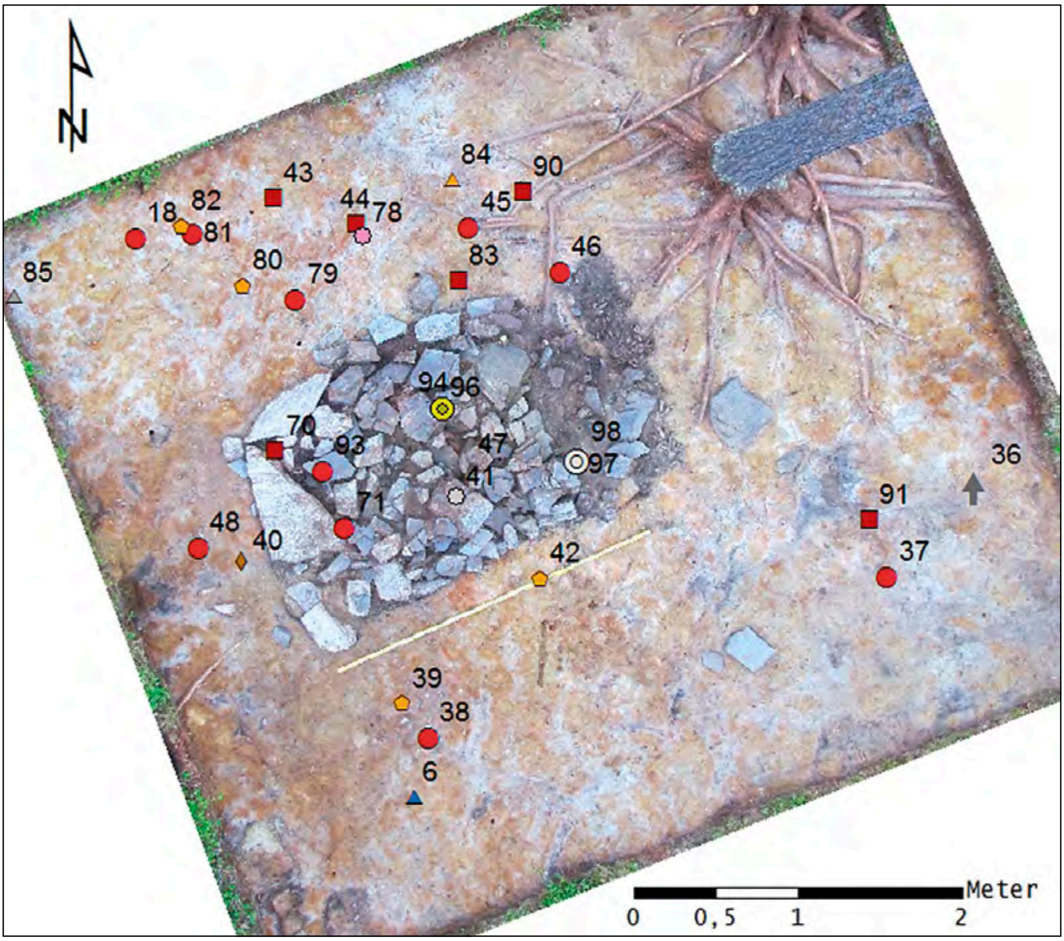

Figure 9. Distribution of artefacts in the H3 areas, Steintjørna.

the opposite ends of the hearths. Phosphate analyses (mainly reflecting bone disposal) have produced soil signatures that correspond remarkably well with these patterns (Jerand et al. 2016; Jerand & Linderholm, this volume). This regularity in bone refuse disposal is so far only documented at the two hearth-row sites in question, but phosphate soil distributions from other hearth-row sites suggest a more common phenomenon (Halinen et al. 2013; Jerand et al. 2016).

The distinct and remarkably uniform pattern of bone refuse disposal at the two sites is thought-provoking. It is also interesting to note that this pattern is not matched by the artefact distributions. Artefacts are found evenly distributed around the hearths, with most of them next to the long sides (Fig. 9). Before discussing this further, it should be noted that each hearth most likely was placed inside a dwelling. This interpretation is based on the spatial patterns that emerge from the confined distribution of finds, cultural layers, and soil chemical signatures. Since no convincing evidence of sod or timbered buildings have been found, tents seem the most plausible option. One likely candidate for a tent dwelling is the winter tent (*goahti*) commonly used by the Sámi. This was constructed using a framework of paired curved poles (*baeljek*) that gave the floor a larger and more oval outline that could even fit big hearths (Bjørklund 2013). Taking this into consideration, a possible interpretation of the bone disposal pattern is that it reflects refuse clearance and/or butchering activities related to the tent entrances. Since the hearths are always oriented transversely to the row axis, the entrances to each dwelling at the respective sites all faced in the same direction and, accordingly, produced a spatially uniform bone refuse disposal.

This interpretation is, however, complicated by ethnographic information regarding Sámi organisation of domestic space. Following the much referred to work by ethnologist Gustav Ränk (1949), the hearth mediated a basic social and cosmological dualism between front and back spaces in the *goahti*, as also reflected by its two opposite entrances. The inner part of the dwelling (the *boassu* area) is reported as a male exclusive area, leaving the middle and front part as the female and common domain. The *boassu*, and the attached (rear) entrance, were considered sacred and religious/sacred objects and hunting weapons were kept here, and as with the slaughtered wild animals they could only enter the dwelling through the 'back' doorway (cf. Yates 1989). However, the *boassu* area also served as the kitchen area of the dwelling, the place where fish and especially reindeer meat were cut and prepared for cooking. When feasible, the slaughtering of reindeer also took place outside the *boassu* entrance. Thus, if we are to trust the ethnographic record, it may well be that the distinct bone disposal patterns observed at Brodtkorbneset and Steintjørna rather reflects a social and cosmological division of domestic space, and where the *rear* side of the dwelling actually may be the one which leaves most bone refuse and the clearest soil chemical signatures.

There are, however, features that seem less in compliance with the ethnographic understanding. For example, the distributions of artefacts, with possible gendered affinities, do not match the bone refuse patterning and show a far more even dispersal around the hearths. One possible explanation might be that the deposition of bones was more subject to the prevailing social and cosmological schemes, including rules for how and where to handle meat and food, but even here the archaeological material contains some cautionary tales. According to Ränk's account (1949), domestic products such as milk, and also domesticated animals (e.g. goats and sheep), should be kept separate from game and 'wild' products and should enter the house through the front entrance (see also Yates 1989). However, in our assemblages the sheep bones are found in the same deposits as bones of reindeer, other wild animals, birds and fishes, and thus inappropriately mixed and placed according to the ethnographic canon. Speaking to this is also the observation that there are no discernible differences between the bones found inside and outside of the hearths (Hedman et al. 2015: 15-16).

Though the ethnographic understanding calls for reflection, there is much to suggest that the distinct and uniform bone distributions mostly are a product of refuse removal and cleaning through a single and equally oriented entrance. This, however, does not rule out that also social and cosmological conceptions may have impacted the formation of the assemblages retrieved, and there are features that may be better understood through this way of thinking. Such features are, for example, the large bone deposits associated with H3 at Brodtkorbneset, which apart from bones of reindeer and wild species, also included most of the sheep bones in this material, and, in addition, a rare iron axe and two trapezoid pendants. Might such deposits also involve ritual significance and could sheep, moreover, as perhaps also suggested by their rather surprising presence in this context, have had significance beyond subsistence and practical utility, for example, in relation to the negotiation of external relations and trade?

5 Seasonality and settlement pattern

A great deal of data suggest that the two sites were inhabited during winter. For example, the size and solidity of the hearths, the traces of intense firing, and the stone packing inside them, all point to dwellings where heat radiation and heat storage were crucial. The location and orientation of the Brodtkorbneset site, which is situated quite close to the bank of the River Pasvik, may further support this. Despite the relative proximity, the placing and layout of the site seems to 'ignore' the river's presence and spatial guidance and seems more in compliance with dwelling in a winter landscape where the shore-river boundary anyway is blurred and snow conditions, moreover, may be more favourable on the chosen, elevated terrace. The location of the Steintjørna site, next to a small tarn 500 m away from the river, is also noteworthy compared with other inland prehistoric dwelling sites but fits well with the pattern historically described for location of the winter villages of the local Skolt Sámi community. Located in the interior of the Pasvik River Valley, these were always placed at a distance from the main river (Keilhau 1831: 43; Tanner 1929: 105-139).

The faunal material also indicates winter habitation. It is important to bear in mind, however, that since food may have been preserved for winter storage, the season of catching does not necessarily match the time of consumption and thus of habitation. In this respect, the absence of species may be more telling than their presence. Birds are sparsely represented in the faunal remains, but especially the material from Steintjørna shows that sedentary forest birds such as different grouse and capercaillie were hunted (see Vretemark, this volume). More significant for the question of seasonality, however, is the absence of migrating spring and summer birds. Especially the absence of ducks (apart from a wing bone at Brodtkorbneset), geese and swans are significant, since these species were traditionally important among the Sámi (Fellman 1906: 72; Lillienskiold 1698: 188-90). It is also interesting to note that despite the large amount of reindeer bones, no remains of very young calves were found. Though hardly hunted or slaughtered, some bones of suckling calves would be expected if the sites were in use during the calving season (May-June) (Hedman et al. 2015). These absences in the faunal material make it unlikely that the sites were in use during spring, summer and early autumn.

When discussing the seasonality and habitation of these two sites, it is hard not to make comparisons with the historically documented settlement pattern of the local Skolt Báhceveaj/Pasvik siida, which until the early 20th century used this very area as part of their territory (cf. Halinen et al. 2013; Hedman & Olsen 2009). The winter village (*Talv-sijd*), used from December to April, was the aggregate site for the entire siida community. During other seasons the group dispersed into family-based units, which had their spring and summer sites on the coast. In the winter village, the community lived to a large extent on stored food reserves and access to reindeer pasture and firewood were the main factors determining the location of the site. Due to decimation of the surrounding pasture and forest, the winter village was moved at intervals of 5–30 years (cf. Nickul 1948: 54-56; Tanner 1929: 104-106). Actually, this pattern of short-interval 'moving' winter villages may be a plausible model for interpreting the Brodtkorbneset and Steintjørna sites, which, despite some differences, are very similar and chronologically hardly distinguishable. The quantity and variety of finds seem also well in accordance with a communal site occupied during a substantial (winter) period, and the number of hearths, moreover, fits well with the first records from 16th and 17th centuries of the number households in Pasvik and neighbouring siidas (Qvigstad 1926: 7; Tanner 1929: 305-310; Tegengren 1952: 33-34). The general spatial organization of the sites also speaks in favour of aggregate sites for the local community rather than smaller, family-based localities. In addition, bones of ocean fish such as cod and salmon[2] in the faunal material, as well as finds of pumice stones, may indicate movement to the coast during summer and thus a settlement pattern similar to the one documented historically for the Pasvik siida (Olsen 1984: 142-157; Tanner 1929).

There are, however, some deviating features that need further consideration. The substantial amount of fish bones in the hearths indicates the importance of fishing. Common whitefish are most numerous, with pike as the second most important species. While lake and river fishing in later periods was most commonly carried out during spring and especially during the autumn spawning period (Nickul 1948: 21-53; Tanner 1929: 125, 134-137), whitefish and pike were also caught in winter with nets under the ice. A more intriguing feature of the pike remains, however, is that they are mostly bones from the extremities (cranial elements and tail end vertebrae), while vertebrae from the flesh-rich body parts are missing (Vretemark, this volume). This strongly suggests that pike was processed at the sites but meant for consumption elsewhere. Drying was the most common way to preserve fish, which also facilitated easy transportation due to the significant weight reduction. That pike was actually dried is further indicated by characteristic cut marks found on the front portion of the jaws, which are identical to ethnographically observed butchering marks on fishes that are split in order to facilitate faster drying (Hedman et al. 2015: 10-11, Vretemark, this volume). Drying may likely have taken place during autumn, and thus suggest that the sites also may have been used outside the actual winter season, either as part of a continuous stay or visited temporarily. However, it cannot be ruled out that pike was (freeze)dried during winter in a way similar to drying ocean fish along the coast.

The convincing data of pike being processed/dried and not consumed at the sites may suggest that it was processed specifically as a trade or tax item, a use that is well documented from later periods in the area (e.g. Tegengren 1952: 21). The eastern ornaments found at the sites, as well as the weight from Steintjørna, clearly indicate involvement in exchange networks, and the dried pike may well have figured among the goods given in return. It may also be noted that the historically documented trade with the Sámi usually took place during winter, at the so called 'winter markets', when snow facilitated expedient transport on reindeer-pulled sledges and skis, and which may be read as further support for the site's suggested seasonal affiliation.

6 Hunting and/or herding: Archaeology, genetics, and osteology

As mentioned, reindeer is by far the most dominant species in the faunal material from Steintjørna and Brodtkorbneset, accounting for ca. 87 % of the identified bones in the merged assemblages. The bone remains represent different parts of the carcass, and bones from both meaty body parts such as thighbones and shinbones and bones from less meat-rich parts are well represented (Hedman et al. 2015: 11; Vretemark, this volume). This suggests that the killing or slaughtering of reindeer, and the dismembering of the carcasses, were carried out quite close to the sites (or even perhaps at them). This further accentuates the question whether the abundant reindeer remains are from hunted or herded animals? Returning to the Skolt Sámi ethnographic analogy, it seems likely that if the inhabitants had stocks of domesticated reindeer and kept them close to the sites, as was the case at the Skolt Sámi winter villages (Tanner 1929), any slaughtering of these reindeer would probably produce the pattern of evenly distributed body parts observed in the zooarchaeological material. Nonetheless, the presence of arrowheads in the excavated material shows that hunting still took place and, whether contemporary or not, recorded pitfall systems for trapping wild reindeer clearly suggest good nearby hunting grounds. In fact, collective hunting of wild reindeer in this region is recorded as late as the early 19th century (Rathke 1907: 159).

In order to discuss in more detail the question of whether the excavated reindeer material represents hunted or herded animals, I shall include some other data from DNA analyses of reindeer bone samples from Brodtkorbneset and Steintjørna. They were included in a comprehensive DNA study of 193 reindeer samples from 12 archaeological sites in Finnmark County dated between AD 1000–1700 (Røed et al. 2018), which were compared with similar data from more recent archaeological sites, and also from extant pastoral herds. An earlier study that included samples of reindeer bones from Stone and Iron Age sites in Finnmark revealed the absence of mtDNA haplotype clusters that were typical of modern pastoral herds in the region, thus indicating that the contemporary domestic population did not descend from the ancient wild reindeer (Bjørnstad et al. 2012). The new study confirmed this and showed that the mitochondrial genome in Finnmark reindeer has undergone massive genetic replacement since medieval times. The shift is characterized by a significant loss of native mtDNA haplotypes, together with a significant emergence of new ones, most likely indicating the introduction of non-native animals. The new data strongly suggest that the shift took place during the 16th and 17th centuries, which complies well with earlier interpretations of when the transition from hunting to reindeer herding took place among the Finnmark Sámi (Hansen & Olsen 2014; Olsen 1987; Vorren 1973). The samples from Brodtkorbneset and Steintjørna fell within the native mtDNA haplotype clusters typical of the ancient wild reindeer stock (Røed et al. 2018).

It is important to emphasize that the results do not rule out that domestication or active management of local reindeer may have taken place before the Early Modern Period. What the study strongly indicates, however, is that any such possible earlier attempts did not play any significant role for the formation of the extant pastoral herds. Thus, it still remains to be investigated to what extent the material from Brodtkorbneset, Steintjørna and other hearth-row sites indicate a new relationship with animals; relationships that may indicate domestication and small-scale herding beyond the reindeer traditionally kept by the Sámi for transport and hunting purposes. In this respect, the environmental setting of the hearth-row sites is intriguing by differing significantly from that of earlier prehistoric inland settlements (Halinen et al. 2013; Hedman 2003; Hedman & Olsen 2009). While earlier sites are mostly found along the shores of lakes and larger rivers, the hearth-row sites normally appear in what seem to be more marginal forest areas away from the major bodies of water, and thus indicate a very wide-ranging change in location preferences. The sites are typically situated on dry moraine outcrops in marshy areas, on forested terraces or next to small creeks and tarns often surrounded by heathland rich in reindeer lichen (Hedman 2003:50). The new environmental preference, as also witnessed by the Pasvik sites, may indicate that access to reindeer pastures, and thus the importance of domesticated reindeer, had become imperative to site location (see also Jerand & Linderholm, this volume).

Another clue is provided by the age distribution of the reindeer represented in the bone material from Brodtkorbneset and Steintjørna (Hedman et al. 2015: 11-14; Vretemark, this volume). This distribution is strikingly similar at both sites, and further speak to their relatedness in terms of human occupancy. Based on observations of attributes of the long bones there is a clear predominance of mature reindeer. The majority (over 60 %) were five years old or more when killed, and reindeer more than four years old amount to 70–80 % of the material. Only a few per cent were less than one and a half years old and there is a total lack of bones of very young calves. This is an age distribution that often is associated with hunting (e.g. Hambleton and Rowley-Conwy 1997: 68), based on the assumption that hunters would go for adult animals, and preferable males, with the highest yield of meat. Such selective target-

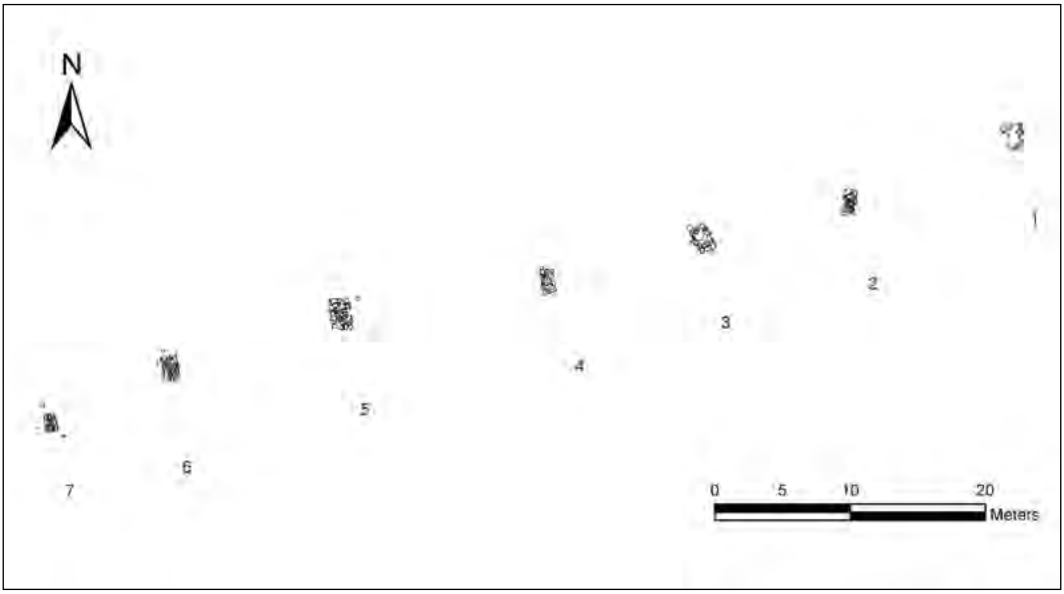

Figure 10. The heart row at Brodtkorbneset

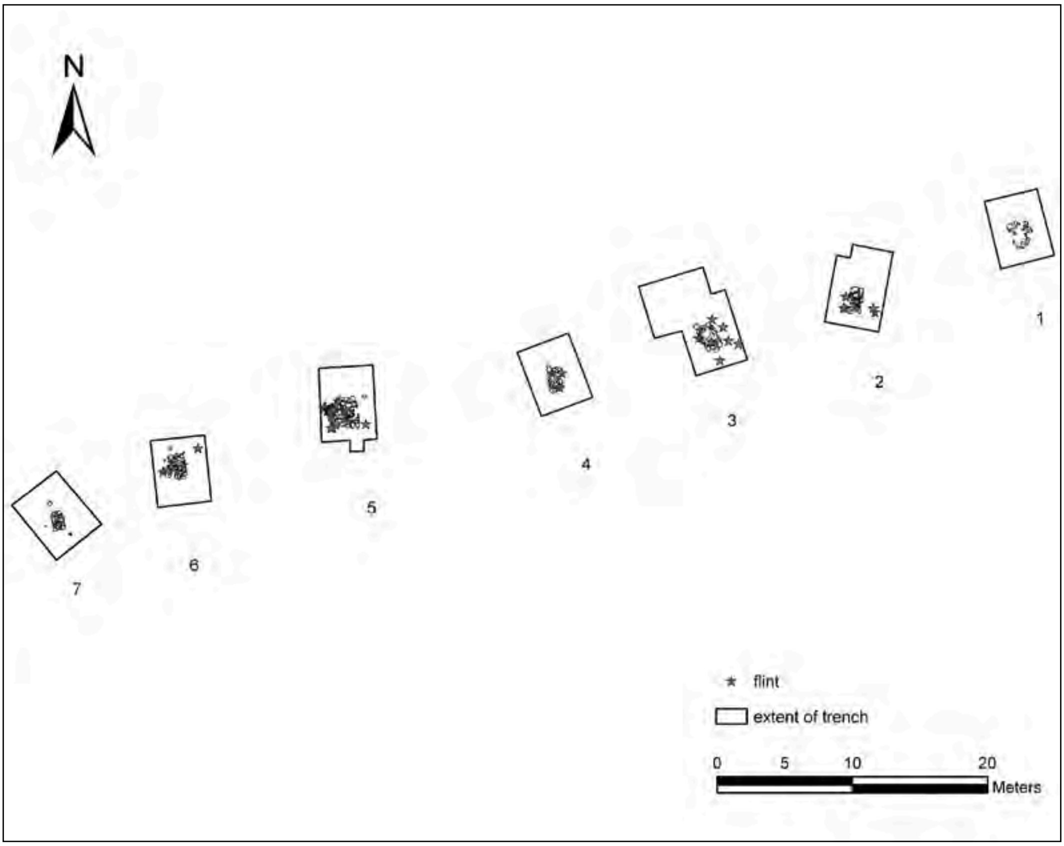

Figure 11. The distribution of tinder flint at Brodtkorbneset

ing, however, is dependent on individualized hunting strategies. The use of pitfall systems and even stalking, as practiced on crust snow during late winter (Fellman 1906: 60; Tegengren 1952:105), are quite indiscriminate and would result in a far more differentiated yield. Moreover, the implied reverse assumption grounding this interpretation, that herding economies would predominantly slaughter young and sub-adult reindeer, is more typical of a modern meat and market-oriented reindeer economy than of pastoral preferences at large. For example, traditional reindeer herding among Sami groups in Northern Sweden in the 18th and 19th centuries involved a culling strategy with essentially the same selection as observed in the Pasvik zooarchaeological material (Drake 1918: 55-56; Vretemark, this volume).

The predominance of adult reindeer in the faunal material might therefore as well reflect small-scale reindeer herding. Moreover, the presence of bones from sheep in the material shows that the people of the hearth-row sites were not unfamiliar with animal husbandry. A total of 20 such bone fragments were found in the hearths, most of them (17) from the deposits associated with H3 at Brodtkorbneset (Hedman et al. 2015: 14-15, Vretemark, this volume). One of the sheep bones from this trench has been radiocarbon dated to AD 990–1155 (Niemi et al. 2013), which makes this the yet earliest undisputable domesticate from any Sámi settlement site. Though admittedly few, the anatomical distribution of the sheep bones indicates that the animals were slaughtered at the dwelling sites (Hedman et al. 2015: 15, Vretemark, this volume). These suggestions of husbandry notwithstanding, such small-scale reindeer (and sheep) herding would not be sufficient to meet the demands for meat, marrow and entrails, or for skins, bones and antlers, neither locally nor as products of exchange. As indicated by e.g. the finds of iron arrowheads, reindeer hunting was still clearly important. Thus, rather than continuing to think of these animal relationships as mutually exclusive, we should perhaps envisage a situation where herding was developing alongside hunting. As suggested, the new importance of herding may well be reflected in the new environmental preferences manifested by the location of the hearth-row sites. A cautionary tale from the genetic studies, however, is that we should stop seeing such possibly early herding attempts as the roots of modern pastoral economies.

7 The agency of hearths

The most conspicuous feature of the hearth-row sites is precisely what their very naming implies; the formalized linear organisation of the hearths (Fig. 10). Indeed, the two sites discussed here typify this organization in an eloquent manner. A common archaeological question posed to such aggregates is whether they are contemporaneous or the accumulated outcome of separate events? Based on the radiocarbon dates, we cannot say for sure whether all the hearths and thus their dwellings were in use at the same time, although the very spatial organisation itself speaks to a site established and conceived of as an entity. What we nevertheless can say for sure is that all hearths from a certain moment onwards were contemporaneous, in the same way as they still are. This is more than a trivial truism, as it suggests a more liberal and inclusive conception of contemporaneity than the one normally guiding archaeological chronologies (cf. Olsen 2010: 126-128; Olsen 2013). Moreover, in the case that some of the hearths were added later, they must have been constructed and organized in compliance with a spatial order already established by those previously built. Likewise, if one or more hearths were abandoned earlier than the others, these abandoned hearths were likely still conceived to be part of the hearth row, especially since there are no signs of destruction or reusing stones for building new hearths. This may also be indicative of what might be termed the “agency” of these hearths, which impact may have exceeded their actual human phase of use. Even when no one returned to the site any more to re-

Figure 12. Excavating H5 at Brodtkorb-
neset. Photo: Bjørnar Olsen.

Figure 13. Pole photo of H1, Steintjørna (scale 2 m). Photo: Bjørnar Olsen.

Figure 14. Pole photo of H2, Steintjørna (scale 2 m). Photo: Bjørnar Olsen.

erect their tents, the hearths continued to affect and draw attention to themselves from hunters, herders, traders, and archaeologists passing by.

What did this new and linear way of organizing domestic space imply? And how did it come about? Linearity is feature that seems easy to associate with symmetry and equality (e.g. Levi-Strauss 1979: 133-139, 291-292). Arranging each hearth next to the other emphasises the commonality and bonds among households occupying a site. In small and fragile societies such means of cohesion are crucial, as commonly reflected in norms of reciprocity and sharing. This, however, does not rule out differentiation between households. In fact, as we have seen, some of the hearths have substantially richer assemblages than others, both in terms artefacts and faunal material (and thus likely representing differences in food processing and consumption). The numbers of metal processing finds associated with H2 at Steintjørna is a clear indication of differentiated skills, and the fact that most of the sheep bones are associated with H3, Brodtkorbneset, may likewise suggest unequal access to certain goods. As suggested earlier (Halinen et al. 2013: 179), such internal inequalities may even have been related to the control of fire. At Brodtkorbneset, the two strike-a-lights were both found next to the rich H5, and as mentioned above, while tinder flint at this site are abundant at the central hearths it is completely lacking at the two outermost ones (H1 and H7) (Fig. 11). In the Steintjørna assemblage, there are no strike-a-lights but the distribution of flint shows a similar pattern as at Brodtkorbneset with only one specimen each in H1 and H7, and none in H8. The ability to light and keep the fire in the hearths was, of course, vital for survival in Arctic winters and to be dependent on others a possible source of inequality and subordination.

Although variation in archaeological assemblages may be caused by a number of factors, including post-depositional processes, there are still ample reasons to suggest that it in this case also signifies actual differences between households. This should come as any major surprise. As a number of studies of Sámi burials, sacrificial sites and settlements elsewhere in Sápmi have convincingly shown, there were clearly an emerging social differentiation within Sámi societies during the Late Iron Age and the medieval period (Halinen 2009; Hansen & Olsen 2014; Odner 1992; Schanche 2000; Storli 1994; Zachrisson 1997). Such differences may, for example, be related to the status and prestige ascribed to successful hunters or herders, and/or to successful involvement in trade networks (Bergman & Edlund 2016; Olsen 1987; Wallerström 2000). What is less explored, however, is how such differences are played out and negotiated in actual sociomaterial contexts. With respect to the sites dealt with here it is therefore important to consider how the hearths themselves may have “acted” these differences, and thus played a significant role in both articulating and negotiating them (Figures 12-14).

Although the large stone-built hearths display commonality by sharing overall design, orientation and appearance, they also exhibit clear distinctions in term of actual size, constructional details and, in one case, even stone materials (H7, Steintjørna). Moreover, as noted above, these commonalities and distinctions are played out and accentuated in the relational context of the row. Thus, while a hearth row may act to articulate equality and bonding, it may also, through the hearth's relative placement within the row, act as a means for differentiation. It is hardly accidental that the smallest and ‘poorest’ hearths are at the ends of the rows at both Brodtkorbneset and Steintjørna (Fig. 13). One key to understanding the material dynamics and communication involved is thus to take seriously the ambiguous and subtle role of the hearths and the hearth rows in articulating both equality and difference. They were not just expressions of household and communities but formed integral parts of these collective and composite entities. In considering their possible “agency” and subtle affordances one should also take notice of their enclosement during the season of dwelling. Apart from the subsequent period of abandonment, the heart row itself was only visible prior to and after the seasonal assembling/disassembling of the tents in late fall and early spring. Thus, during the season of habitation, the individual hearths required access to households in order to be seen.

Being attentive to the material characteristics of the hearths, and the hearth rows, may also provide a clue to understand why they became so remarkably widespread and common among the Sámi in the Viking Age and early medieval period. This period was clearly a time of change, affecting both interethnic relations and the Sámi societies themselves. State formations and Christianization transformed Nordic societies, and together with an emerging market economy, clearly created very new conditions. While earlier interaction to a considerable extent was mediated by local redistributive economies and partly shared religious values (Hansen & Olsen 2014; Odner 1983), the new regimes created a less culturally embedded and predictable sphere of interethnic contact. The intensification of fur trade and taxation as effectuated by the emerging states of Sweden and Norway, as well as the medieval Novgorodian trade empire, put the Sámi economy under pressure and also caused a more direct interface between the local society and the emerging European 'world system' (Hansen & Olsen 2014). While these new conditions likely may have initiated or accentuated processes of social differentiation within Sámi societies, we should not forget their internal causes. For example, how trade, new commodities, and possibly changes in reindeer economies may have accentuated already existing tensions in relation to property rights versus common access to resources. Crucial in this respect is the delicate balance in small-scale societies between individual realization and collective interest. One way to negotiate this balance is seen in the principle of sharing, where an egalitarian principle of common access to resources is maintained through the opposite principle of individual prestige ascribed the hunter for sharing his catch (cf. Olsen 1987).

The external and internal changes, dependencies, and 'frictions' that emerged and developed in the Viking Age and early medieval period provides an overall social and economic context for the hearth-row sites. Taking this into consideration, I think one rational of the hearths and the hearth rows was that they provided a subtle means for simultaneously articulating commonality *and* difference that proved socially effective. Being a mundane manifestation of domestic space, they quite literally made the small and fragile societies appear more solid and bonded, while at the same time constituted a means for displaying and negotiating social difference (Figs. 12-14). How this initially came about is difficult to discern, although it is unlikely that it emerged as any planned or intentional undertaking for the outcome suggested here. What is important is that their articulations 'worked' under the prevailing circumstances; and it is this success that may well explain their attractiveness and dispersal over such an amazingly large geographic area.

No one could foresee this distribution or have known the full extent of the hearth rows. Little did they know, those who settled 800–900 years ago at Brodtkorbneset and Steintjørna that an almost identical site had been established and abandoned more than 1200 km to the south. As with many other phenomena this can only be seen in retrospect; it is, if you like, an archaeological affordance. Moreover, through the spread of the hearth-row sites new and unforeseen effects was created. They may over time unintentionally have contributed to processes of ethnic consolidation and unification, and by being constructed over increasingly larger areas, their presence may have reminded travellers and traders of to whom this land belonged. Against the backdrop of state economies and trade networks competing over Sámi resources, the hearth rows may have increasingly become regarded as a mutually comprehensible if tacit statement of Sámi rights to hunting grounds and pastures.

Figure 15. Exposed hearths, Steintjørna. Photo: Bjørnar Olsen.

8 Postscript: the hearth man

The forest floor in the Pasvik woodland hides its treasures well. Scattered with tussocks and uprooted trees, and overgrown by moss, heather, birch, and pine, it poses a tough challenge to a surveying archaeologist. Arriving here in August 2007, it was Sven-Donald's first visit ever to Pasvik. He had recently joined the research project that initiated these investigations, chosen because of his excellent research in Sámi archaeology but also because of the skills he held from decades of surveying and excavating Sámi sites in the woodland of northern Sweden. Despite being foreign to this particular area he felt immediately at home with the conditions here. A few weeks later, he led the first survey and among the many discovered sites were the hearth-row sites at Brodtkorbneset and Steintjørna. And the rest, as they say, is archaeology. Sámi archaeology.

During the coming years of surveys and excavation, Sven-Donald proved his skills as an outstanding – and in this particular habitat, I would claim, unrivalled – field archaeologist. When we visited the sites for the last time together in the autumn of 2014, half a year before his untimely death, we talked much about the work we had done, discussed future research, and how to investigate the third hearth-row site situated a little to the north. Those plans should not be realized. Still, as the director of the investigations at Brodtkorbneset and Steintjørna, Sven-Donald played a more than crucial role in making this unique archaeological legacy available through fieldwork, analyses, research, publications, as well as numerous presentations in Norway, Sweden, and abroad.

Included in this record is also the wealth of memories of all those summer days and nights in the Pasvik forests; memories that speak to his kindness and wit, to his knowledge of the forest and its animals and birds. And to all cups of coffee brewed over the fire, all the sausages fried, and to all pieces of dried reindeer heart, chocolate, apples, and oranges shared with fellow diggers during the afternoon breaks. The hearths left exposed at Brodkorbneset and Steintjørna are a most appropriate commemoration of the legacy of this extraordinary man (Fig. 15).

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Notes

1 It is hard to distinguish between sheep and goat due to the similarities of skeleton morphology. In those cases where clear species identification was possible, including one DNA analysis, however, it turned out to be sheep.

2 Salmon cannot pass Skoltefossen, the waterfall close to the mouth of the Pasvik River, 60 km to the north. Salmon is also evidence of summer fishing.

Possible Traces of Reindeer Corralling at a Hearth-Row Site from 1000–1300 CE in Northern Norway

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Abstract

In this paper, we aim to present a methodology for identifying reindeer corralling-herding in connection with prehistoric hearth-row sites in Northern Fennoscandia by using a multiproxy approach of geochemical and geophysical analyses. In previous studies, these sites have been associated with Sámi settlements based on their geographical distribution and archaeological material. The approach is demonstrated in a case study from the Steintjørna site in the municipality of Sør-Varanger in the county of Finnmark, Norway. In order to identify traces of reindeer corralling, fractionation analyses of both organic and inorganic phosphates have been conducted on samples collected from areas near hearths as well as from the surrounding environment. The results show high amounts of organic to inorganic phosphate in two areas extending outward from the hearths terminating the row, which indicate reindeer corralling in small pen-like areas that otherwise lack visible remains and structures.

1 Aims

This study presents how a multiproxy approach, utilizing geochemical and geophysical methods, can be used for the purpose of defining spaces of reindeer corralling in settlement areas. The scientific discourse regarding the introduction of reindeer herding is rather extensive and diverse (for a general review see Sommerseth 2011) and is further exemplified by earlier works by Aronsson (1991), Hedman (2003), Lundmark (1982), Mulk (1994) and Storli (1994). Archaeological interpretations of Sámi settlements often point out the possibility of reindeer being used for milking and transportation, but also the fact that such activities have left no visible traces in the archaeological material (Aronsson 2009, Aronsson 2017, Hedman 2003, Karlsson 2009). Remains of reindeer in settlements are usually demonstrated in the faunal bone material and whether these, often charred, remains derive from domesticated or wild reindeer is indeterminable by osteological methods (Hedman 2003). However, keeping reindeer in restricted areas has been shown to cause long-lasting alterations in vegetation, soil nutrients and microbial activities (Egelkraut 2017). In order to overcome the difficulties of using material remains for studying reindeer herding, additional methods or proxies are needed. The environment and its various culturally induced changes could be used as such proxies, as there are several different sources from which information can be extracted, sources that are usually resilient to decomposition over time.

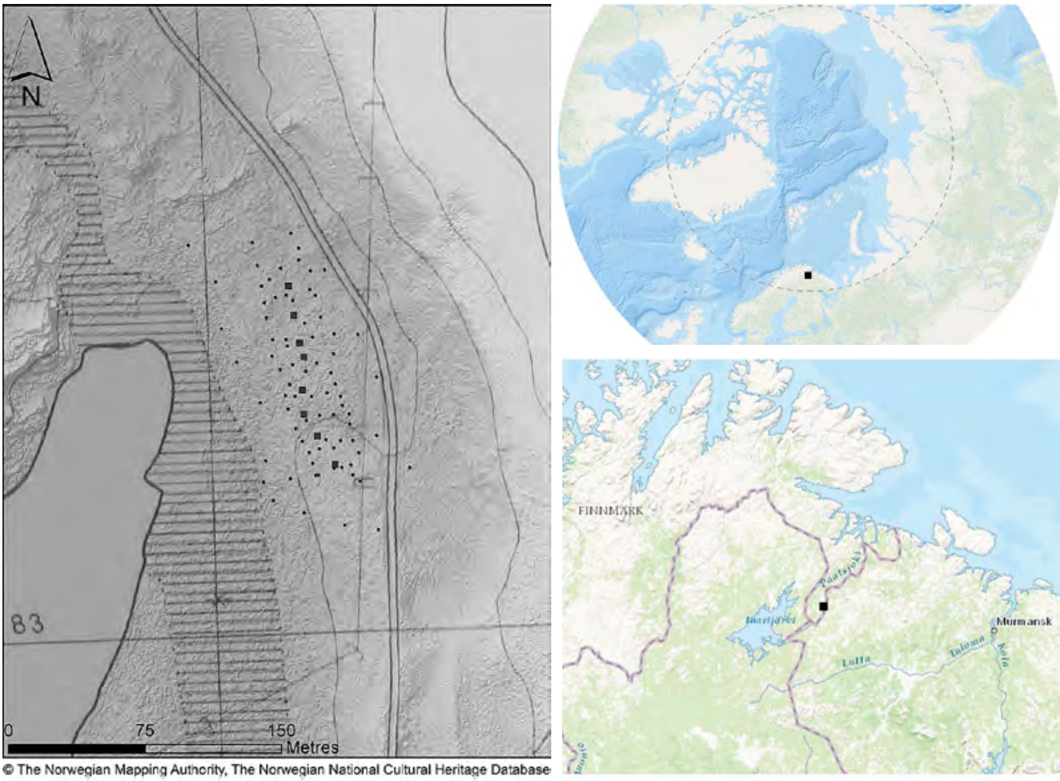

Figure 1. A topographic map is displayed on the left, with the locations of hearths and sampling points marked with squares and dots. To the right, the top map shows where in the Arctic region the site is situated while the bottom map shows its location in Finnmark, Norway.

Environmental proxies have been used in earlier studies of reindeer herding. Aronsson (1991) analysed pollen cores from several sites with reindeer pens, which showed that the pens had been fertilized through intensified manuring by reindeer, resulting in increased phosphate levels (PO_4) inside the pen as well as apparent changes in vegetation. Later studies by Karlsson (2006) also showed enrichment of citric soluble P-PO_4 in a reindeer milking pen at Nilasvallen in Northern Sweden.

Our purpose is to apply an approach based on ideas on soil amendments and manuring in prehistoric and historic agrarian contexts (Engelmark & Linderholm 1996; Grabowski & Linderholm 2014) to a Sámi settlement in Northern Fennoscandia. In this study, we aim to test the idea that reindeer corralling in close connection to settlement areas should result in similar responses as in stabling or manuring in agrarian systems. However, in comparison the intensity may be significantly lower as the extent of reindeer herds, the spatial organization and the timeframe of use are unknown. We have analysed additional parameters on samples presented in a previous study (Jerand et al. 2016) that mainly focused on household spatial organization. Furthermore, we are convinced that information on reindeer herding can be collected from several proxies apart from artefacts, bone materials and historical sources; namely the soil.

2 Archaeological context

The hearth-row site of Steintjørna is located in the valley of the River Pasvik in Finnmark, Norway (Fig. 1, see Olsen, this volume). The river is the outlet of Lake Inari in Finland and flows through Russia and Norway to discharge in Bøkfjorden, a southern branch of the main Varanger Fiord. The river is a distinctive feature in the landscape that has also marked parts of the border between Russia and Norway. The area is part of the taiga zone with a vegetation cover of pine, spruce and, among other ground covering plants, crowberries. The most common soil type is podzol (IUSS Working Group WRB 2015).

The hearth-row site is situated on the western side of the river, 1–2 kilometres from the border to Russia, close to the small woodland lake of Steintjørna. The site consist of eight hearths with a north-northwest to south-southeast orientation, placed at ca. 6–18 m intervals. The site has been investigated on two occasions. Three hearths were excavated in 2012 whilst the five remaining hearths were excavated in the following year. Trenches were dug to investigate the presumed living areas around the hearths. Both charcoal and bone material have been radiocarbon dated, showing that the site was in use between 1000–1300 CE (Hedman et al. 2015). The eight hearths are quite similar to one another, both in morphology, being rectangular with frames of stone encompassing a layered packing of stones, and size, with widths and lengths measuring between ca. 0.9–1.4 m and respectively 17–2,2. m and with areas ranging from 1.7 to 2.5 m^2. The larger hearths were centrally located within the row, these hearths and their presumed living area contained significantly more finds and bone material than the hearths terminating the row.

Flint and pieces of cut copper or bronze alloy were the most common finds but there were also arrowheads, knives and strike-a-lights. Reindeer predominated in the bone material along with the occurrence of various species of fish, and the faunal material together with the morphology of the hearths suggests site use during the winter season (Hedman et al. 2015). Analysis of patterns in age attributes in the reindeer bone material may indicate small-scale reindeer herding, although analyses of this kind depend highly on the cropping strategy that was used (Hedman et al. 2015).

Two sampling strategies were applied: grid sampling covering the whole site area and sampling focused on the areas near hearths, to cover both central and peripheral activities. The enriched B-horizon was consistently the targeted layer, although for several control samples the leached E-horizon and the parent material, or C-horizon, were also sampled. The phosphate deposition was, for all hearths, heavily oriented towards the eastern short sides that together with high concentrations of finds and bone material have been interpreted as entrances to the presumed dwelling (Jerand et al. 2016).

3 Soil as Source Material

The use of geochemical analysis for defining settlement and arable soil is well established, and even more so in low nutrient soils with a low recent impact, in other words remote places. Activities from large-scale arable fields and settlement spaces to smaller-scale farmsteads and houses can be traced in variations of certain soil and sediment properties. Phosphate is one of these properties and the relationship between the accumulation of phosphates and human activity is well known (Linderholm 2010; Smil 2000; Tiessen 1995). In soils, phosphate naturally occur as inorganic compounds but they are in parts transformed into organic compounds before plant uptake. Manure and other phosphate accumulations from plants will therefore mainly consist of organic compounds. Phosphate is also stored in the bones of animals in inorganic compounds, which is why there is a recurring correlation between archaeological depositions of bone material and high soil phosphate concentrations.

Another property of relevance is the organic matter in the soil, both for understanding general soil formation and potential human impact. As materials containing high amounts of organic matter are being deposited (such as manure), the humic matter will subsequently increase and change the soil properties. Combining analyses of phosphate and organic matter in soils, makes it possible identify fertilized fields, lands for pasture and grazing or spaces with animal husbandry.

4 Methods

The analytical base for phosphate analysis in this study is the Arrhenius' citric acid extraction method (Arrhenius 1934), that was modified to encompass fractionation of inorganic and organic phosphate (Engelmark & Linderholm 1996). The phosphate content is expressed as mg/kg dry soil, extracted with citric acid (2 %).

The theoretical assumption for acid soils, such as podzol, is that mainly iron (Fe) and aluminium (Al) bound phosphate (PO_4) is brought into solution by citric acid extraction, as complex formations between Fe/Al and citric acid is strong. Organically bound soil PO_4 will only be hydrolysed to a small degree. That is why the organic PO_4 fraction is quantified by heating the sample in a laboratory furnace for 3 h at 550 °C, during which the organic matter is decomposed, thus releasing the organically bound phosphate. Since the subsequent post-heating measurement gives a reading of the sum of inorganic and organic phosphate (CitPOI), the organic fraction can be calculated by subtracting the total sum with the inorganic phosphate (CitPOI-CitP=CitPorg; Engelmark & Linderholm 1996; Linderholm 2010). By dividing the organic fractions with the inorganic the relation between them can be attained (CitPOI/CitP=PQuota).

In this publication phosphate data are presented as three parameters: inorganic phosphate (CitP), total phosphate as measured after ignition (CitPOI), and the relation between organic and inorganic fractions of phosphate (CitPOI/CitP=PQuota).

The soil organic matter content is determined by loss on ignition (LOI), in a furnace at 550 °C for 3 h (Carter 1993; Clark 2000).

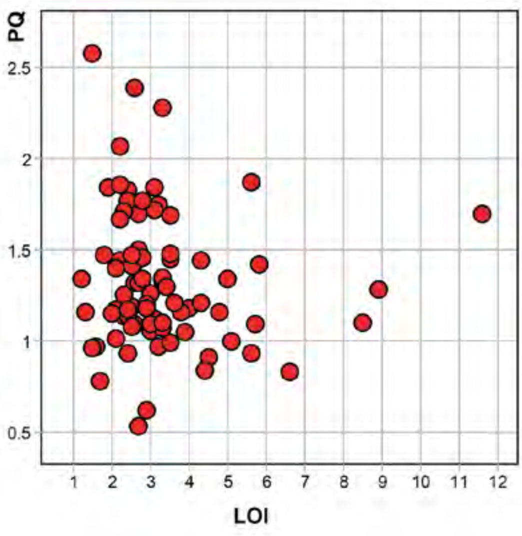

Figure 2. Scatter plot of PQuota and organic matter of analysed samples.

Magnetic susceptibility (MS) is analysed with a Bartington MS3 system equipped with a MS2B sensor. Data are reported as low frequency measurements (χlf 10^{-8} m^3 kg^{-1} mass specific susceptibility) on 10g soil (Dearing 1994; Walden et al. 1999).

For an extended methodological description, see Linderholm (2010).

5 Results

In the scatter plot showing the PQuota to LOI ratio of samples (Fig. 2) there are some differences compared to the agrarian model suggested by Engelmark & Linderholm (1996). In the prevailing podzol, the LOI is generally comparably lower but high PQuota in the B_1-B_2 horizons can be observed.

The spatial model of CitP distribution (Fig. 3) is based on both the grid sampling and the hearth-focused sampling. In general, high accumulations of soil P can be found around the hearths, though to a much lesser extent at the hearths at the outer end of the row. The four central hearths have a distinguishably higher P accumulation over a larger area. Worth noting is the remarkable

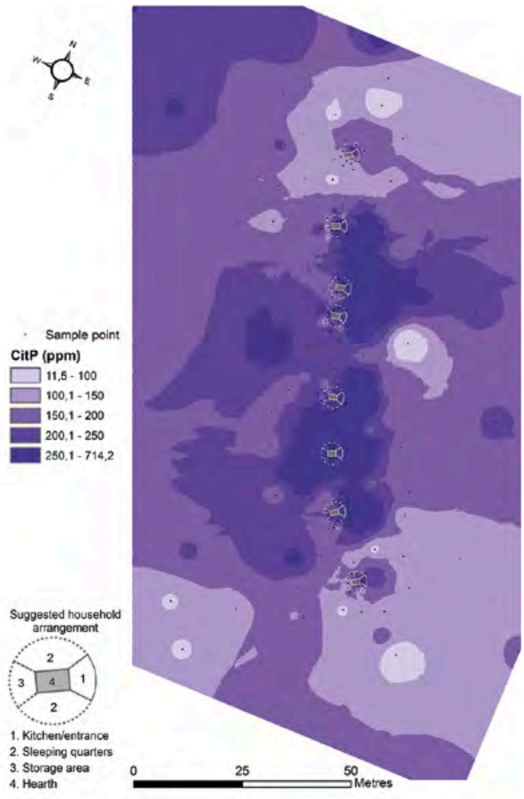

Figure 3. Interpolation of CitP with sampling points marked as black dots and a superimposed model suggesting household arrangements (further described in the lower left corner).

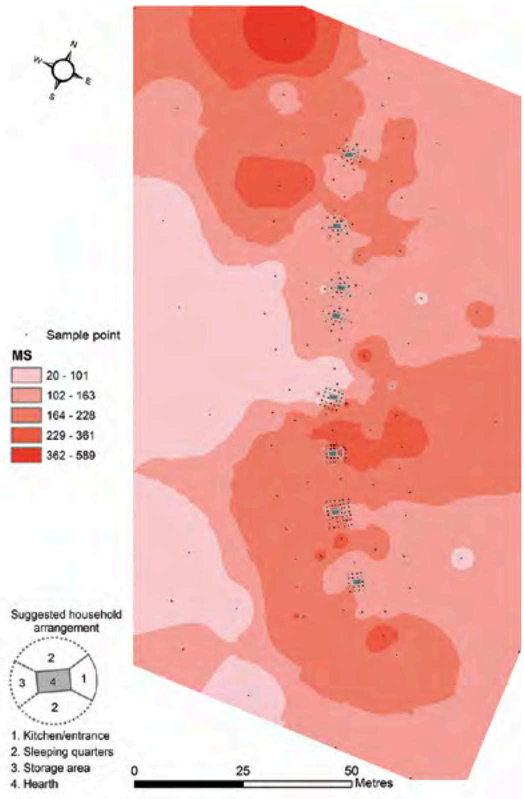

Figure 4. Interpolation of MS with sampling points marked as black dots and a superimposed model suggesting household arrangements (further described in the lower left corner).

patterning of the hearth-near areas, where higher accumulations can be seen at the eastern short sides of each hearth. This is further discussed in Jerand et al. (2016). There is also an area in the northwest with higher P accumulations.

The MS distribution (Fig. 4), also based on both grid sampling and hearth-focused sampling, is the lowest in the west and southwest, closer to the lake. In the northwest, there is one sample with high MS that probably enhances the surrounding areas to a certain degree, though disregarding this, the area still has a high MS compared to the general level. Another such area can be seen east of the lower central hearths. Considering the rather high levels of MS, contributions from bedrock and moraine have to be acknowledged and that not all variations can be attributed to cultural impact.

The spatial distribution of CitPOI (Fig. 5) is very similar to the distribution of CitP (Fig. 3), with high accumulations emphasized in the west and around the central hearths.

The MS550 (Fig. 6) analysis shows distribution similar to that of the MS, with an addition of a rather high response in the southwest, related to the wetland zone.

Higher amounts of organic matter are found in the south and southwest (Fig. 7). Areas surrounding the hearths at the outer ends of the row, in the north and southeast, generally seem to have lower amounts of soil organic matter.

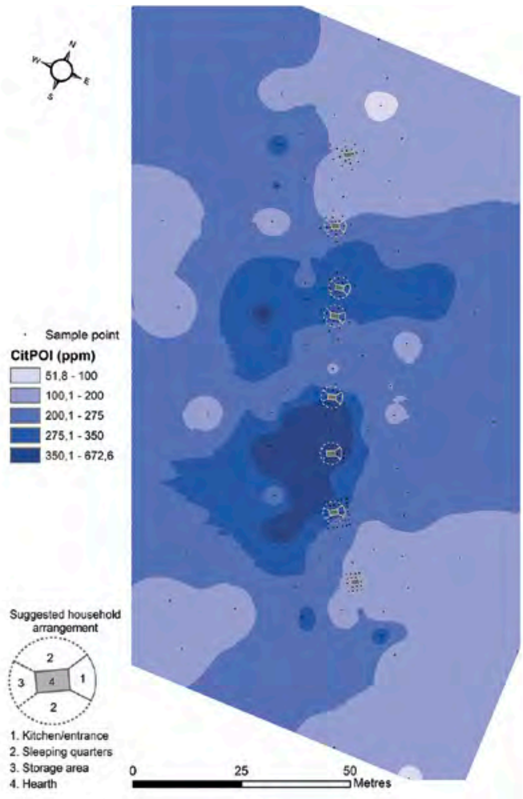

Figure 5. Interpolation of CitPOI with sampling points marked as black dots and a superimposed model suggesting household arrangements (further described in the lower left corner).

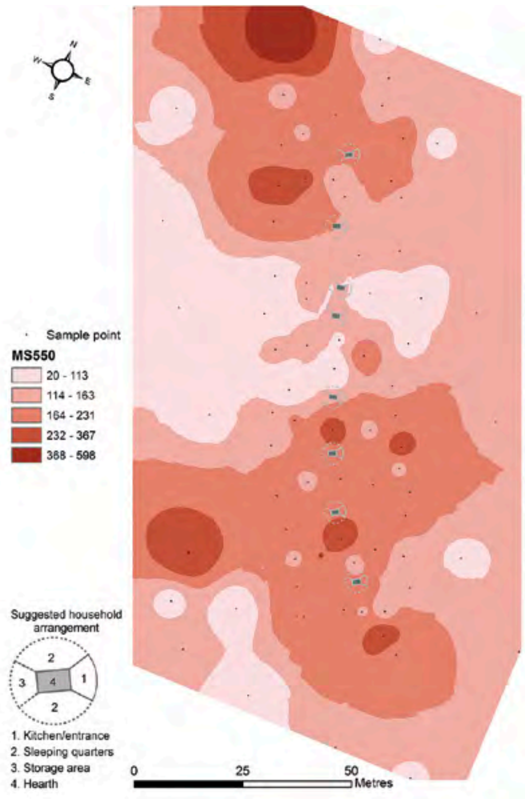

Figure 6. Interpolation of MS550 with sampling points marked as black dots and a superimposed model suggesting household arrangements (further described in the lower left corner).

There are three distinct areas with higher PQuota (Fig. 8), two are located outwards of the hearths terminating the row and one to the west of the lower central hearths.

PQuota lower than 1 imply a more complex iron chemistry in the soils (12 of a total of 80 samples). These samples are located close to the lake and the wetland zone in the western part of the site. The higher water table in conjunction with a mixture of water soluble Fe^{II} and precipitated Fe^{III} oxides that during combustion form less soluble complexes of Fe and PO_4-P is one possible explanation for this. The citric acid extraction is less effective dealing with these compounds and this is something that needs to be addressed in future studies.

6 Discussion

A dualistic response, or patterning, in finds, bones and CitP, was noted in the earlier study of the site (Jerand et al. 2016) and the results presented here show some similarities. The two areas with higher PQuota, close to the hearths terminating the row, indicate that reindeer may have been kept there in a restricted space. Together with the scarcity of the archaeological material in these two hearths, a possible interpretation could be that they in some way are connected with reindeer herding, perhaps housing the most active herders. This, in turn leads to the fact that analysing the use of space through observable cultural im-

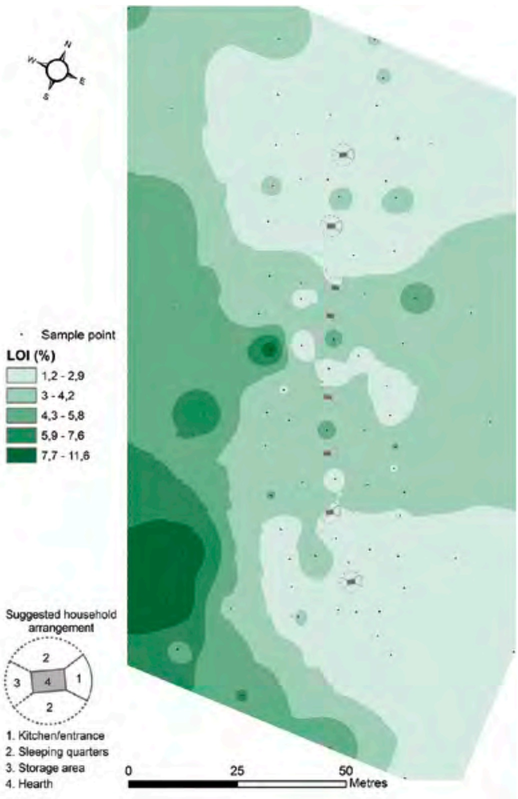

Figure 7. Interpolation of LOI with sampling points marked as black dots and a superimposed model suggesting household arrangements (further described in the lower left corner).

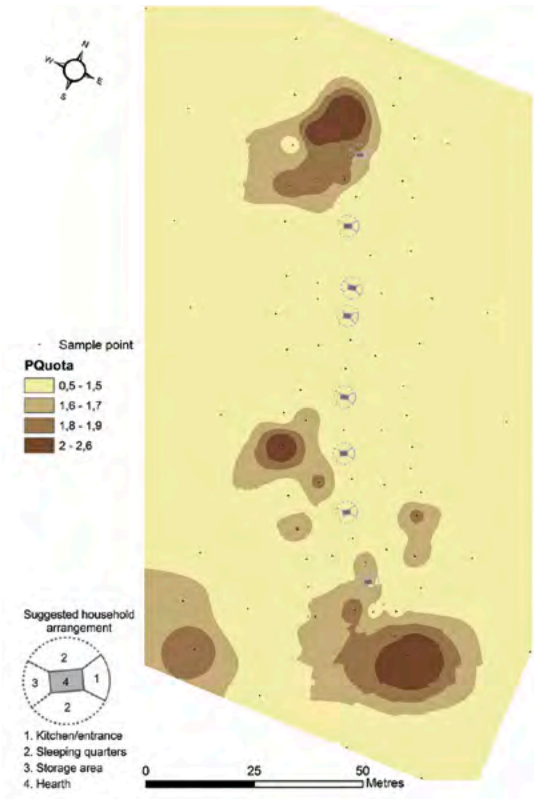

Figure 8. Interpolation of PQuota with sampling points marked as black dots and a superimposed model suggesting household arrangements (further described in the lower left corner).

pacts in the soil, can be used as a proxy for understanding socio-economic organization.

Other reasons for this soil response could theoretically be a variance in soil characteristics; given the context, this seems unlikely. Undoubtedly, this approach can be utilized when studying reindeer husbandry as well as site organization. Although we cannot present absolute evidence for the corralling of reindeer or the keeping of reindeer close to the settlement area, there are strong implications, at least for the latter. Still, as traces of such activities are rarely visible to the naked eye in the archaeological material it is evident that sources like these has to be taken into account.

However, to analyse this further, multiproxy approaches are needed in order to generate more information. A combination of archaeology, pollen analysis, soil science, soil micromorphology and macrofossil analysis will give a more complete story of the hearths and the people who used them, from the immediate environment to the landscape scale. Another decisive variable is the sampling, where basic research is needed. As mentioned previously, for acidic soils the B-horizon usually is sampled, though it might be that it could be more informative to use eluviation horizons, as phosphate may not have been fully relocated during the roughly 700–1100 years of post-soil formation.

There are also additional methods, such as aDNA, which could greatly improve our knowledge of these phenomena (Rawlence et al 2014), given that the preservation in soil-sediments is satisfactory. The methods presented above are more suited for identifying and locating areas in which animals might have been corralled, but whether people were keeping reindeer, goats or even cows can only be assumed, even though some are more likely than others. This is one of many areas in which aDNA would be of great use. However, in order to locate suitable sampling points for this kind of analysis the proxies mentioned previously are still crucial to study.

From a soil chemical point of view, addition of manure is no different whether is derives from cattle in Iron Age farmsteads or reindeer in relation to Sámi dwellings. If the use of space was manifested in the construction of a longhouse or a circumpolar Sámi hearth, is not important in relation to the methods we chose to employ. Reindeer-related activities have been shown to induce a significant change in vegetation and to a certain extent to the soil chemistry (Aronsson 1991, Grøn et al. 1999, Karlsson 2006, Egelkraut 2017) and this study does not contradict the results from the aforementioned investigations. Consequently, the outcome of the methods employed at Steintjørna, may be considered an encouraging approach for future investigations in order to shed light on reindeer management in the spatial contexts of Sámi dwelling sites.

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Trade, Manufacture, Dismantling and Reassembling? Metal Processing and Eastern Ornaments at Brodtkorbneset and Steintjørna

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Abstract

This article takes as its starting point artefacts recovered from excavations at Brodtkorbneset and Steintjørna, or rather a focus on selected categories of artefacts retrieved from these sites. These categories are artefacts related to iron processing, imported iron tools and cut pieces of copper alloy implements and ornaments. The artefacts are discussed in the light of the North Fennoscandian context. As all categories were brought to the sites over long distances, and the likely routes of traded iron, copper alloy vessels, cauldrons and kettles seem to have been through the interior of Finland, these objects were most likely part of Trans-Bothnian trade networks. The eastern ornaments seem to be connected with a mainly Novgorodian fur-trade network, with Karelian traders acting as intermediaries. The involvement of Karelians could have meant an extension of the inland trade routes, possibly including the western White Sea area and alternative routes of a south-eastern – south-western direction.

It is argued that the advantage of the Gulf of Bothnia was its central position as a transit area for long-distance trade and the distribution of objects to the upper Pasvik area in the early Iron Age/Early Middle Ages. The discussion therefore ends with a comparison of the models of trading networks and communities proposed for the area, and the context of hearth-row sites excavated in upper Pasvik (Fig 1).

1 Introduction

In the context of Finnmark County, Norway, habitational coastal sites contemporary to hearth-row sites are presently absent in the regional archaeological record. Dated to the Late Iron Age/the Middle Ages, the excavated hearth-row sites of Finnmark represent a distinct re-orientation towards exploitation of resources confined to the interior of Finnmark and intense seasonal inland habitation compared with the preceding period of the Iron Age. This is also reflected in the artefacts retrieved from the locations, which make them among the richest sites from the Late Iron Age/Early Middle Ages excavated in Finnmark so far. Moreover, the archaeology of hearth-row sites regarding economy, the spatial and temporal distribution of the sites, domestic site organization etc. corroborate the impression of hearth-row sites as manifest expressions of a transitional phase in Sámi history, as discussed elsewhere in this volume (see Vretemark; Olsen, this volume).

While not a prominent feature among the artefacts, some fragments of iron slag have been reported from hearth-row sites in Northern Sweden and Norway, but in very limited amounts (Hedman 2003: 72; Simonsen 1979: 17). This indicates activities related to some kind of iron forging at the sites or in their immediate vicinity, but

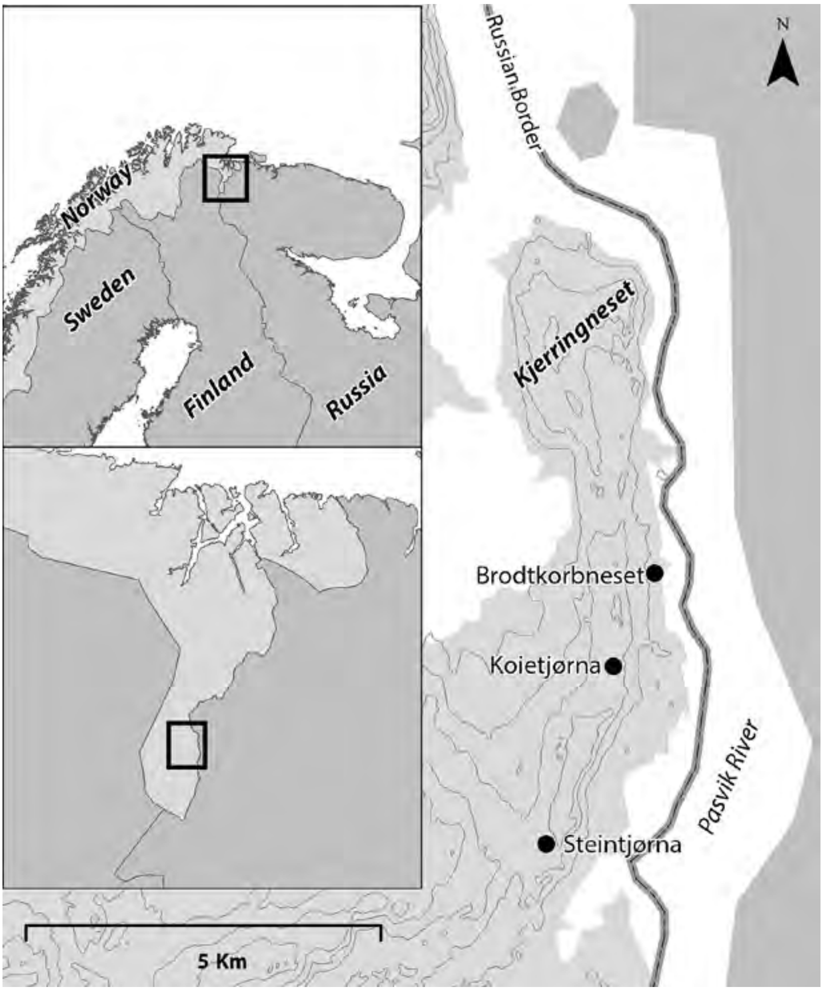

Figure 1. Kjerringnes and the discussed sites. Map: Johan E. Arntzen.

further inferences about the nature and extent of such activities have been difficult to provide until quite recently. One example of new evidence that iron was wrought at hearth-row sites is a Viking Age site in the upper valley of Dividal, in the interior of Troms County, Norway. The site was partly excavated in 2010, and numerous minute, highly magnetic, hammer scales dotted the interior of the hearths, clearly indicating iron smithery among the activities that took place at the site (Svestad 2017). Against this background, the opportunity to gain knowledge about iron metallurgy through substantial amounts of iron slag in a definitive context with the hearths was the welcome, but not entirely surprising, outcome of the excavation of the Steintjørna hearth-row site in Pasvik, Finnmark County, in 2012–2013 (Hedman et al. 2015, see also Olsen, this volume). Before the discussion of how this category of artefacts can shed light on iron processing at Steintjørna, some general notes on the characteristics of the sites and formation processes are required.

The eight hearths at Steintjørna are situated ca. 4 km south-southwest of Brodkorbneset, a site consisting of seven hearths. Both sites are dated to the late 11th to the late 12th centuries, and are contemporary in an archaeological sense (Olsen, this volume). Evidence of seasonal occupation in the faunal material indicates that both sites mainly represent late autumn/winter habitation (Olsen; Vretemark, this volume). Massive indications of intense heating present in the hearths themselves corroborate the interpretation of habitation during the cold seasons (Olsen, this volume). Ethnographical sources on the organization of the winter villages of the Skolt Sámi in the Pasvik area may serve as a useful analogy to the interpretation of Steintjørna and Brodkorbneset. The historical Skolt Sámi settlement pattern was characterised by communities dispersed in seasonal settlements over a wider geographical area that gathered in concentrated settlements in the interior during the winter season. Particularly important in this context is that written sources stress the necessity of moving the village in intervals of 5–30 years as the aggregated seasonal occupants exhausted the surrounding resources of firewood, pasture etc. (Hedman et al 2015: 10). Brodkorbneset and Steintjørna, despite the similarities in their overall details and chronology, were most likely late autumn and winter sites, alternately occupied and re-occupied throughout the overall duration of the two sites and in a strict sense never in use at the same time (Olsen, this volume).

Brodkorbneset and Steintjørna are two sites within the same socio-cultural context at a very close level, but still the result of the protracted variations of the groups and individuals present, their skills, contacts, habits of procurement and consumption varying over the years. This is certainly not any different from most archaeological sites settled for generations, but intervals of years, even decades, of abandonment and re-occupation are likely to have an additional effect on the composition of the assemblages at the sites. Some of the variations at inter-site level were blurred by generations of clearance and resettling, while some observable differences may be the result of episodic activities dependent on the opportunities and competence of the last generations of habitants at the hearth-row sites of Steintjørna and Brodkorbneset. However, the chronological solution provided by ^{14}C dating does not permit elaboration on the relative sequence of the time of use of the hearths at the intra and inter-site level in further detail, and stratigraphic analysis is essentially a tool limited to the contexts of the separate hearths. Subsequently, the Brodkorbneset and Steintjørna sites will be considered as *one* multi-phased site and variations between the hearths and between the sites is accepted at face value.

2 Iron forging in the context of the Pasvik hearth-row sites

The evidence of iron forging in the form of slag found at the Steintjørna site constitutes ca. 20% of the recovered artefacts, most notably evident in excavated hearth no. 2, and to a lesser degree in hearths nos. 5 and 8 at the same site (Hedman et al. 2015: 7). Due to the amount of slag in hearth no. 2 (see Olsen, this volume), this hearth functioned as an open-hearth smithy, at least episodically. The Geoarchaeological Laboratory (GAS) of the Swedish National Heritage Board conducted the metallurgical analysis of a selection of six slag samples (Grandin & Willim 2013).

Initial visual inspection concluded that the slag is a by-product of secondary forging, most probably from the manufacture of iron objects. The characteristic planoconvex shape of larger pieces of sampled slag at Steintjørna is a result of its formation; a once fluid material hardened in the depressions at the bottom of the hearth after the forging events took place (See Olsen, this volume, fig. 5). In addition, the vitreous, heterogenic surfaces including visible sand/fine gravel and hammer scales form a conglomerate typical of slag associated with forging of tools (cf. Brusgaard et al. 2015; Grandin & Willim 2013). Further petrographic analysis revealed that the appearance of the slag was caused by the deliberate addition of quartz/silica sand to the iron during secondary forging i.e. mending or production of tools (Grandin & Willim 2013).

The most likely explanation for this practice was that the sand was a welding compound added to the iron/steel objects during forging (Grandin & Willim 2013: 23). Interestingly, small spherical droplets of copper alloy and even larger pieces of the same material were also lodged in the slag. Grandin & Willim (2013: 23-24) have suggested skilled metalworking at Steintjørna as an explanation for their finds; i.e. the advanced forging of tools made of iron in combination with copper alloys, for instance welding and/or brazing of some kind[1]. Sand was used as flux material by blacksmiths in Finnmark until industrial fluxes became available in the late 19th/ Early 20th Century. Alluvial sand deposits in riverbeds were a source of sufficiently fine-grained sand that could be used in welding/ hard-soldering, as documented in the valley of the River Tana in eastern Finnmark (Lund 2009: 50). A likely source for flux sand in the context of the Steintjørna site would be the riverbeds of the River Pasvik some 700 m east of the site.

2.1 Iron production in Northern Fennoscandia

The slag debris from the manufacture and/or mending of iron artefacts at Steintjørna does not reveal indications of the origin of the forged iron itself. Iron production sites from any prehistoric or early historical phase have so far not been located in Finnmark County (Jørgensen 2010: 206). This is hardly different from Northern Norway seen as a whole, as bloomery sites are very rare, even if sound caution against arguments of silence about the present archaeological record is taken into account (cf. Jørgensen 2010: 194–95). The sites known so far, Hemmestad in Kvæfjord municipality in Troms County (ca. 500 BCE), Flakstadvåg in Torsken municipality (ca. 300 CE), Troms County and Rognlivatnet in Bodø municipality, Nordland County (13th Century) display a very wide chronological and spatial distribution, and none of the sites represent lasting large-scale production (Jørgensen 2015: 104).

In the interior of Northern Finland and Sweden, the iron production sites excavated so far are more numerous. The three North Finnish sites, Kotijänkä and Riitakanranta, both in Rovaniemi municipality, and the third site, Neitilä in Kemijärvi municipality, are all dated to the Pre-Roman and Roman Iron Age (Karjalainen 2016: 12–13). The first prehistoric iron-smelting site in northern Sweden was discovered in 2009 during large-scale salvage excavations in Sangis in Kalix municipality, Norrbotten County preceding the major expansion of the Swedish Haparanda railway (Bennerhag 2012). The oven or furnace is dated to ca. 200 BCE and recently, another iron production site presumed to be contemporaneous was excavated in Vivungi, Kiruna municipality, Norrbotten County (Bennerhag 2017). This latter site appears to be larger than the Sangis site (SVT nyheter 2017). All the documented iron production sites in Northern Sweden and Finland are characterized by so-called stone-box ovens, associated with an eastern early iron production technology, different from the shaft furnace type of ovens in Northern Norway (Jørgensen 2013: 79; Karjalainen 2016: 8–9), and all pre-dates Steintjørna by several centuries. This leaves only one known production site possibly contemporary with Steintjørna in the entire area of Northern Fennoscandia. This is the above-mentioned short-term minor production site of Rognlivatnet, some 650 km southwest of Steintjørna.

Early slag associated with secondary forging elsewhere in Finnmark has been positively identified by archaeo-metallurgical analysis, but so far only from contexts belonging to the Kjelmøy Phase (ca. 800 BCE–300 CE). Owing to the absence of production slag, or rest products of primary forging, this shows that iron was not produced locally (Sundquist 1999: 51). Apart from the above-mentioned few fragments of iron slag at the hearth-row site of Ássebákti, sites contemporary with Steintjørna and with indications of iron forging are at present unknown in Finnmark County. It is, however, unlikely that the Steintjørna site represents an isolated case of forging during the Late Iron Age/ Early Middle Ages. The intensity of archaeological surveying, cultural heritage management and research in Finnmark is skewed, as there has been little archaeological interest in the interior parts of the county until the last couple of decades (Skandfer 2009: 89). Apart from the geographical imbalance, the Iron Age and the Middle Ages have been quite neglected in the archaeological investigation of Finnmark as a whole, in favour of the extensive archaeological focus on the Stone Age and Early Metal Period (Amundsen et al. 2003; Henriksen 2016: 53ff.). Consequently, it is likely that the limited presence of slag in the Late Iron Age/medieval archaeological record of Finnmark represents a bias of research, and that future excavations will balance the picture. In this context, a stray find of a forge stone made of steatite (Ts.4396a) from Nyrud, some 2, 3 kilometres directly south-east of Steintjørna, is of particular interest. This type of forge stone occurs throughout the Late Iron Age/Middle Ages into the Early Modern Period, and can only be reliably dated by definite reference to the archaeological context (Jørgensen 2010: 145 ff.).

In the counties of Troms and Nordland, slag indicating secondary forging is quite common among finds from contemporary contexts to Steintjørna and Brodtkorbneset. Interestingly, according to Jørgensen, none of the slag fragments he inspected can be associated with iron production, thus resembling the results of the Kjelmøy phase slag pieces analysed from Finnmark (Jørgensen 2010). However, he found that forge stones, smithing tools, remains of smithies etc. are present in large numbers, particularly in Late Iron Age contexts (Jørgensen 2012). Consequently, the region met its demand for iron mainly in the form of imports rather than local production, despite favourable natural conditions and apparent widespread metallurgical knowledge among the inhabitants (Jørgensen 2010: 186; 2013: 77–78; 2015: 106). A highly similar course of development is suggested for the northernmost regions of Sweden.

Slag from forging is documented in Late Iron Age hearths or hearth-like structures suggested to be smithies at the Norra Holmnäs and Njallenjaur sites in the inland of Northern Sweden, as the slag clearly indicates secondary forging (Hedman 2003: 84-88). In the Northern Swedish coastal zone of Norrbotten slag from sites predating ca. 300 CE includes production slag, while sites dated to ca. 300–800 CE exclusively contains slag from secondary forging, likely due to a development where local production gave way to imported iron blooms or other types of trade iron (Bennerhag 2012: 60f.; Ramqvist 2012: 46–47)[2].

2.2 Iron artefacts at Brodtkorbneset and Steintjørna

To sum up the context of the metallurgical iron treatment at Steintjørna, it appears that the iron forged there was trade iron, i.e. ready-made material, such as scrap iron or billets, bars etc. produced elsewhere and brought to the site. The reliance on imported trade iron seems to be a trait consistent with excavated sites all over Northern Fennoscandia. At present, iron production sites of a significant scale contemporary to the Steintjørna site are unknown in Northern Fennoscandia, and more extensive networks of exchange must be considered to address the question of provenance. Unfortunately, the iron artefacts from Steintjørna and the contemporaneous hearth-row site at Brodtkorbneset, located 4 km to the NNE, are rather indefinite in this respect, as they mostly represent common types widely distributed in Northern Europe in the Late Iron Age and the Middle Ages. This is particularly the case for nails, rivets, chain segments etc. that constitutes the main bulk of the identifiable iron artefacts retrieved from the two hearth-row sites in Pasvik (Hedman et al. 2015: 6–7, Tab. 1 & 2). The categories considered here are the strike-a-lights, knives, arrowheads, an axe head and an iron ring.

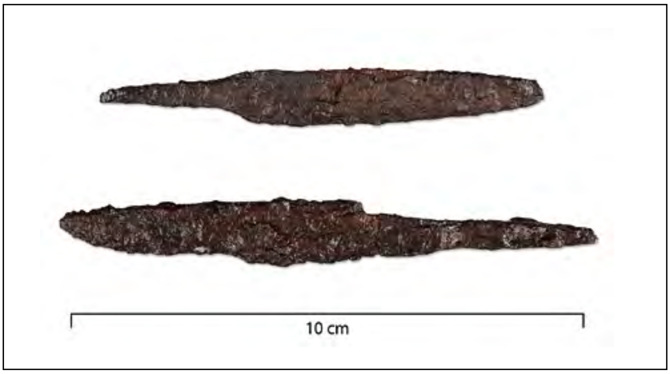

Figure 2. Knife blades from Steintjørna. Photo: Julia H. Dammann.

Figure 3. Upper: arrowhead with transverse point from Steintjørna, lower: arrowhead with triangular point from Brodtkorbnes (see Olsen, this volume, fig. 6.4). Photo: Julia H. Dammann.

The two strike-a-lights found at the Brodtkorbneset site are of two types; an oblong ring-shaped variant and an open lyre-shaped type (Hedman & Olsen 2009: 12–13; Cf. Hedman 2003: 132; Cf. Henriksen 2016: 233–234). The nine single-bladed tanged knives are of a rather common type in the interior of Fennoscandia, similar to knives frequently found in early medieval urban contexts in Northern Europe (Fig. 2, Cf. Færden 1990: 268–269; Cf. Henriksen 2016: 257). The eight arrowheads are all variants of types referred to as 'hunting arrowheads' (Cf. Farbregd 1972: 33; Zachrisson 1997: 212). One type is of broad, triangular shape (see Olsen, this volume, fig. 6.4), in contrast with the long and narrow tang at its base, while the other is a chisel-shaped arrowhead with a transverse point (Fig.3). The type is rare in Northern Norway. Except for a similar arrowhead (L 1320 i) found in house no. 5 at Gollevarre, Tana municipality, I am not aware of any parallels in the Northern Norwegian archaeological record. The context of the latter arrowhead is dated to the 13th and 14th centuries (Munch & Munch 1998: 130-131). Both types are commonly found in Sámi contexts, mainly in Finland and the entire interior of the Northern and Central Scandinavian Peninsula to such extent that these types are suggested to be Sámi arrowheads (Zachrisson 1997: 212f., see however Lindbom 2006: 93ff. for a detailed discussion). The axe found at Brodtkorbneset (Fig.4) is of a type described as a medieval forest axe, and has a very widespread distribution, throughout Northern Europe, including the British Isles (Figenschau 2012: 47–49). It also has s a special decorative (?) feature of three parallel lines chiselled across the transitional section between the eye and the cheek, which despite being unique among axes of this kind in northern Norway, has counter-

Figure 4. The medieval forest axe head from Brodtkorbnes, Ts.12037.12. Photo: Joakim Skomsvoll.

parts in the Russian, Baltic and English material (Figenschau 2012: 140). An iron ring from Brodtkorbneset is possibly part of an annular brooch, but owing to its condition, this interpretation remains uncertain. If this tentative identification of this artefact is correct, it is of a type common throughout the type European continent during the 12th–15th centuries (cf. Søvsø 2009).

There should be no reason to doubt that finished iron tools and implements were exchanged though extensive trade networks, but the shaping/reshaping of iron by indigenous smithery is also a factor that needs to be taken into consideration. In particular, small tools such as arrowheads, nails, rivets and strike-a-lights are likely to have been produced locally (cf. Zachrisson 2006). At present, other imports found at the Pasvik hearth-row sites may be more informative about the origin of iron compared to the actual iron artefacts. Regardless of whether it was in the form of raw material or as finished tools, iron found at the sites once circulated in a vast network of trade and exchange in which a variety of goods flowed between medieval centres and the northern peripheries (Cf. Bergman 2007; Bergman et al. 2014; Immonen 2013).

3 Cut thin pieces of copper alloy

Non-ferrous metal objects are by far the most numerous group of artefacts retrieved from Brodtkorbneset and Steintjørna (Halinen et al. 2013: 160, Hedman et al. 2015: 5–6). This category consists almost exclusively of objects made of copper/copper alloy. In the present article, thin strips and fragments of bronze and copper are referred to hereinafter with the collective term ‘cut pieces of copper’. The predominance of cut pieces of copper alloy at investigated sites dated to the Late Iron Age/Middle Ages all over Northern Fennoscandia has attracted the attention of archaeologists occupied with the history of Northern Fennoscandia since the 1950s (Bergman 2007: 6; Carpelan 1975: 65; Hakamäki 2016: 41; Hedman 2003: 161, 186; Henriksen 2016: 243–44; Immonen 2013: 24; Odner 1992: 131; Serning 1956: 91–93; Zachrisson 1976: 47–50, 62). Pendants of this kind were used as dress ornaments, as appendages of other objects such as fine chains of copper alloy on the Sámi drum, on belts and as ritually deposited sacrificial objects. (Zachrisson 1984).

3.1 Transformation of cut pieces of copper alloy at hearth-row sites in Pasvik

The practical aspects of cut pieces of copper as scrap-metal to mend old tools, or create new ones (such as fish-hooks, knives/knife-sheaths, arrowheads, pendants etc.) are evident in numerous examples in the Sámi archaeological contexts (Bergman 2007: 6–7; Hedman 2003: 187; Zachrisson 1976: 48–49, Fig. 73, 74; 1984: 43–44). The versatile practical application of cut pieces of copper alloy as scrap metal for reparation, production of tools etc. is certainly an aspect to consider in the context of the hearth-row sites of Brodtkorbneset and Steintjørna.

There is an observable difference in the size of copper alloy fragments at Steintjørna and Brodtkorbneset. The former site has considerable larger fragments compared with the latter, while on the other hand the greater majority of complete axe-shaped and trapezoid pendants were found at Brodtkorbneset; nine trapezoid and two axe-shaped, in contrast to a single trapezoid pendant recovered at the latter site (Hedman et al. 2015: 6–7, Tab. 1 & 2). A tentative interpretation is that different technological aspects of metalworking at the two sites may account for the variation, although this is a possible example of an episodic event, as accounted for in the introduction to this chapter. The specialized forging techniques involving iron and copper alloy in combination that are present at Steintjørna, hearth 2, may have required larger amounts of copper alloy as raw material. Indeed, most of the copper al-

Figure 5. Cut piece of copper alloy, folded and riveted. Possibly a fragment of a kettle or cauldron, Ts.12317.43. Photo: Julia H. Dammann.

Figure 6. In situ photograph of a small copper alloy brooch with four knobs. Photo: Bjørnar Olsen.

Figure 7. Lattice pendant after conservation (Ts. 12037.168), from Brodtkorbnes. Photo: Julia H. Dammann. See in situ photograph in Olsen, this volume (Fig. 6.1).

loy fragments at Steintjørna were found in association with this hearth (Hedman et al. 2015: 6–7). Metalworking at Brodtkorbneset, on the other hand, may have been limited to reshaping and coppering cut pieces into pendants. Other kinds of re-working of cut pieces of copper alloy from the hearth-row sites in Pasvik are less evident, as the main bulk of the copper alloy fragments does not display obvious signs of re-use (i.e. smelting/coppering).

As the material permits repeated reuse, and usually appears in a heavily fragmented state, it is difficult to specify to which original object the fragments belonged. Important exceptions, however, are kettles and vessels. Pieces of cut copper alloy from other contemporary Sámi sites often bear signs of dovetailing or riveting (Fig. 5) and in some cases traces of engravings etc., and kettle handles are in some cases found in context with such fragments. This indicates that a large portion of cut fragments of copper alloy consists of dismantled vessels of different kinds (Zachrisson 1976: 47–50; Bergman 2007: 6–7).

Similar observations can be made in the assemblage from sites that not considered Sámi sites per se, yet highly relevant in medieval trans-cultural interaction. Small pieces of cut copper alloy were found in excavations of multi-room houses in Skonsvika and Kongshavn in Berlevåg municipality, Finnmark County, but more importantly in this context, also produced definite evidence that kettles were cut up and prepared for secondary use. The medieval phases of the Kongshavn and Skonsvika sites, eight kilometres apart are synchronously dated within the period ca. 1250–1450 CE, despite clear differences of cultural associations, i.e. the first site appears as mainly Norwegian, while the latter suggests Russian/Karelian affiliation (Cf. Henriksen 2016: 221 ff.). The multi-room houses at Kongshavn and Skonsvika are dated later than the abandonment of the hearth-row sites of Brodkorbnes and Steintjørna, but their comparative relevance geographically and chronologically is rather close. Large copper sheets joined by nails, probably torn from kettles or cauldrons (Ts.11381.110) were found in a depot at the Skonsvik Site. At Kongshavn, a large fragment constituting ca. one third of a cauldron was found in a context that also indicates careful storage (Henriksen 2016: 242–244, Fig. 5.6, 5.7).

At least one definite indication of a fragmented kettle was found at the Steintjørna site in the form of a leaf-shaped handle of a kettle or cauldron, and several fragments of cut pieces of copper alloy from both sites are riveted. This suggests that kettles were a source of cut pieces of copper alloy also at both of the investigated hearth-row sites in Pasvik.

3.2 Imported ornaments

This category comprises one copper alloy brooch, a 'lattice pendant', and fragments of hollow cast zoomorphic pendants. Among the iron artefacts previously commented on, an iron ring could possibly be part of a simple brooch, but admittedly, this interpretation is uncertain. It is therefore excluded from the overview of imported ornaments.

The brooch has four knobs and appear to be penannular (Fig. 6). It is however twisted, and broken between two of the knobs. The breach is in the slender constriction of the frame between the knobs, where the loop of a now missing pin was fastened. Its original form was consequently annular. The brooch corresponds well to Søvsøs type 2.5, dated to the 13th and 14th centuries (Søvsø 2009: 186, Fig. 2, 196, Fig. 8). Søvsø (2009: 198) considers this type to be restricted geographically to Northern Europe, which corresponds to Zachrisson's assessment of the provenance of fragments of similar brooches from the Mörträsket sacrificial site (Zachrisson 1984: 35, Fig. 17 no. 96-103).

The imported pendants, on the other hand, have a more specific eastern origin. In this category, one complete pendant of a coin-shaped so-called 'lattice pendant' (my translation of Zachrisson 1984: 46) was found at the Brodtkorbneset site (Fig. 7). Presently, it is the only pendant of this type recovered within the national borders of Norway. The group of pendants with openworked oblique lattice pattern in the centre are common in the artefact assemblages of early medieval Novgorod and Central Russia, but also have a wide distribution spanning from the lower reaches of the Pechora to the Baltic, Finland and Northern Fennoscandia. At the Gnilka Sanctuary, (named after a tributary to the Pechora river) in Nenets Autonomous Okrug, Arkhangelsk Oblast, Russia, a series of almost identical pendants were among the sacrificial deposits (Ovsyannikov 1990: 101, Fig. 1 no. 9 &10; 1993: 34, Fig. 37; Zachrisson 1984: 46). Similar pendants occur at the sacrificial site of Unna Saiva (Serning 1956: 68, Plate 21 no. 14). Pendants of this type also occur in Finland, one from Kiantajärvi, Suomussalmi municipality central eastern Finland (KM 23600) and one from Kirkk'ailanmäki, Hollola municipality in Southern Finland (Huurre 1987: 87-88). In Karelia, one lattice pendant (not oblique) was found at Paasolinna hillfort in Sortavala in Russian Karelia close to Lake Ladoga (Huurre 1987: 88, Uino 1997: Fig. 6:10, no. 7). 'Lattice' pendants are dated to the 12th–14th centuries (Ovsyannikov 1990: 100; 1993:34; Zachrisson 1984: 46).

The other pendants demonstrate the practice of deliberate fragmentation of imported ornaments. Two heads belonging to variants of zoomorphic, hollow cast copper alloy pendants were found at the Steintjørna site in the contexts of two different hearths set ca. 60 metres apart: hearths no. 8 and 3 (Fig. 8.). The heads are identical and resembles horseheads, with characteristic ringformed eyes/ears, and false filigree work imitating the mane, an ornament that extends to the mule. The Ryabinin group VI, type XX, series 3a-b of zoomorphic pendants, depicts horses equipped with identical heads to the specimens from Steintjørna (Ryabinin 1981: Fig. 3 and Fig. 11). Series 3a is a variant portraying the upper body of a single horse with an elaborate tail. In variant 3b, an additional

Figure 8. The two horseheads of hollow cast copper alloy from Steintjørna (Ts.12317.82 left, ts12317.83, right), after conservation. Photo: Julia H. Dammann. See also pre-conservation photographs in Olsen, this volume (Fig. 6.2).

head conjoined to a single body replaces the latter trait; the heads faces opposite direction relevant to each other, thus comprising a horse with two front sides. Both variants date from the 12th–13th centuries (Ryabinin 1981: Fig. 3). Common to both subtypes of zoomorphic horse pendants (series 3 a and b) are the lower, abdominal part of the body, which are ornamented with zigzag lines between two parallel rims, above a varying number of rings to which chains were attached. The sections between the rings are decorated with small, round knobs, so-called false granulation. There were usually appendages fastened to each chain, such as round or conical bells, pendants, often of trapezoid or 'axe shaped' variants. The exact type of zoomorphic pendants recovered at Steintjørna have been found in unmatched numbers in the medieval strata in urban excavations in Novgorod, and were apparently commonly used as dress ornaments among the 13th-century inhabitants, and probably produced there in large quantities as well (Pokrovskaya 2002: 89). Type XX is com-

Figure 9. Fragment of a zoomorphic hollow cast copper alloy pendant found in a test-pit near Koietjørna. Photo: Bjørnar Olsen.

mon in Ingria and Russian Karelia, also considered a possible place of production, in particular the areas at the north-west end of Lake Ladoga (Uino 1997: 169). Type XIX is most common in the Kostroma area south of Lake Kubenskoye in Russia, probably the main area of production, but may also have been produced in Karelia (Uino 1997: 169).

During field surveys in 2008, a test pit revealed another fragment of a zoomorphic pendant, which was documented by photographing and left in situ[3] (Fig. 9). This was a fragment of the lower part of a pendant belonging to a similar type as the heads from Steintjørna. Part of the zigzag ornamentation and one complete ring were preserved, as well of the half portion of a second ring. The context of the test pit was a sunken floor in a small quadratic house, at a site documented by Sven-Donald Hedman in 2007 (Askeladden Id. 116713). A second, nearly identical house is situated a few metres to the west of the test-pitted structure. The site is located near Lake Koietjørna, ca. 700 metres north-northeast from Steintjørna. As the head fragments cut from the original pendant(s) found at the Steintjørna site are neatly delimited to the neck area, and the fragment from the house site is the 'abdominal' part of a zoomorphic pendant, it is impossible to determine to which sub-series in Ryabinin's typology of pendants, group VI, type XIX–XX the fragments belong. Consequently, an assessment of whether the fragments were originally part of the same ornament or several different artefacts is equally impossible.

There a very few zoomorphic pendants depicting horses from within the national borders of Norway. The only nearly complete pendant of Ryabinin's type XX, variant 3b is found in the vicinity of Sjåk in Oppland county in the interior regions of Southern Norway (Gjerde 2010: Fig. 3[4]). Closer to the upper Pasvik area, a zoomorphic pendant of Ryabinin's group VI, type XIX , i.e. stray find Ts.1657 from Abelsborg, Nesseby (Storli 1991: Fig 7[5]) is of importance. This type of pendant is a somewhat fantastic animal depiction, believed to incorporate elements of a horse, waterfowl and even sheep/ram, but otherwise closely related to the type XX pendants in chronology and provenance (Ryabinin 1981: 35). The lower rim of this pendant has horizontal zigzag ornament, rings for attaching chains and pendants, similar to the fragment discovered in the test pit described earlier. Another stray find of a zoomorphic pendant was found in Badderen, Kvænangen municipality in northern Troms County, some 260 km to the west of Abelsborg. This is a pendant of type XX, subgroup 3a (Storli 1991: Fig. 7). South of upper Pasvik, a quite recently excavated site at Illinsaari, Pirttitörmä, in Ii municipality, Finland yielded a zoomorphic pendant within the horse figures of type XX (Hakamäki 2014: Fig. 3). Another northern Finnish example (KM 26387), type XX, subgroup 3b is from Kenttälampi, Salla municipality. According to Tomanterä there are 10 additional hollow cast zoomorphic pendants in southern Finland including ceded Karelia, where at least Ryabinin's type XIX and XX obviously are included with several examples (Tomanterä 1991: 41). I have not been able to assess this material in detail.

Two fragmented pieces of zoomorphic pendants, one found in Finnish Lapland, and the other somewhere in the interior mountain plateaus of Western Finnmark respectively, are also clearly part of the same group of ornaments discussed here. The first were found during the rescue excavations of the Juikenttä site, Sodankylä municipality Finland, preceding a massive hydroelectric development project. This site were situated ca. 150 km directly south-west of Steintjørna. Among the fragmented ornaments found here is a cut piece of the lower 'abdominal' part of a zoomorphic pendant of Ryabinin's type XX, alternatively a variant of type XIX, with the same characteristics as the fragment revealed in the test pit accounted for above (Carpelan 1975: 63, second figure from above). The second example is the head of a pendant of Ryabinin's type XX, subgroup 3 a/b. This is attached as part of a larger composition of copper alloy ornaments, tubular beads and chains, probably found somewhere in the interior south of Hammerfest during the early 19th century (Fig. 10, De Capell Brooke 1887: 161, 182; Gjerde 2010: Fig 6).

The ornaments from the excavated hearth-row sites in upper Pasvik, and in particular, the 'eastern' group belong to a category of artefacts associated with the long-distance trade in furs in the Late Iron Age and early Middle Ages in Northern Fennoscandia in archaeological studies since the early 1930s (Mulk 1996). This presentation is a fitting conclusion to the discussion of the selected categories of artefacts from Brodtkorbneset and Steintjørna, as the following discussion will consist of an analysis of the potential spatial trajectories of exchange or the long distance networks of distribution of my selected categories of objects deposited in hearth-row sites in the upper Pasvik region.

4 Networks of trade and exchange

The selected categories of artefacts from the Steintjørna and Brodtkorbneset hearth-row sites and the discussion so far has somewhat implicitly touched upon their connection with far-reaching networks and external contacts. In the subsequent discussion, these aspects of the material will be further elaborated upon, after an introduction with some general notes on the wider historical context as basic premises.

In the context of the interior regions of eastern Finnmark during the Late Iron Age and early medieval period, the networks of trade and exchange seems to be intrinsically connected to the development of the fur trade in Northern Europe during the period. The centre of gravity of the fur-trade during the Iron Age was primarily western, and the predominant trade networks were managed by Germanic/Norse chieftaincies controlling the major part of the Norwegian coastline. Little is known about the details of this trade in Finnmark, but Ohthere's list of tributes exacted from the Sámi in Finnmark in his report to Alfred of Wessex ca. 890 CE includes pelts from animals likely to be hunted in the interior forested riverine valleys of Finnmark (cf. Valtonen 2008: 318f.).

In the 11th–12th centuries, the archaeological record of Finnmark indicates a shift in external relations of trade and exchange oriented towards the southeast (Hansen & Olsen 2014: 129–130). The role of the Northern Russian principalities, primarily Rostov-Suzdal and Novgorod as major centres of the northern fur-trade is crucial. The Russian principalities' success in the expansion of the trade depended on their ability to integrate various cultural groups, i.e. (mainly) Finno-Ugric tribes in the trade (cf. Uino 1997: 201). The cultural complexity of the agents operating the trade networks in Northern Europe may be enormous, but their common characteristics were probably their established status as knowledgeable agents in the fur trade, as trappers, processers and procurers of pelts, as well as expert managers of the logistics necessary to conduct long-distance trade and transport in the Boreal North (Kovalev 2002: 131ff.).

Novgorod is particularly relevant in the context of the excavated hearth-row sites of Pasvik as this principality was at the centre stage of the fur trade's north-western expansion. From the 11th to the 13th century, the fur trade grew to cover vast areas from Central Russia north and north-west to the Baltic, the Dvina valley, White Sea regions and vast areas of Fennoscandia (Hansen & Olsen 2014: 130). This expansion was partly driven by coercion, as Novgorod demanded tribute from the various groups under its influence. However, the development of the Novgorodian trade and tribute networks relied heavily on policies of successful integration of intermediaries, and despite demanding tribute from the peripheries of the 'Novgorod lands', the inhabitants were privileged with a certain degree of semi-independent legal status in the fur trade (Brisbane et. al. 2012: 4–5). Therefore, the networks were culturally complex, as well as geographically extensive. The routes in which traders and goods flowed in the context of Brodtkorbneset and Steintjørna cannot be reconstructed in detail, but a general assessment of directions should be possible to evaluate. Mainly based on the imported categories of trade iron, sources for the cut pieces of copper alloy and imported ornaments, such a general estimate of the geographical trajectories of the transport of objects in long-distance trade will be attempted.

4.1 Iron

Neither lack of metallurgical knowledge nor access to good resources such as bog iron ore and fuel could fully serve as explanations as to why large-scale iron production never developed in Northern Fennoscandia during the Iron Age (Jørgensen 2010: 172, 186–187). Jørgensen has suggested an alternative explanatory model based on socio-cultural enablement and restraints inherent in premodern trade and exchange through an elite network, which interconnected Germanic Iron Age chieftains or petty kings along the sailing routes of Western Norway, the vast hinterlands of Northern Fennoscandia, and ultimately, Continental Europe.

The relations between the northern elites and their peers in mid-Norway, (northern Trøndelag County) is of particular importance in Jørgensen's model due to the extreme contrast in the evidence of iron productions in the two regions. The development of large-scale iron production in order to provide iron intended for trade seems definite, as does the role of the elites in promoting this production (Stenvik 2003: 124). Jørgensen has suggested that the northern elites took measures to dissociate themselves and their subjects from the role of iron producers, while promoting their role as designated consignees for some of the surplus production controlled by the magnates in Trøndelag (Jørgensen 2010: 198ff.; 2015: 102). Jørgensen's model presupposes the mutual interests among the Germanic elites to exercise control over goods and objects that flowed through networks of trade and exchange; i.e. the nature of exports as well as imports between north and south. In this case, iron, mainly produced in or redistributed from Trøndelag was exchanged along with highly prized prestige objects of Continental European origin, while northern trade items such as pelts, hides, train oil etc. entered the network in return (Jørgensen 2010: 200f.). Iron, in this perspective, was among the objects of exchange securing stability and reciprocal bonds of peer-polity interaction, on which the Northern Germanic Iron Age elites relied. Naturally, any development of large-scale iron production in Northern Norway would challenge this strategy. Jørgensen suggests that iron also formed a vital part of the socio-cultural structuration of trans-cultural trade and exchange, this time with the Germanic Iron Age magnates in their role as redistributors of desirable objects including iron tools and various forms of trade iron etc. at a regional trans-cultural level i.e. to the Sámi in Finnmark (Jørgensen 2010: 203).

Jørgensen's model is chronologically delimited to the Iron Age, and may not be directly relevant in a discussion of iron at the Brodtkorbneset and Steintjørna sites. The hearth-row sites in Pasvik are dated to the end of the Viking Age and Early Middle Ages, during which time the chieftains of Northern Norway gradually lost power to the emergent Norwegian realm. Initially, this led to protracted processes of secular and religious administrative integration of the coastal landscapes of Northern Norway north to interior of Troms County (cf. Hansen 2010: 199–200; Hansen & Olsen 2014: 143–144). Thorough changes in the conditions of trade and taxation in the wake of these processes may have had a negative effect on the Norse involvement in the Finnmark trade in the Early Middle Ages (Henriksen 2016). In addition, the expanding stock fish trade and control of land rent from acquired farms in the more southerly regions of Northern Norway may have represented a more profitable alternative to the emerging secular and religious power, and trade in Finnmark may have been given less priority as a result (cf. Hansen & Olsen 2014: 145). These processes effectively changed the cultural landscapes of the period. The former north-eastern fringe of the Germanic Iron Age in northern coastal Troms County 'lost' its former Norse archaeological imprints. This phenomenon is explained as a southward withdrawal of the Norse population, or alternatively, as processes of acculturation that led groups and individuals to acquire Sámi ethnic identities (cf. Bratrein 1989: 201ff.). It appears that the inhabitants of Finnmark actually loosened their ties with the Norse societies in the southwest during this transitional phase, coinciding with the time when hearth-row sites in Pasvik were used (Henriksen 2016). It is therefore unlikely that any significant quantity of the iron found at the hearth-row sites in Pasvik were transported from Nordland and Troms counties in the west through a coastal network controlled by Norse traders.

Jørgensen's model is still a valid analogy in context of the excavated hearth-row sites in Pasvik. During the Iron Age, the Sámi groups secured their integration in the trade and exchange network as specialist providers of valued prestige products that the Sámi were in a unique position to provide, such as pelts, hides, eider down, walrus tusks, of vital importance to the external trade managed by the elites controlling the Northern Norwegian coastal areas (Jørgensen 2010: 203; 2015: 105). In the institutionalized structures of transaction, the Sámi entered the role as receivers of iron provided by the Germanic Iron Age elites, but Jørgensen did not elaborate on the question of why Sámi societies in Finnmark apparently chose the same strategy of disassociation from the role of iron producers as the Norse societies in Northern Norway (Jørgensen 2010: 203). Following the logic of Jørgensen's model, self-sufficiency by indigenous iron production among Sámi groups could potentially weaken the socio-cultural structuring principles that secured stability in the transactions between external trade partners and Sámi societies. In other words, agents in a position to control production and trade within Sámi societies would have had interests congruent with the strategies Jørgensen proposed for the Germanic Iron Age trader elite, and seek to implement measures to prevent internal extensive production of iron.

Indications in written sources, as well as in the archaeological records does indeed imply social stratification among Sámi groups during the Late Iron Age and Early Middle Ages (Hansen & Olsen 204: 116ff.). In fact, intra-site variations of size, form and construction of the hearths at Brodtkorbneset and Steintjørna as well as artefact distribution are among factors suggesting internal differentiation in status between the habitants of the hearth-row sites in question (Halinen et al. 2013; Hedman & Olsen 2009; Hedman et. al. 2015). The hearth no. 2 in Steintjørna seems to fit this pattern. The intensity of metalworking, and the skills applied here contrasts to neighbouring hearths with considerably less slag (hearths no. 5 and 8), and a total absence of this material at the rest of the site. This suggest an uneven distribution of skills among habitants of the sites as well, in this case skills related to smithery (Hedman et al. 2015: 7). The existence of social elites within Sámi societies capable of managing or controlling production, trade and exchange during the period when the hearth-row sites in Pasvik were used is plausible, and so is the potential power to suppress local iron production.

Leaving this interpretation as to *why* iron was imported in the context of the hearth-row sites in Pasvik, the question of *where* the iron originated from may be equally complex. As previously stated, a pattern of distribution via Norse nodal points of trade along the Norwegian coastlines is unlikely as much of this network's operational force in Finnmark was lost during the Early Middle Ages. However, it does seem that Norse traders were more successful in maintaining an inland trade network into the medieval *south-west* of Finnmark, as indicated by the predominance of Norwegian coins among deposits at the Northern Swedish sacrificial sites until ca. 1200 CE (Wallerström 1995: 188ff.). If iron traded via expeditions from the present Nordland and Southern Troms Counties in Norway reached the Pasvik area through the inland, it would most likely had undergone very complex and geographically extensive chains of exchange. It is also a question whether iron was among the bartered goods in trade initiated from the coastal areas of Norway in the early medieval period, from where most if not all iron had to be redistributed from afar. After all, Northern Sweden and interior eastern Finnmark had closer access to alternative trade networks with a closer connection with large iron production sites.

The size and technological innovation evident at Late Viking Age/Early Middle Ages iron smelting sites in the Swedish interior south of Norrland is unparalleled in the Northern European context, and very relevant to our setting. Estimates of the quantity of iron produced in the southern and central regions of Sweden indicate a surplus production sufficient to introduce this product as a main bulk of Swedish exports in cross-Baltic trade in the early Middle Ages, possibly also in the late Viking Age (cf. Berglund 2015: 105ff; Karlsson 2015: 63ff., 283). Vernacular iron smelting in other regions, for instance Russian Karelia (Kosmenko & Manjuhin 1999), should not be ignored as a potential source of trade iron to interior eastern Finnmark, but cross-Baltic iron trade via the Gulf of Bothnia still seems to be the most likely route of traded iron in our context. Consequently, a north-southern route connected to the Baltic Sea-Gulf of Bothnia seems the most plausible general direction of trade routes in context of the hearth-row sites in Pasvik, even if we allow the possibility of 'Karelian-produced' trade iron among the imports.

4.2 Cut pieces of copper alloy

The fragmentation of copper alloy sheets into small pieces and strips is obviously an intentional reshaping, but it has long been apparent that the majority of the fragments are without traces of actual re-use. Some have interpreted such deliberate fragmentation as part of a ritual act, i.e. preparing metal for sacrificial purposes (Carpelan 1975: 65; 1992: 41). Others have seen this praxis as a mere practical transformation of a material into something exchangeable in commercial terms, even suggesting that cut pieces of copper alloy served as a version of '*primitive money*' (Odner 1992: 131). This latter interpretation presupposes recognized standards of denomination specific to measurement and valuation of different goods. A spherical flat-poled weight found at Steintjørna is a clear indication that the occupants of this locality (including visiting seasonal traders), exchanged items suitable to be measured with scales and weights. Four similar weights have been found at the Rerbraur 1 hearth-row site in northern Sweden, Arjeplog municipality, and one at the settlement sites at Njallejaur, in Arvidsjaur municipality (Hedman 2003: 161 ff.). Of a total of five weights among the metal deposits at the sacrificial site Unna Saiva, three are spherical and flat-poled like the one recovered at Steintjørna (Hedman 2003: 162), in context with two folding balance scales (Steuer 1987: 71). Closer to upper Pasvik, scales and weights are included in the Aatservainen hoard close to Lake Tenniöjärvi in present-day Murmansk oblast, Russia (Talvio 1985: 31), some 220 km south of Steintjørna and Brodtkorbneset. Thirteen weights, the majority of a spherical flat-poled shape, and folding balance scales were found in this hoard (Steuer 1987: 71).

The weights in the Northern Fennoscandian interior can possibly have a connection with long-distance trade in precious metals, such as silver (cf. Hedman 2003: 162, Hedman et al. 2015: 7), but 'mundane' metals such as pieces of copper alloy could certainly be traded in the same manner. In this perspective of trade and exchange, cut pieces of copper (alloy) are comparable to ingots rather than money. The fragmentation of copper alloy could serve as an additional practical preparation of a material intended for trade, as the modification would allow easier packaging in bags, sacks or other containers. Cut pieces of copper alloy, sometimes easily recognizable kettle fragments, are common features in the artefact assemblage in archaeological contexts contemporary to the hearth-row sites of Pasvik in the regions of Ostrobothnia and the interior of Finland, in contexts considered as Finnish (cf. Hakamäki 2016: 41). Like the example from the slightly younger multi-room houses of Skonsvika and Kongshavn, this shows that cut pieces of copper alloy were valued among various cultural groups in Northern Fennoscandia, which interacted in a variety of ways, not least in trade and exchange (cf. Hakamäki 2016).

While the fragmented or reworked condition of the cut pieces of copper alloy often prevents an assessment of the main group of objects from which these fragments originated, we have to settle with the fact that dismantled kettles *are* identifiable among the cut pieces of copper alloy at the Brodtkorbneset and Steintjørna sites, as previously stated. Kettles and cauldrons in close association in contexts of trade and exchange may serve as a viable approach in order to assess the trade routes relevant to the cut pieces of copper alloy at Steintjørna and Brodtkorbneset.

The value of copper alloy extended beyond the usage of imported objects, and it is suggested that kettles/vessels actually were the main 'source' for the cut pieces of copper alloy found from all historical phases in Northern Fennoscandia (Bergman 2007: 6-7 ff.). It is further suggested that kettles/cauldrons and fragments thereof were considered to be part of the same category of valued goods circulating in northern networks of trade and exchange in the Late Iron Age/Middle Ages (Bergman 2007, Immonen 2013). However, complete kettles and cauldrons dateable to this period are absent in the archaeological record in northernmost Sweden (Bergman 2007: 6), and to my knowledge, in the corresponding record on the Norwegian side of the border as well. With reference to late medieval historical sources which lists cauldrons as trade items in high demand among the Sámi in Northern Fennoscandia, Bergman finds that the multifaceted potential for secondary use inherent in copper alloy vessels accounts for the reason that such objects rarely enter the archaeological record unaltered (Bergman 2007: 11). It is likely that broken kettles and cauldrons were also of commercial value. Written sources such as Early Modern tax and trade registers, probate records and other documents record cut pieces of copper alloy as valued items in a commercial sense. Pieces of worn out kettles even seem to have been denominated as a commodity in late medieval Norwegian contexts, with its own term used in different accounts, probate records etc. The term 'Kjedelbrom' translates as 'scrap metal from worn out kittles' (my translation from Fritzner 1886: 193), being listed in accounts related to repairs of the medieval King Håkon's Hall in Bergen in 1518–1520 (Kielland 1906: 8). The provincial governor of Finnmark, Hans Hansen Lilienskiold, reported that around Russian traders around 1700 CE were willing to pay high prices for old and worn copper and other non-ferrous scrap metals in their trade with local Sámi partners in interior eastern Finnmark (Lilienskiold 1943[1702]: 318–319). Historical analogies may add to the probability of a close qualitative or conceptual relation between kettles/cauldrons and cut pieces of copper alloy as commodities in trade and exchange in Northern Fennoscandia during the Late Iron Age/Early Middle Ages.

However, whether cut pieces of copper alloy found in Northern Fennoscandia are exclusively a result of indigenous reuse/local exchange, or if they were also considered a valuable material for long-distance trade in its own right during the Late Iron Age/Early Middle Ages remains uncertain. An alternative approach is to accept the premise of copper alloy vessels as a main source for the cut pieces of copper alloy, and as part of the same network of exchange, and attempt an assessment of the distribution of complete vessels to Northern Fennoscandia in the Late Iron Age/Early Middle Ages.

Stray finds of more or less complete kettles or cauldrons in the interior eastern central and northern parts of Finland may be from depots, or hoards. If some of these are contemporary with the excavated hearth-row sites of Pasvik is uncertain, but some are likely to be medieval (Immonen 2013: 23, with references). Kettles appear in grave contexts in ceded Karelia dated to the Late Iron Age/Early Middle Ages (Kivikero 2011: 62; Kivikoski 1973: 149, Tafel 144, 1254 and 1255). Surely, if the stray finds are ritual or secular hoards, special care was taken with kettles/cauldrons as valuable objects. They may not be representative of the historical distributional patterns, except perhaps at a macro-level. The landscapes where they were found are described as wilderness, and two alternative interpretations has been discussed; that the stray finds are mobile traders' depots, or intentionally deposited by a native Sámi population (Immonen 2013: 23). In either case, this indicates the exchange of copper alloy kettles with the Sámi in the north via Southern Finland/Karelia. Kettles distributed to Northern Fennoscandia during the Late Iron Age/Early Middle Ages may have been produced as far away as the Near East (Zachrisson 1976: 46), but the manufacturing of copper alloy vessels was widespread in parts of Southern Scandinavia, Eastern Germany/Poland and Eastern Central Europe (Müller 2006: 132-133)[6]. Vessels of copper alloy were transported in large quantities in cross-Baltic trade, with a connecting northern branch to Finland. It seems likely that this area functioned as a hub for the further distribution of copper alloy, such as kettles, cauldrons and vessels, or possibly as cut pieces thereof intended for trade. Like iron, the main bulk of copper alloy items was probably distributed to the vast inland areas in the north through a route where the northern regions of Finland served as transit area during the Late Iron Age/Early Middle Ages, including eastern interior Finnmark. Such a route would surely involve the Ostrobothnia area of Finland.

4.3 Imported ornaments

The imported ornaments are evidence of exchange through far-reaching networks at Brodtkorbneset and Steintjørna evident in their general provenance. One of the ornaments discussed above is an annular brooch with its probable origin in the western parts of Northern Europe, although a further specification of production area is presently not possible (cf. Zachrisson 1984: 34). The lone representation of a 'western' brooch at Steintjørna can be extended to the entire Finnmark County, as I know of no counterpart to this type in the medieval assemblage of the region. At present, the suggestion must suffice that this brooch was transported along similar trails as suggested for trade iron and copper alloy vessels. The imported ornaments of definite eastern origin, another minor category in the artefact assemblage, may be more informative as an indicator of trade and exchange.

Firstly, a very direct connection between eastern ornaments represented in the assemblages at Brodtkorbneset and Steintjørna and the fur trade is likely. Eastern ornaments considered to be Finno-Ugrian, such as the zoomorphic pendants from Steintjørna, have long been interpreted as a particularly suitable item of exchange among external traders and their Northern Fennoscandian partners, especially the Sámi (see Mulk 1996 for an overview). The depictions of animals and the material they were made of have been crucial to this interpretation. In particular, ornaments of waterfowl and horses associates to elements of the old Sámi religion as documented in ethnographic sources of the 17th–18th centuries sources as shamanistic guiding spirits between worlds, and as a companion to Ruohtta, the demon-like god of the nether realm of death, respectively (Hansen & Olsen 2014: 112; Mulk 1996: 68). Although Ruohtta, according to the same sources, accepted sacrificial offerings, the religious connotation with horses may have been different in the Late Iron Age/Early Middle Ages. The dualistic concept of separate subterranean and vertically aligned good and bad realms of the dead in old Sámi religious beliefs may have been conceptualized under the growing influence of Christian doctrine of Heaven and Hell during later stages of history (Schanche 2000: 256–257). While this does not exclude an older veneration of horses, it was probably influenced by a larger northern Eurasian set of mythologies of horses representing transcendence between the worlds of the living and the dead, and as a spiritual helper (Gjerde 2010: 54cf.; Hansen & Olsen 2014: 112). Gjerde's note about the type of zoomorphic pendants present at Steintjørna/Koietjørna is in this regard important. If appendages attached to such pendants represented legs and hooves, the number of 'legs' attributed to different versions of horse pendants always exceeds four (Gjerde 2010: 54). Depiction of horses, or animals with horse-like features as 'over-membered' beings indicates that horse pendants probably referred to a widespread motif in cult and religion in Northern Eurasian cultures, including the old Norse religion represented by Sleipnir, the horse of Odin (Gjerde 2010: 54). It seems likely that shared elements of cosmology account for the popularity of the zoomorphic pendants in the trade among Sámi and Finno-Ugric groups, but other categories of pendants, such as the oblique lattice pendant at Brodkorbnes, a Russian type (Uino 1997: 186–187), demonstrate a broader selection of preferred ornaments of eastern origin in the exchange (Cf. Roslund 2016: 194). This indicates that eastern ornaments in general may be seen as an integral part in a wider system structuring the interaction of heterogeneous cultural groups involved in the Northern Fennoscandian trade networks of the Late Iron Age/Early Middle Ages. A perceived sodality among the participating group may have developed from linguistic, cultural and cosmological familiarities, but any realization of such commonalities would require prolonged intergroup transaction. Eastern ornaments could have acquired status as material 'iconographic' signifiers elucidating or identifying partners and their role in trade and exchange (Cf. Odner 1983: 73, 106; Roslund 2016: 26). The eastern ornaments found in secure archaeological contexts dated as contemporary to the Steintjørna and Brodtkorbneset sites are definitively predominantly Sámi, and seem to have been of significant symbolic value, even as an ethnically specific idiom in this period (cf. Mulk 1996: 68; Storli 1991).

Secondly, the zoomorphic pendant(s) recovered at Steintjørna and in the test pit near Koietjørna were deliberately fragmented, and I find it unlikely that such praxis can be explained as the mere practical preparation of objects as scrap metal, particularly in light of the proposed symbolic and ideological value of such objects in Sámi contexts. The practice of cutting zoomorphic pendants has close chronological and geographical counterparts at the Juikenttä site where Carpelan encountered deposits of faunal material, whole and fragmented tools and ornaments in a context interpreted as a combined Sámi winter village and sacrificial site (Carpelan 1975: 65). The interpretation of cutting imported ornaments into pieces as part of a ritual act, or preparation for a domestic sacrifice is relevant to consider regarding the zoomorphic ornament at upper Pasvik as well. In my opinion, other aspects behind altering ornaments must be considered. Imported ornaments and other imported items, such as coins, often underwent transformation as they entered Sámi contexts of use, which deviates from the objects' intended purpose or the functional context of their geographical provenience. In Northern Sweden, there are examples of clasps or brooches used in a different manner and/or transgressing their 'original' gender association in burial contexts; coins are pierced or otherwise altered to serve as pendants at offering sites etc. (Mulk 1996: 67).

An example from Finnmark is a particularly conspicuous example of such praxis (Fig 10). The collection of eastern ornaments acquired by Arthur De Capell Brooke in Hammerfest in the 1820s and referred to above inspires further thought about the manner in which imported ornaments were transformed as they (re-)entered Sámi contexts of intraregional exchange an use[7]. The artefacts (NFSA.2691) are 17 spiral ornamented tubular copper alloy beads strung on a cord, which appear to be leather (?). Most likely, this cord is a modern addition to the ornaments after the recovery. Round copper alloy bells are attached to both sides of 15 tubes. These tubular beads are similar to the 'Ohrrörchen' in Tomanterä 1991 (Abb. 13). Two other beads on the cord deviates from the other; a smaller one of similar design as the larger ones, and one tubular bead of a type that I cannot identify. They seem to have been arranged around a larger tubular pendant, with multiple spiral ornaments (Fig. 10B). Eight rings on the lower side of this pendant have chains and somewhat larger bells attached to them, comparable to the bells attached to the smaller tubular beads. The Klimushkino burial site connected to the Moshinsky portage associated with the Svir-Onega-Dvina water systems contained a female burial with a strikingly similar arrangement of 15 copper alloy beads as well as a larger tubular pendant, and linked by context to the skeletal remains, probably worn as a belt (Makarov 1994: 23–24, 26, Fig. 9). Due to the similarities with the artefact assemblage of the Finnmark stray find, De Capell Brooke's shaman chain interpretation, with which Nesheim (1963) and Vorren (1965) concurred, is questionable.

An arrangement of chains are attached to one of the tubular beads, to which 12 different ornaments are affixed as appendages, much like traditional Sámi belt wear (Fig. 10A). Ornaments were traditionally attached to the belt, along with tools such as knives, strike-a-lights etc. In this case, this latter category of 'practical' implements is missing. The items attached to this appendage are three conical bells, a trapezoid pendant, four ornamented pieces of the same type, but damaged in various degree. The latter objects are probably mountings from belts, straps or textiles, but I have not been able to find parallels to these ornaments. Of

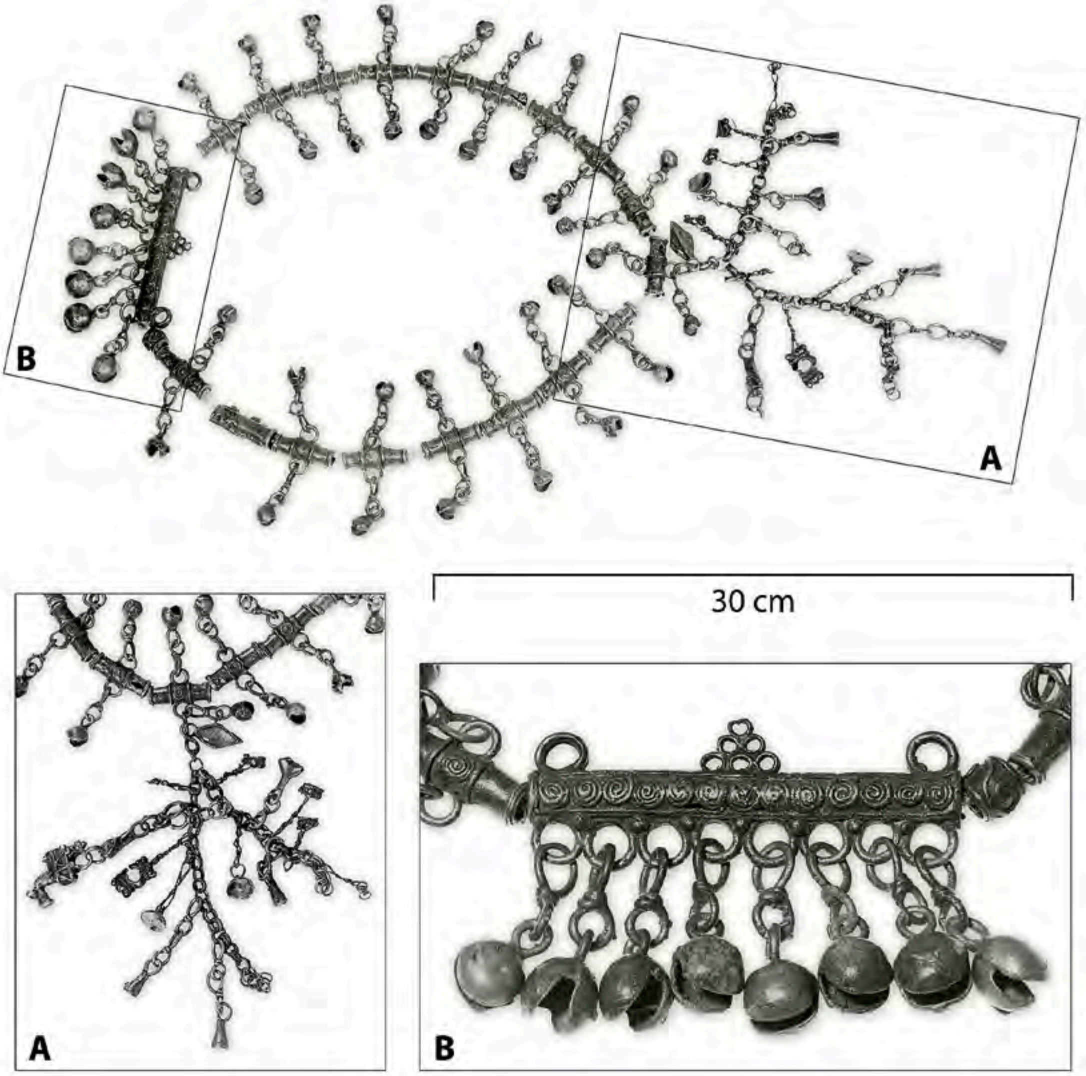

Figure 10. NFSA.2691. Composition of eastern ornaments found in Western Finnmark, A: Details of appendages. Chains, bells, trapezoid pendants and fragmented ornaments, B: Detail of a large tubular pendant with spiral ornamentation. Photo: © Norsk Folkemuseum/Norwegian Museum of Cultural History.

course, the main interest in this context is the fragment of a zoomorphic horse pendant of the previously discussed Ryabinin type XX. The very practice of attaching ornaments, bells, etc. in new compositions, more or less transformed or adapted to a (presumed) belt arrangement suggests an explanation for the Steintjørna, Koietjørna and Juikenttä fragments. The fragmentation of imported ornaments may have been an intended act designed for further distribution or exchange regionally, either in the form of dismantled, fragmented objects or reassembled into new arrangements of pendants. This could possibly be an intended use for the locally produced axe-shaped or trapezoid pendants made from cut pieces of copper alloy.

A historical analogy yet again based on ethnographic sources from the Early Modern Period about old Sámi religion and ritual may serve as a reminder that, such mundane aspects as intra-regional exchange, modification and reassembling of pendants proposed here, do not necessarily exclude ritual aspects associated with such practices. The *sjiele* (South Sámi), or *šiella* (North Sámi) concept that can refer to metal implements of pewter or silver, offering gifts made of the respective metals, or simply gifts or rewards (Bäckman 1985: 93). In a sacrificial context, the sjiele/šiella concept could refer to an individual sacrifice where separate or easily detachable ornaments, coins etc. occasionally were offered at sacrificial sites during annual migrations or hunting expeditions (Bäckman 1985: 93; Spangen 2016: 99). Further studies of ornaments of eastern provenance in a wider context, outside the scope of this paper, could possibly shed more light on the circulation and use of the imported objects once they entered Sámi contexts. In this context, it must suffice to bring attention to an ornament found in one of the excavated hearths at the hearth-row site in Ássebákti, Karasjok municipality (Ts.7183a), which appears to have been deliberately cut (see Simonsen 1979: Fig. 6). It is an eared tubular pendant, of probable Karelian origin (Uino 1997: 198).

To return to the question of trajectories of transportation, there is as previously stated, a very likely connection with the medieval fur trade spurred by the expanding Northern Russian principalities and the distribution of the eastern ornaments. Moreover, the involvement of Finnish tribes in the management of the expansion of the fur trade in Northern Fennoscandia is deemed crucial in that regard. In a critical scrutiny of earlier interpretations of the eastern ornaments against more recent archaeological research in Russia, the Russian archaeologist N. Makarov argued that earlier ethnic associations with the categories of ornaments as Finno-Ugric and Russian was problematic (Makarov 1991). Rather than being confined to ethnic groups, 'Russian' and 'Finnish' ornaments formed a common repertoire among peoples of Finnish and Slavic cultural identity in the northern peripheries of Rostov-Suzdal and Novgorod during the 11th–13th centuries (Makarov 1991: 73, 75). Makarov's description of how the multi-cultural context developed into practices of intermixing of ornaments, and the development of hybrid forms are interesting in our context, mainly because it offers a reasonable explanation for the forms of eastern ornaments present at the excavated hearth-row sites in upper Pasvik (Cf. Makarov 1991: 73). The oblique lattice pendants' Russian provenance and the Finnish association with the zoomorphic pendants may express commonality in material culture among the population from where traders in Northern Fennoscandia originated. This would be the areas around Lake Ladoga, Lake Beloye and the basins of the Rivers Vaga and the Northern Dvina (Makarov 1991: 75). The trade and far-reaching external exchange in the fur-trade in Makarov's model, seems to favour a route along the Vaga and Northern Dvina river systems to the White Sea and from the western shore enter the Kemijoki water systems, which connects to several alternatives leading to the Gulf of Bothnia (Makarov 1991: 77; cf. 2007: 146-148).

The main distribution of artefacts discussed by Makarov is central and northern Russia, which makes his proposed route probable. In later excavations in the Lake Kubenskoye region, which in essence support his previous model, zoomorphic pendants of Ryabinin's type XIX, a possible parallel to the fragment from a test pit near Lake Koietjørna, were among the furnishings of a grave (Makarov 2005: 231). As this type is typical of the Kostroma area south of Lake Kubenskoye, Makarov's suggested route is possible. The distribution of the type XX pendants of Ryabinin's classification, on the other hand, suggests a western path, from Novgorod, Ingria, Karelia and Finland, which certainly indicates a direction of trade routes relevant to the presence of the ornaments at Steintjørna.

The dating of the two categories of eastern ornaments present at Steintjørna, Koietjørna and Brodtkorbneset may very well indicate deposition during the latter phases of the sites, possibly during the 13th century, due to the aforementioned cultural formation processes that were likely to have affected the settlements during their use. Regardless of this, the ornaments are dated within a range coinciding with the period when the Karelians enter the historical record, first in 1143, and subsequently portrayed as semi-independent allies or collaborators in the Novgorodian expansion to the northwest, until Karelia become forcibly incorporated in the Novgorodian realm in 1278 (Uino 1997: 192–193). The Karelians' role as intermediaries between Novgorod and Northern Fennoscandia as expert managers of the fur trade, and possibly tribute collection in the 12th and 13th centuries was probably vital to the transport of goods exchanged in the eastern part of Northern Fennoscandia (Hansen & Olsen 2014: Fig 23; Roslund 2016; 2017). The contact with Novgorod provided trade items, possibly even zoomorphic ornaments not worn by Novgorodians at the time (cf. Uino 1997: 192), as well as Russian ornaments such as the oblique lattice pendants.

The centrality of the Ostrobothnian region in the distribution of zoomorphic pendants to the excavated hearth-row sites in upper Pasvik is likely, as is also its role as a route of transport of the lattice pendant. With the Karelian influence, their expansion into northern interior Finland, and to the White Sea during the latter 12th and the 13th century, does, however, present a vast array of possible alternative routes (cf. Hansen & Olsen 2014: 151). A Karelian migration to the western shores of the White Sea would provide opportunities to bypass the Gulf of Bothnia altogether and carry out winter expeditions from Kandalaksha Bay to the west. Even though contemporary sites or stray finds that could substantiate this route are lacking (Uino 1997: 200), it is a helpful reminder that the assessment of routes along which goods flowed to eastern Finnmark in the Late Iron Age/Early Middle Ages must be a matter of further consideration.

5 Concluding remarks

The hearth-row sites at Steintjørna and Brodtkorbneset were settled from the latter part of the Late Iron Age until the turn of the 13th century. Settlement was restricted to the cold season of the year, yet the artefact assemblage indicates long-distance trade, and the presence of a weight shows that trade was conducted at Steintjørna.

My assessment of the trade iron, cut copper alloy pieces and ornaments retrieved in the excavation of the hearth-row sites in upper Pasvik led me to conclude that a northern – southern path from the Northern Finnish interior and the Ostrobothnia area must have been a central transit region for the goods exchanged through far reaching trade networks between north and south. This is not a novel idea, and the discussion does not contribute to insights of the multitude of networks, nodes, passages, infrastructure which existence were contingent upon the need and desire for objects from afar. Except, perhaps, to the status of hearth-row sites such as Steintjørna and Brodtkorbneset and the context of long-distance trade.

The centrality of Ostrobothnia and interior Northern Finland has been the subject of recent studies that may be of relevance to sites such as Brodkorbneset and Steintjørna. The point of departure may be that an extension of trade networks into the Bothnian area in the Early Middle Ages, was not a venture into *terra nullius*, it could simply not have happened if there wasn't already someone present with the skills, infrastructure and social organization to manage this expansion (Kuusela et al. 2016: 179). Another crucial aspect are the natural conditions. Packed with rugged ice, which does not permit sea voyages for the better part of the year, and hardly allows alternative traffic on the ice, the Gulf of Bothnia was virtually unreachable during the cold season. At the same time, during winter, passage in the interior was at its most convenient. This means that the communities situated close to suitable harbours were in a position to control the incoming trade, and effectively maintain positions as intermediaries in the trade further north (Kuusela 2016; Kuusela et al. 2016). Settlements that fulfil these requirements have been positively identified, such as Illinsaari in Ii municipality in the estuary of the River Iijoki and Valmarinniemi, Keminmaa municipality at the outlet of the River Kemijoki (Kuusela 2016: 126 ff.). The traders without alternative means of transport inland such as seafarers involved in cross-Baltic trade would lack other options than to establish, and maintain, personal relationships with members of the gateway societies. Gateway societies were therefore closed networks of trade, inherently exclusive to a limited set of trade agents. In the interior landscapes, the context of trade were different. Particularly during winter, there would be limited possibilities to control trade by controlling specific landscapes, and the trade networks of the interior would in contrast be open (Kuusela 2016: 132–133). The open inland trade was also open to competition and rivalry, possibly reflected by the registered finds of Iron Age/medieval weaponry, which have almost exclusively been recovered in the interior of Northern Finland (Kuusela 2016: 135).

It is entirely possible that trade managed by intermediaries originating from gateway societies was crucial in the trade of iron and copper alloy items such as vessels/kettles towards the north. It is also possible that traders able to conduct long-distance winter travel in the interior, such as the Karelians, preferred to carry on trade independent from the coastal trading nodes. The latter group may even have specialized as traders of much sought after ornaments. In any case, the location of sites such as hearth-row villages may have possessed qualities that closed some of the openness of the interior landscapes (cf. Kuusela 2016: 133). It is vital for any trade relation that people are present, preferably at some fixed geographical location at predictable times (Kuusela 2016: 133). Good, stable personal relationships between local individuals and visiting traders from afar must have been an asset for both parties as well. In this context, the seasonal aggregation of a dispersed community in the context of long-distance trade must have facilitated the perfect setting for trade. This may be an additional explanation to why the alternating winter sites Steintjørna and Brodkorbneset were such fixed localities in such near proximity to each other for approximately two centuries. Hearth-row sites like Brodkorbneset and Steintjørna may even have achieved status as intra-regional trade hubs. Ornaments were transformed, produced, and possibly intended for geographically limited exchange/trade, and a similar explanation may apply to the large amount of cut pieces of copper alloy. Hearth-row sites such as Brodkorbneset and Steintjørna may have been the regional node in long-distance trade, and part of the reason for the continued use of the site(s) could have been their successful function as 'open gateway societies' for trade and exchange in the interior of Finnmark.

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A. Svestad, archaeologist, oral communication, November 2017

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Notes

1 Traditionally, adding copper (alloy) as a means to fit pieces of iron pieces before brazing was a technique applied to manufacturing small tools. Locksmiths, for instance, could make keys with this method (Tobiassen 1981: 62-63). Adding brazes of copper alloy in order to fit steel to iron in traditional blade manufacturing is a living tradition among smiths in Norway, although the practitioners of the art are few today. (Knivprat fra Per Thoresen). However, examples of blades made with this technique are unknown in the archaeological record of Northern Norway, and other possibilities, like fitting copper alloy to blades, axes etc. for decorative purposes have to be considered as an explanation for the composition of the slag from Steintjørna (cf. Bøckman 2007: 68; Grandin & Willim 2013: 24).

2 Further elaborations on this matter are to be expected. Other sites with slag in Northern Sweden are currently being studied in the major cross-disciplinary research project "Järn i Norr" (Iron in the North,) initiated in 2016 by the Luleå University of Technology and the county museum of Norrbotten (Bennerhag 2017).

3 The reasons behind a decision to re-bury the blessings from a test pit might need clarification. Of course, the motive to investigate one of the houses with a test pit was reasonable enough. There was a need to clarify if these ephemeral features really represent houses or other fabricated structures rather than being products of natural processes, like tree windfalls etc., and if the former assumption is correct, how old are they? The test pit produced a relatively certain affirmation that these structures represent houses of a hitherto unknown type in interior Finnmark dated to the 11th–12th centuries. However, the project management realized too late that the permit to excavate did not include test pitting at this particular site. According to the Norwegian Cultural Heritage Act, any physical intrusion in a protected site is prohibited unless legal permission is acquired in advance. The solution to this conundrum was to replace the artefact as careful as possible, and cover it beneath soil and turf. The plan was to sort out the formalities in dialogue with the proper authorities, and then acquire the necessary permits and funds to a future excavation. Sadly, Sven-Donald's illness and death naturally ended these plans.

4 This stray find is peripheral to the discussion of the fragmented ornaments found at Steintjørna but it represents a group of ornaments of eastern origin in the interior of southern Norway, which certainly brings interesting perspectives to the interpretation of early southern Sámi history and associated sites in the area. Among sites discussed in this connection is the southernmost hearth-row site on the shore of Lake Aursjøen, Lesja municipality (Gjerde 2010: 56–57).

5 In the figure of the two zoomorphic pendants referred to here, the references to the respective catalogue numbers are mixed up (Storli 1991: Fig 7).

6 A study of a particular group of bowls, somewhat inaccurately denominated 'Hanseschale' in traditional archaeological discourse displays a pattern of distribution that certainly indicates cross-Baltic exchange. (Müller 2006). A total of 13 bowls have been found in Southern Finland (Müller 2006: 329-30). The category is highly interesting to consider in the context of long-distance trade in copper alloy (vessels) to Northern Fennoscandia. However, engravings, which could affirm some of the sub-groups of bowls as the original object, have not been detected on the cut pieces of copper alloy at Brodkorbneset and Steintjørna. This would in any case hardly be possible for the plain-coppered undecorated variant of this category of the copper alloy vessels (cf. Müller 2006: 133). This category of vessels in therefore not discussed further in this paper.

7 Originally interpreted as a shaman's chain used in magical rites (De Capell Brooke 1827: 161) these artefacts has escaped archaeological attention until recently (Gjerde 2010; see however Reymert 1980: App. B II). This curious neglect can possibly be ascribed to the 'ethnographic' association of the chain, despite the fact that neither Nesheim (1963) nor Vorren (1965), both specialists in Sámi ethnography, failed to identify its eastern provenance or antiquity. More likely, the post-recovery history, nearly as interesting as the artefacts themselves, can be illuminating. After 138 years in the possession of the descendants of Arthur De Capell Brooke, Mr Sam Guinness donated the chain to Oslo University on behalf of the family in 1959 (Nesheim 1963: 143). Since then, its location has been the Sámi collection at Norsk folkemuseum – The Norwegian Museum of Cultural History, Oslo, hardly a place where Norwegian archaeologists directed their attention. In that regard, I confess I have not seen the artefacts myself, except from published illustrations and photographs (Norsk folkemuseum – Norwegian Museum of Cultural History.) Unfortunately, De Capell Brooke provided little information about the context of the artefacts, besides that a Sámi, probably a reindeer herder, found them in the mountain plateau of Finnmark. (De Capell Brooke 1827: 161). The presumption that this means somewhere in interior western Finnmark is admittedly uncertain and simply based on the fact that De Capell Brooke acquired the ornaments in the town of Hammerfest (De Capell Brooke 1827: 161).

The Faunal Remains from Two Hearth-Row Sites in Pasvik, Arctic Norway

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Abstract

At archaeological excavations of rectangular hearth-row sites in Pasvik, Arctic Norway, rich animal bone assemblages have been found that are dated to AD 1000–1350. Reindeer predominates among the represented species, followed by fish as the second most important category. Some bone elements of sheep have also been identified suggesting an early example of sheep herding. Indications of seasonality point to winter activities at these hearth-row sites.

1 Introduction

This paper presents some new results based on the faunal remains from two quite recently investigated hearth-row sites in Pasvik, Arctic Norway (Fig. 1). The specific features at these sites consist of large rectangular hearths organized in a linear pattern (Halinen et al. 2013; Hamari 1996; Hedman 2003; Hedman & Olsen 2009). Radiocarbon dating indicates that the hearths were constructed and used within the period AD 1000–1350 (Hedman et. al. 2015).

The hearth-row sites in the Pasvik area are unique with respect to their well-preserved faunal remains. The faunal material from the different hearths consists of more than 17,000 fragments with a total weight of 16 kg (table 1). This is no doubt a comparatively large assemblage within this corpus. The amount of faunal material found at Sámi sites is often very small due to poor preservation conditions for bone fragments in acid soil (Mulk 1994: 176; Sommerseth 2009: 256).

In contrast with most other contemporary sites, Brodtkorbneset and Steintjörna are rich in bone finds and there are also unburnt bone fragments in the faunal assemblages (Fig. 2). However, the vast majority of the fragments from both sites are burnt and mostly found within the hearths. The amount of bones from the separate hearths differs, from around 60 g to more than 7 kg. The bone fragments are consistently very small. This will, of course, limit the available

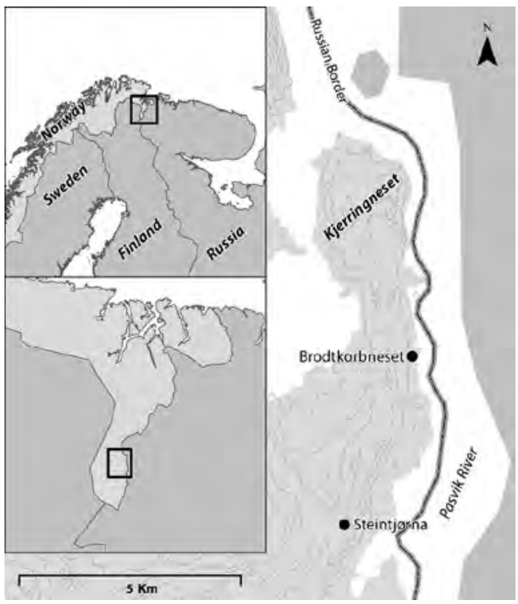

Figure 1. Location of the hearth-row sites in the Pasvik area. Map: Johan E. Arntzen.

Site	Hearth	Number of fragments	Total weight in gram
Brodtkorbneset	H1	141	59,2
Brodtkorbneset	H2	165	335,1
Brodtkorbneset	H3	5240	7604,0
Brodtkorbneset	H4	1369	563,5
Brodtkorbneset	H5	3447	2741,8
Brodtkorbneset	H6	546	311,1
Brodtkorbneset	H7	264	458,5
Steintjörna	H1	494	188,5
Steintjörna	H2	572	384,3
Steintjörna	H3	2254	2317,2
Steintjörna	H4	775	335,9
Steintjörna	H5	666	325,3
Steintjörna	H6	672	170,9
Steintjörna	H7	230	203,1
Steintjörna	H8	228	141,2
Total Sum		**17063 fragments**	**16139,6 gram**

Table 1. Amount of animal bone fragments in the different hearths at Brodtkorbneset and Steintjörna.

information. Still, data from the osteological analysis, such as abundance of different species, distribution of anatomical elements, age and gender assessment etc., provides useful contributions to discussion about subsistence and seasonality (Hedman et. al. 2015; Vretemark 2009; 2010; 2013a; 2014).

There is a clear predominance of reindeer in the assemblages from the hearths (Table 2). No less than 87 % of the identified fragments were identified as reindeer. The amount of fish bones are also quite impressive with a total of around 12 %. The remaining 1 % represents stray finds of birds and some fragments of artic fox, wolf and sheep/goat.

Figure 2. Well-preserved reindeer bone elements from hearth H3 at Brodtkorbneset. Photo: M. Vretemark.

2 Anatomical distribution of reindeer bones

The variation in occurrence of different bone elements in the hearths mirrors various activities that took place at the dwelling site. There are, however, problems in connection with the interpretation of the anatomical distribution because of several factors that will bias the results. Fragments from more compact bone elements will have a greater chance to be preserved than others and some bones are easier to identify because of their specific morphology or texture, for example cranial fragments or ribs.

The identified reindeer bones from the hearths at Steintjörna and Brodtkorbneset represent different parts of the carcass (Fig. 3). Bones from meaty parts as well as

	Brodtkorbneset							**Steintjörna**								
	H1	**H2**	**H3**	**H4**	**H5**	**H6**	**H7**	**H1**	**H2**	**H3**	**H4**	**H5**	**H6**	**H7**	**H8**	**Sum**
Reindeer *Rangifer tarandus*	82	70	1243	204	504	85	105	47	142	552	94	135	50	59	68	**3440**
Sheep/goat *Ovis/Capra*			17		1					1	1					**20**
Artic fox *Alopex lagopus*					7											**7**
Wolf *Canis lupus*					1											**1**
Wild duck *Anadinae*					1											**1**
Willow grouse *Lagopus lagopus*			1													**1**
Black grouse *Lyrurus tetrix*				1							1					**2**
Capercaillie *Tetrao urogallus*									1		1					**2**
Hazel grouse *Bonasa bonasia*										5						**5**
Common whitefish *Coregonus sp*			95	2	83	2			30	94	3	1	7			**317**
Grayling *Thymallus thymallus*			4	4	6											**14**
Salmon *Salmo salar*				1				1								**2**
Pike *Esox lucius*	6	2	13	1	32		3	2		20					2	**81**
Cod *Gadus morhua*				1	2											**3**
Carp fish *Cyprinidae sp*				1									1			**2**
Fish unspec.			7	14	41	2										**64**

Table 2. Number of identified bone fragment per species in the different hearths.

those from lean body parts were found in all hearths. There is a slightly smaller proportion of cranial fragments than would have been expected and parts of antler are notably quite few in number. The underrepresentation of skull fragments in the investigated hearths may be due to special treatment of the reindeer cranium in ritual uses. Faunal remains from offering or sacrificial sites, such as Unna Saiva in Swedish Lapland, have proved to be clearly dominated by reindeer cranial bones (Nyyssönen and Salmi 2013: 45; Serning 1956).

Phalanges and metapodia from the lower parts of the extremities are well represented in the hearths. This has also been noticed in previous analyses of contemporary sites (Magnell 2001). These are bones from lean body parts, but the content of fatty marrow would compensate for the lack of meat. What is known from ethnological documentation of traditional reindeer slaughter in the 18th and 19th centuries is that all parts, including meat, marrow and entrails, were taken care of and almost nothing was considered as useless waste (Drake 1918: 56-58).

The pattern of element distribution in the faunal assemblages from Steintjörna and Brodtkorbneset is very consistent with almost no difference between the hearths.

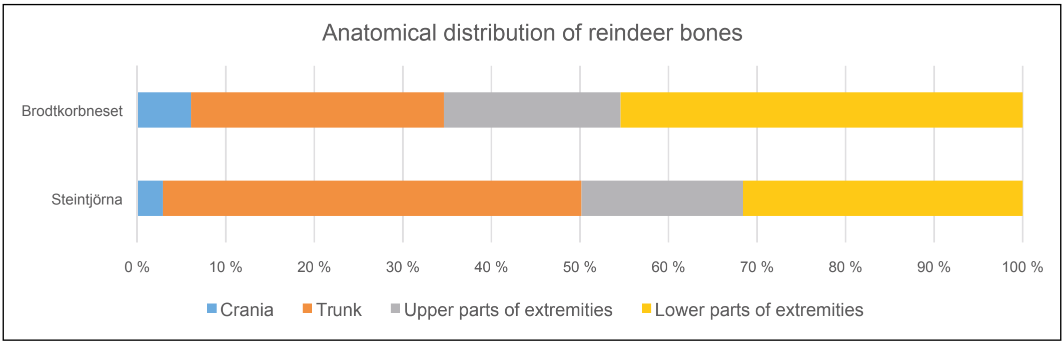

Figure 3. Anatomical distribution of reindeer bone fragments found at the hearth-row sites of Steintjörna and Brodtkorbneset (data from Vretemark 2009, 2010, 2013a and 2014).

Various activities in the process from the living animal to prepared pieces of meat were carried out at the dwelling sites. As is seems, the waste that ended up in the rectangular hearths was the result of similar acts and handling in connection with food preparation and consumption in the everyday life of these households.

The anatomical distribution pattern may to some degree mirror the relation between the slaughtering place and dwelling site in terms of distance. For practical reasons the weight was reduced as much as possible if the cuts had to be transported over a long distance. At dwelling sites at greater distances from the killing areas, the predominance of bones from meaty parts has been noticed while bones from less meaty parts such as metapodials or phalanges were clearly underrepresented (Binford 1978; Fossum 2006: 66). In reindeer bone assemblages from medieval professional mass hunts in Southern Norway it is obvious that the meat-producing parts of the carcasses were defleshed and that the heavy bones were left at the slaughtering sites in the mountains to facilitate long-distance transport (Indrelid 2013:67). This was not the case at Steintjörna or Brodtkorbneset. At these sites the anatomical distribution points of slaughtering activities were closer to the dwelling sites. The place for killing or slaughtering the reindeer and dismembering the carcasses appears to have been not too far away since even heavy bones such the thighbone or shinbone are well represented, along with bones from body parts with less meat.

3 Age and gender assessment of reindeer bones

Due to the often highly fragmented condition of the faunal material in Sámi hearths, observations of age and sex assessment are normally very few, if any (Hedman 2003: 190). Discussion about the age profile and proportions of male and female reindeer among the slaughtered or hunted animals will consequently be based on a rather small body of data. The hearths from Steintjörna and Brodtkorbneset however have contributed with a comparably large number of observations concerning age, but less when it comes to gender assessment.

There is without any question a clear predominance of mature reindeer. Based on observations on epiphysis status in the long bones it is clear that 70 –80 % were at least 4 years old when killed. A little over 60 % were even 5 years or older (Fig. 4). Only a few per cent were less than 1.5 years of age and there was a total absence of very young calves.

The question is what such a killing strategy represents – the hunting of wild reindeer or slaughtering within reindeer herding? The predominance of adult animals may indicate hunting as the hunters would aim for the

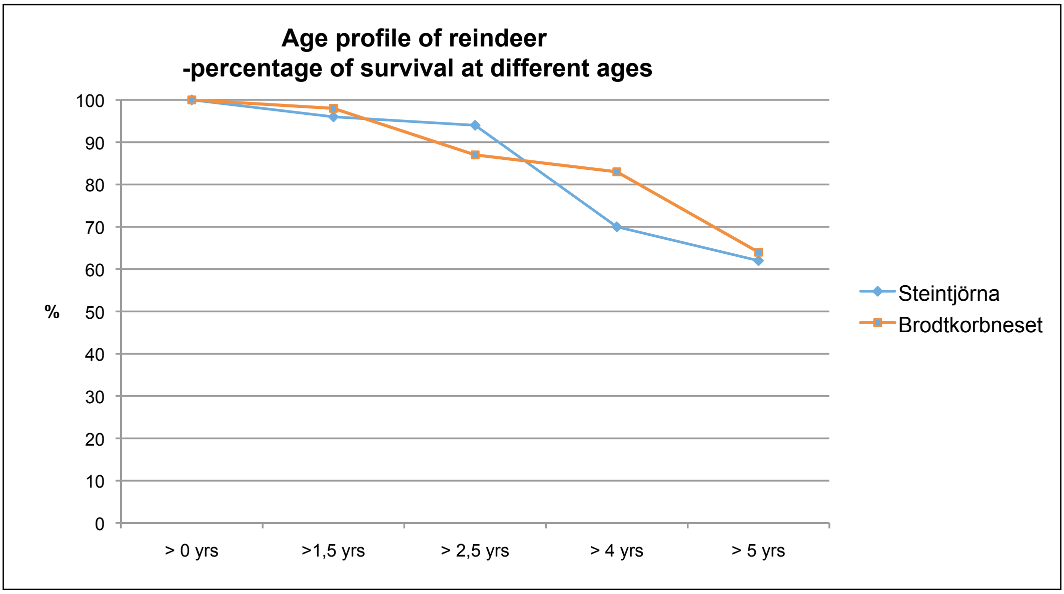

Figure 4. Kill-off rate of reindeer. At 5 years there is a survival percentage of little more than 60 %. Consequently, only 40 % of the reindeer turned out to be younger than 5 years when slaughtered or killed. The majority were older.

adult animals with the highest yield of meat. But it is more complicated than that. Documentation of traditional reindeer herding from the 18th and 19th centuries describes a cropping strategy with essentially the same pattern among Sámi groups in the northern parts of Sweden. They had small herds of only 10-15 animals. Normally 3 to 5 fully grown males were slaughtered in the autumn, sometimes also an older female (Drake 1918: 55-56). This information is supported by the results of an osteological investigation of faunal material found at Silbojokk near Arjeplog in Sweden and dated to the 17th century. A total of 160 kg of mostly unburnt bones were found at the site and the majority of them were of reindeer (Sten 1984: 3; 1989: 168). The age profile of the Silbojokk reindeer displays exactly the same pattern as the data from the considerably smaller and older faunal material from the rectangular hearths of Steintjörna and Brodtkorbneset; only a few juvenile individuals with around 90 % of the reindeer older than 2 years and 70 % over 4 years (Sten 1989: 173). The settlement at Silbojokk was not a Sámi dwelling site but instead a silver mine area run by the Swedish crown, but the local Sámi population became highly involved in transportation activities, as workers and not least in food supply. The reindeer bone elements found in the waste heaps at Silbojokk most probably reflect the outcome of the reindeer economy and the cropping strategy of local reindeer herding in Early Modern Times. The same pattern of age profile is also confirmed in late medieval and Early Modern faunal material from other Sámi contexts in the Arjeplog area along the Lule River when reindeer herding had definitely been established (Vretemark 2013b). The predominance of adult reindeer in a body of a faunal material is thus obviously not a strong indication of reindeer hunting, and neither is the absence or low proportion of very young calves. To conclude, the age and sex assessments displayed in the faunal material from the hearths, might just as well reflect small-scale reindeer herding. The cropping strategy would in that case include a yearly slaughtering of a few fully grown male reindeer, including the surplus of younger male individuals of aged 2 –4 years. The females would normally be kept longer and slaughtered at higher ages.

4 The importance of fishing

The substantial amount of fish bones in the hearths reveals the importance of fishing in food subsistence at Steintjörna and Brodtkorbneset. Six different fish species were identified in the assemblage. Common whitefish were most numerous, represented by a great number of bone fragments from vertebrae and the cranium. Fresh whitefish was probably brought to the site, prepared and consumed. Pike was the second most important fish species. Their size varied but most of them were 50–60 cm length.

The other fish species found in the assemblages; salmon, grayling and some carp fish were of minor importance in comparison with common whitefish and pike. They could have been caught in nearby waters but not necessarily. Some fish might just as well have been included in food storage prepared elsewhere. The number is too small to reveal any pattern.

In addition, cod was also found and this is the only undisputable indication of sea fishing activities. The finds of cod bones at Brodtkorbneset suggest costal contacts. Groups of people could have moved seasonally between different areas to exploit a variety of resources, or the cod may simply have belonged to exchange goods.

With the exception of cod, the list of species reflects fishing in freshwater lakes and flowing rivers. Given the fact that fish always will be underestimated compared to bones from larger species, the amount of fish bones stresses the importance of fish as a vital food resource at these dwelling sites.

The normal method of fish conservation was drying. Pike and other fish were split up in order to speed the drying process by making the fish thinner and increasing the area exposed to the air. Drying as a food preservation technique could be used for all kind of fish that was to be stored, even for a long time. It also facilitated transport since the dried fish lost a great deal of weight from the reduction of water content. It is plausible that food preparation to fill the winter stores with dried fish took place here at Steintjörna and Brodtkorbneset.

5 Bird hunting

The bird finds consist with one exception of different species of forest hen, more precisely willow grouse, black grouse, hazel grouse and capercaillie. These are birds available throughout all seasons and they could be hunted most preferably in the forest zone. Apart from them, only one duck bone was found, the species of which is impossible to identify.

Bird hunting evidently played a part in subsistence and the species represented in the hearths reflect the seasonality of the hunt. The hunting of sedentary forest birds such as different grouse and capercaillie took place on a regular basis as can be seen from a number of bones in the faunal remains, especially at Steintjörna. Strong evidence for late autumn-winter occupation is provided by the almost total absence of summer birds except for a single find of a wing bone from a wild duck in hearth number 5 at Brodtkorbneset. Bones, however, could be kept for special reasons and may not automatically reflect seasonal occupation. Except for this duck bone, there were no other remains of migratory birds.

6 Signs of animal husbandry

Bones from sheep/goat can be considered as undisputable signs of animal husbandry. A total of 20 such bone fragments were found in the hearths at both Brodtkorbneset and Steintjörna (Fig. 5) (Vretemark 2009; 2014). It is difficult to distinguish sheep from goat because the morphology of their skeletons is very similar. In those cases where clear species identification was possible it turned out

Figure 5. Bone elements from sheep, found in Brodtkorbneset hearth H3. Photo: M. Vretemark.

to be bones from sheep. Therefore, it is most plausible that all the small ruminant bones in the assemblages represent sheep.

The presence of sheep indicates that domesticates were actually part of animal exploitation systems very early in history in this part of northern Fennoscandia. One of the sheep bones from Brodtkorbneset has been radiocarbon dated to AD 990 –1155 (Niemi et al. 2013: 4). As it seems, the concept of animal husbandry was familiar to the inhabitants of the area already in early medieval times. In previous investigations concerning medieval Finnmark, bones of sheep/ goat have been noted at least from the 14th century (Amundsen 2011) and are well recorded from late medieval sites and onwards (Odner 1992). The sheep bone finds from Brodtkorbneset and Steintjörna obviously predate the possibility of herding in this area.

Even a minor level of sheep farming would have enabled a steady food supply but it also meant that life had to adapt to this situation, otherwise the sheep could not survive. The presence of domesticates no doubt led to a demand for grazing areas with grass and leaves, as well as needs for shelter and winter fodder.

The anatomical distribution of the sheep bones found in the hearths indicates that the animals were slaughtered at the dwelling site. However, it is not beyond doubt that sheep farming was practised by the very groups using the hearths. Living sheep may have been traded and brought to the site as part of exchange goods. Nonetheless, it is tempting to consider the sheep bones as signs of early low-scale sheep herding in this part of Finnmark.

7 The question of seasonality

An important issue to address is the question of seasonality, i.e. when the hearths were in use according to the evidence provided by the faunal remains. Since food was preserved for winter storage, the hunting or fishing season did not necessarily have to be equivalent to the time of consumption. This is important to bear in mind when interpreting seasonality on basis of species occurrence. Sometimes the absence of species will tell more in this matter than their presence.

The vast majority of the bone assemblages represents reindeer. Despite the identification of hundreds of reindeer fragments, not a single bone from very young calves was found. Even if individuals of this age category were not normally slaughtered. some bones from suckling calves could have ended up in the refuse if breeding female reindeer were around. Their absence points to a dwelling period in autumn, winter or early spring. It is consistent with the seasonal indications given by the bird bones as mentioned earlier.

Other signs of hunting activities were the bones of wolf and artic fox found at Brodtkorbneset. These animals were present throughout the year but were preferably hunted in the winter season since their winter fur is of far better quality than the summer fur.

When all the faunal evidence is considered, the use of the hearths in the late autumn and winter half of the year seems most likely.

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Liva 1 – The First Medieval Sámi Site with Rectangular Hearths in Murmansk Oblast (Russia)

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Abstract

In 2017–2018, the Kola Archaeological Expedition of the Institute of the History of Material Culture (IHMC) RAS carried out excavations at the medieval site of Liva 1 (a hearth-row site) in the Kovdor District of Murmansk Oblast. Sites of this type are fairly well studied in the western part of Sapmi – the area inhabited by the Sámi – but until now they have not been known in Russia. The site was found by local residents in 2010. Some of the structures there were destroyed or damaged when searching for artefacts with a metal detector. A total of nine archaeological structures have been discovered (7 rectangular stone hearths, 1 mound, 1 large pit). Four hearths were excavated. They are of rectangular shape, varying in size from 2.0 x 1.15 to 2.5 x 1.7 metres. The fireplaces are lined with large stone blocks in one course, and the central part is filled with small stones in 2–3 layers. Animal bones, occasionally forming concentrations, were found near the hearths. Throughout the area of the settlement, numerous iron objects (tools or their fragments) and bronzes were collected including ornaments made in manufacturing centres of Old Rus', Scandinavia and the Baltic countries. The settlement is dated with radiocarbon analysis and the typology of the ornaments to the 11^{th} – 14^{th} centuries.

1 Introduction

The Middle Ages are at present undoubtedly the archaeologically most poorly studied period in the history of North-Eastern Fennoscandia. The main reason for this situation lies in the scientific interests of the large number of researchers who carried out archaeological studies in Murmansk Oblast. B. Zemlyakov, N. Gurina and V. Shumkin concentrated primarily on studying the Stone Age. Other reasons include the geographical remoteness of this region, and hence inadequate interest in it among specialists and the absence of archaeologists in the scientific centres of Murmansk Oblast. In part, this situation was also due to the language barrier leading to poor knowledge of the antiquities of Western Fennoscandia and current problems of scientific research there. As a result, the territory of Murmansk Oblast and Northern Karelia appears as a huge blind spot with regard to medieval antiquities. Entire categories of archaeological sites which are well known west of the Russian border remain completely unstudied. Examples include the systems of trapping pits for hunting reindeer and European elk, Sámi settlements (including hearth-row sites), hoards and sacrificial sites. Of note is the history of the very first ar-

Figure 1. The distribution of rectangular hearths and the location of the Liva 1 site (based on Halinen 2016, fig. 4). Illustration: A. Murashkin.

chaeological finds on the Kola Peninsula, viz. the hoard found in 1888 in the region of the River Varzuga. Containing seven neck rings of the 10th – 13th centuries, this hoard was published over a century after its discovery (Goryunova & Ovsyannikov 2002). During the 20th century, some 30 archaeological sites of the medieval period have been discovered in the Kola Peninsula. A few of them were excavated and the results of only some excavations have been published (Gurina 1997: 127-128; Ovsyannikov 1985; Ovsyannikov & Ryabinin 1989; Shayakhmetova 1990: 37-38). In fact, we are now at the stage of the initial formation of the source base for studies of the Middle Ages of North-Eastern Fennoscandia.

In this article, we present the preliminary results of the investigation of the Liva 1 site situated in the south-west of Murmansk Oblast. These excavations were conducted in 2017–2018 and the fieldwork is planned to be completed in 2019. At this site, characteristic rectangular stone hearths were found ranged in a single row. Similar medieval sites are well-known in Northern Norway, Sweden and Finland being considered as the remains of the dwelling sites of Sámi reindeer hunters and/or herders (Halinen 2016; Halinen et al. 2013; Hedman 2003; Hedman & Olsen 2009).

2 The history of discovery and description of the structures

The first medieval metal objects were found in 2010 by local resident Dmitriy Pechkin using a metal detector. Even then, photographs of the artefacts, information on the site and the conditions of their discovery were communicated to V. Shumkin and A. Murashkin. Meanwhile, the character of the site remained unclear. In spring 2016, A. Murashkin accompanied by D. Pechkin visited the locality and revealed stone hearths. In August 2017, the topographical surveying of the site was conducted, as well as the description and photography of the revealed structures and excavation of hearth 4. In 2018, the excavation was continued and hearths 5–7 were investigated. In the course of the excavations, great attention was paid to searching for signs of constructions related to possible dwelling superstructures.

The Liva 1 site is in the Kovdor District of Murmansk Oblast, approximately 16 km

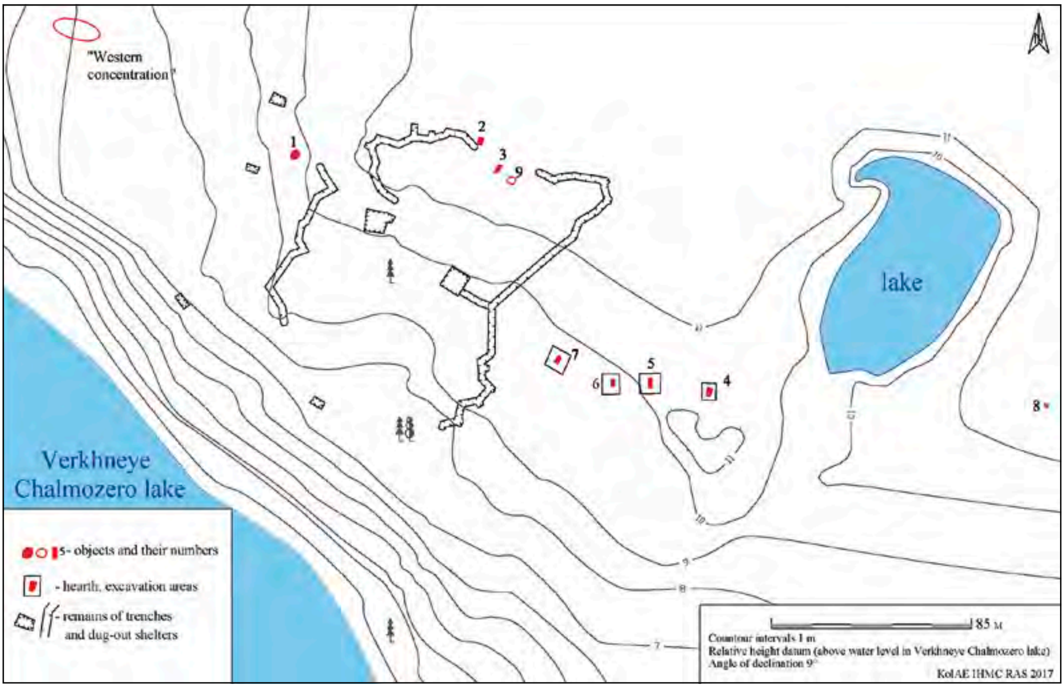

Figure 2. The Liva 1 site (Kovdor district, Murmansk oblast). Map: E. Kolpakov.

north of the village of Yona and 21 km to the west of the settlement of Avva-Guba, on the northern bank of Lake Verkhneye Chalmozero, on the left bank of the River Liva at its inflow into the lake (Fig. 1). Archaeological structures were revealed in the areas of the second and third terrace and the slope between them at an elevation of 9–11 metres above lake water level, 80–220 metres from the shoreline in the area between the left bank of the River Liva and a small lake without a name situated 300 metres from the river. A total of nine archaeological structures visible on the surface were revealed: seven fireplaces lined with stones (structures 2–8), one low mound of earth (structure 1) and a pit (structure 9). They were ranged in two lines running from west to east; structures 1, 4–8 were in the area of the second terrace and the slope of the third one, while structures 2–3, 9 were in the area of the third terrace (Fig. 2).

Also discovered in the area of the site were the remains of war-time shelters, dug-outs, trenches and pillboxes of a border strong-point of the 1930s–1940s. During their construction some of the archaeological structures may have been destroyed; the forest in this area then was cut down, and now young mixed forest is growing there.

The westernmost structure visible on the surface here is a low oval mound of earth (structure 1) measuring 2.8 x 2.2 metres and 0.2 metres in height. It is oriented from south-southwest to north-northeast on a gentle slope 85 metres to the north-east from the shoreline of Lake Verkhneye Chalmozero and 105 metres to the east from the river (Fig. 2). Structures 2 and 3 represent stone accumulations measuring 2 x 1.4 and 2.2 x 1 metres and up to 0.4 metres high. They are located on the flat surface of the third terrace. As it appears, they are the remains of hearths. According to information from D. Pechkin, both structures were dismantled and afterwards piled into heaps of stone. The ground around them was dug over with spade when the locals rummaged

Figure 3. The Liva 1 site. D. Pechkin and hearth 4 at the time of discovery. View from the north. Photo: A. Murashkin.

Structure	Dimensions before excavation (m)	Dimensions under excavation (m)	Orientation
Mound 1	2.8 x 2.2 x 0.2		NNE – SSW
Stone setting / hearth 2	2 x 1.4 x 0.4		N – S
Stone setting / hearth 3	2.2 x 1 x 0.4		N – S
Hearth 4	2.4 x 1.4 x 0.2	2.5 x 1.7 x 0.25	NNE – SSW
Hearth 5	2.8 x 1.2 x 0.2	2.15 x 1.1 x 0.1	N – S
Hearth 6	2.0 x 1.1 x 0.2	1.9 x 1.25 x 0.1	N – S
Hearth 7	2.8 x 1.2 x 0.1	2.8 x 1.4 x 0.2	NE – SW
Hearth 8	2.2 x 1.5 x 0.2		WNW – ESE

Table 1. The Liva 1 site, the dimensions and orientation of the structures.

there. Some of the lower stones possibly remained in their original position. Five metres to the east of structure 3 there is a rounded pit (structure 9) 2.3 metres in diameter and 0.3 metres deep, without any visible bank of spoil. The surface of the pit is covered with turf. Beginning in 2010, several dozen iron and bronze artefacts were found using a metal detector at structures 1–3 and in the adjoining area (see below).

Structures 4–8 are hearths of a rectangular shape constructed of stones. Prior to excavation they were discernible on the turf surface as flat rectangular or oval features measuring from 2.0 x 1.1 to 2.8 x 1.4 metres, and 0.1–0.2 metres high (Table 1). They were covered with turf and only occasionally large stones protruded from under them (Fig. 3). Fireplaces 4–7 are arranged in a flat area of the second terrace west of the unnamed lake.

Figure 4. The Liva 1 site. The area of hearth 7 under excavation. View from the south-west. Photo: E. Kolpakov.

Figure 5. The Liva 1 site. Hearth 7 excavated to the bottom. View from the south-east. Photo: E. Kolpakov.

Fireplace 8 is to the east of the latter. Most of the structures are oriented approximately along a line running north–south (Table 1).

Excavated hearths 4–7 are of similar construction. They have a rectangular form and dimensions from 2.0 x 1.15 metres to 2.5 x 1.7 metres being constructed from stone blocks measuring from 0.07 x 0.05 x 0.05 metres to 0.5 x 0.5 x 0.4 m. Around the perimeters of the hearths, large rounded boulders were laid; the space between the latter was filled with smaller stones laid in 2–3 courses. The largest, often flat, stone blocks were placed in the northern sections of the hearths; the southern parts of the latter were constructed mostly of smaller stones and the clear form of the outlines of the structures was sometimes disturbed here. The fireplaces were filled with compact grey-brown coarse sand mixed with gravel-sized particles from decomposed stones crushed by the effect of fire and numerous fragments of charcoal. In the centre of the fireplaces, the layer of the grey-brown sand sometimes formed baked dense lenses immediately beneath the turf and protruding above the stone setting. The same layer filled interstices between the stones and extended for 10–30 cm beyond the limits of the stone structures. Underneath the stones and a layer of whitish sand (*podzol*) in the central part of the fireplaces were found lenses of bright crimson sand – the calcined layer (Figs. 4-5). Hearth 5 differed from the other ones by the fact that its contours were not densely filled with small cobbles. Fireplace 6 was of a rectangular form with rounded corners; beneath the stones of the hearth and a layer of grey-brown sand there was a layer of buried turf. It appears that in the process of its use this fireplace was repaired several times, and sand was possibly poured into it.

Figure 6. The Liva 1 site. The bone concentration to the north of hearth 5. View from the north-west. Photo: E. Kolpakov.

3 Finds

Most of the artefacts found in the course of the excavations were inside the contours of the stone settings. They were deposited in the layer of grey-brown sand on the stones and between them. Beyond the limits of the hearths, the artefacts were found mostly at the contact layers between the turf and whitish sand (*podzol*) or in the upper section of the latter. Finds were completely lacking in the layer of the yellow-red sand. The area of the site was explored using a metal detector during the investigations. Several bronze and iron items were uncovered beyond the limits of the started excavations in a similar stratigraphical situation, i.e. immediately beneath the turf in the contact layer between the turf and whitish sand. Some artefacts were found near the revealed structures at a distance from 2 to 10 metres from them. An isolated concentration of finds ('Western concentration') was discovered at a considerable distance from the fireplaces, in the western section of the site, 30–35 metres to the east of the River Liva and 70 metres to the north from the lakeshore, in the area of the second terrace.

In the hearths and their immediate vicinity numerous bones of animals and fish were found; in some cases, the bones were deposited in compact concentrations. One of the latter, measuring 0.35 x 0.3 metres, was located 2.3 metres to the west of the north-western corner of fireplace 6 with the bones deposited in several layers. Another accumulation, measuring 1.3 x 0.5 metres, was 1.4 m north of hearth 5 (Fig. 6). Preliminarily, it may be noted that these accumulations included large numbers of splintered reindeer bones. Mostly calcined bones were found within the contours of the fireplaces.

Material	Excavation areas				Beyond the limits of the excavation areas	TOTAL
	Hearth 4	Hearth 5	Hearth 6	Hearth 7		
Bronze	22		44	3	5	74
Iron	36	3	18	3	11	71
Bone			2			2
Sandstone			1			1
Quartz		3	2			5
TOTAL	58	6	67	6	16	153

Table 2. The Liva 1 site, distribution of finds among the structures.

Among the 153 artefacts revealed in the excavations there were mostly bronze and iron objects; single examples are represented by artefacts of bone, quartz and sandstone (Table 2). It is of note that most of the finds were deposited in the northern section of the excavation areas. Most of the bronze objects are represented by small pieces of thin plate, often less than 1 mm thick with traces of cutting. Some of them have an edge coiled into a spiral of 2–3 turns and flattened; we are possibly dealing with fragments of a cut kettle. A number of tubular spacer-beads were made from sheets of this kind. The bronze flange of a knife handle (an oval plate with an elongated triangular slit) was found in hearth 4. The 'Western concentration' contained a round convex bronze brooch with an umbo-like protrusion and an accentuated edge along the perimeter decorated with four animal heads on long necks turned into a spiral (Fig. 10: 4) – Jansson's type IIC (Jansson 1984: 77).

The majority of the iron artefacts are small unidentifiable fragments, mostly poorly corroded. Of note is a group of elongated rods, most frequently square or rectangular (occasionally flattened) in cross-section, sometimes tapering towards one or two ends. Fragments of metal plates fastened together by such rods turned into rings presented in the assemblage. As it seems, they were used as fittings for fastening metal bindings and repair of bronze and wooden (?) objects. Individual iron artefacts are rare. Near hearth 4 were found a tanged arrowhead, a knife blade with a tang, a swivel and a binding (convex plate with a hole); near hearth 5 were found two fragments of knives; near hearth 6 a massive rod of quadrangular section (a punch ?) and a fragment of a knife; near hearth 7 were found an arrowhead fragment and a knife tang. The 'Western concentration' included a rivet, a binding, a mount (a convex plate with a hole and an S-shaped protrusion at one end).

The fragments of bone objects found near hearth 6 are bent small rods 5–7 mm in diameter. Near hearth 6 a tetrahedral whetstone from sandstone with strongly worn sides was found. Quartz flakes were found near hearths 5 and 6.

In 2011 and 2016, D. Pechkin handed over to us a large number of iron and bronze artefacts collected from the area of the site in 2010–2014 using a metal detector. During the visit in 2016, he showed the place where many of the artefacts were found. Judging from his information, most of the finds were collected from the western area of the locality near structures 1–3, to the south and east of them, near the trenches, dugouts and weapon emplacements (along with the medieval artefacts, objects dating from the period up to the 20th century were found here). Fireplaces 4–7 were discovered only during the visit in 2016; D. Pechkin had not noticed them earlier. These hearths were undisturbed and the finds were not collected from this part of the site.

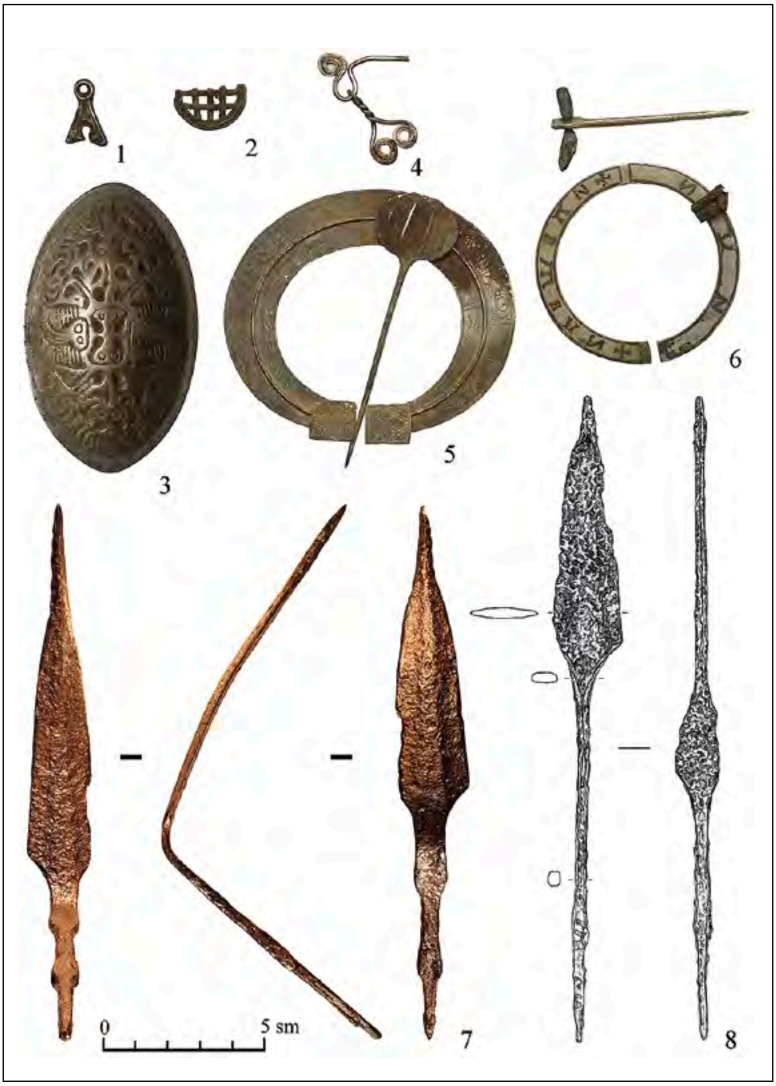

Figure 7. The Liva 1 site. Finds from structures 2 (4-8) and 3 (1-3): 1-2, 4 – pendants; 3 – tortoise brooch; 5 – penannular brooch; 6 – ring brooch with a pin; 7-8 – arrow heads. 1-6 – bronze/ copper alloy (?), 7-8 iron. Photo: D. Shakhirev, drawing: A. Malutina.

According to D. Pechkin's information, numerous fragments of a bronze kettle were uncovered in mound 1 (Fig. 8: 10-14); an iron axe with a wedge and a penannular brooch with faceted heads were found 7–8 metres south-west of the mound, near the breastwork of a semi-dugout (Fig. 8: 5-7). Several objects were found near hearth 2: two metres north of the hearth there was a twisted pendant of white metal together with a ring brooch bearing an imitation of an inscription; a flat penannular brooch with punched decoration was found 2 metres to the south; a socketed iron spearhead and an accumulation of rhomboid iron plaques were found 2–3 metres to the east; and on the breastwork of the trench two iron tanged arrowheads were found (Fig. 7: 4-8). A tortoise brooch was found between the stones of fireplace 3 and near the hearth there was the fragment of a bronze lattice pendant as well as a triangular pendant made from white metal with a rounded lug (Fig. 7: 1-3). To the south-west of fireplace 2 and the trench, within an area of about 20 x 10 metres extending along the trenches in the north-west – south-east direction there were finds consisting two fish hooks,

Figure 8. The Liva 1 site. Finds from the east and south parts of the site (1-4, 8-9) and from structure 1 (5, 6, 7, 10-14): 1-4 – blades (ornaments?); 5 – penannular brooch; 6 – wedge; 7 – axe; 8-9 – bent rods; 10-14 – fragments of cut kettle (?). 1-5, 10-14 – bronze/ copper alloy, 6-7, 8-9 – iron. Photo: D. Shakhirev.

a swivel, three knives, fragments of tools, rods, nails (Fig. 9: 1-9). On the slope of the terrace facing the lake one complete and two partly melted lead (?) weights (Fig. 10: 2-3) and two iron rods were found. In the eastern part of the site four bronze bindings, a plate with holes, rhomboid plates and an iron knife were discovered (Fig. 8: 1-4, 8-9; 10: 1, 5).

4 Dating

At the isotope centre of the Department of Geology and Geoecology of the Herzen State Pedagogical University (Russia) two radiocarbon dates were obtained from two samples of charcoal from hearth 4: 1498±25 BP (SPb-2407) and 934±25 BP (SPb-2408). The calibrated values (3σ) for the first sam-

Figure 9. The Liva 1 site. Finds from the concentration to the south-west of hearth 2: 1-2 – fragments of tools; 3 – rod, 4 – nail; 5-7 – knives; 8-9 – fish hooks. 1-9 – iron. Photo: D. Shakhirev.

ple are: 437–445 AD (0.9%), 473–486 AD (2.0%), 535–636 AD (92.4%) and for the second sample the dates are (3σ) 1031–1158 AD (95.4%).

A detailed analysis of the chronology of the collected metal ornaments has not so far been conducted, therefore only general suggestions may be proposed concerning their dates. In the territories of Finland, the Baltic region and Karelia, the ring brooches of flattened cross-section, penannular brooches with faceted heads, tortoise brooches and lattice pendants are dated to the period from the 12th to the 14th century. (Bel'skiy 2012; Saksa 2010). The convex brooch with an umbo-like knob of Jansson's type IIC is datable to the Viking Age (not later than the 11th century) (Thunmark-Nylen 1998: 77).

In Finland, Sweden and Norway, series of radiocarbon dates have been obtained during investigations of the chronology of Sámi rectangular hearths from various samples (charcoal, animal bones). In Northern Sweden, rectangular hearths were used throughout the time span from 700 to 1600 AD, although the most of the dates belong to the period between 800 and 1300 AD (Hedman 2003: 133). In Finland the dates of the use of

Figure 10. The Liva 1 site. Artefacts found without connection with structures: 1 – belt stud; 2-3 –weights (one of them melted); 4 - round convex brooch; 5 – rhomboid blade (ornament?). 1, 4-5 - bronze/ copper alloy; 2-3 – lead (?). Photo: D. Shakhirev, E. Kolpakov.

these hearths are limited to the period 633–1669 AD but the most of them are within the span from 950 to 1270 AD. In Northern Norway, dates of 684–1285 AD were obtained (Halinen 2016: 164-165; Halinen et al. 2013: 156; Hedman & Olsen 2009: 10).

The age 1031–1158 AD (SPb-2408) correspond well to the period of the use of ornaments of non-ferrous metals found at the site, as well as C^{14} dates obtained for rectangular hearths in North-Western Fennoscandia. In all probability, the hearths at the Liva 1 site were built and used during the Early Middle Ages (11th–14th centuries).

5 Concluding remarks

Research concerning the Liva 1 site has only begun, but even now some conclusions are possible. Firstly, Eastern Fennoscandia is to be included in the area of distribution of Sámi hearth-row sites. A preliminary analysis of the results of the excavations at Liva 1 suggests its similarity or even identity with hearth sites of North-Western Fennoscandia and enables us to consider them in a single context.

One of the most important questions that we tried to answer in the course of these excavations was concerned with the character of the dwellings constructed over the hearths. The very size of these fireplaces suggests the existence of some kind of superstructure. In order to search for traces of wooden structures, post holes and other architectural details, excavations over a large area were begun but no traces of huts were found. We have to agree with the conclusions of our colleagues about the use of light portable dwellings of the *chum* type (*lavvu/goahti*) leaving no observable traces (Hedman & Olsen 2009: 14). The arrangement of hearth-row sites in a forest at a distance from large water basins and considering also the winter character of the settlements suggests, in the opinion of many authors, reindeer hunting and small-scale herding as the basis of the economy of the population (Halinen 2016: 168-170; Halinen et al. 2013: 170-173; Hedman & Olsen 2009: 15). Concerning the Liva 1 site, it is only after the osteological analysis of the retrieved bones that there will be grounds to confirm this conclusion.

The assemblage of metal artefacts from Liva 1 is at present the richest collection from the medieval sites of North-Eastern Fennoscandia. Unfortunately, most of this collection has been obtained through gathering with the use of a metal detector without proper documentation. Therefore, information about their relative positions should be regarded with great caution. However, the composition of the finds clearly suggests analogies with sites in Sweden and Norway. Arrowheads found at Liva 1 have direct parallels among arrowheads of Wegraeus's (1973) types B and C from the Östra Kikkejaure district (Hedman 2003, fig. 6: 5-6). The axe is similar to the one found at the site of Njallejaur 19 (Hedman 2003, fig. 6: 25). The iron tools, bronze and silver ornaments came to Northern Fennoscandia through trade with manufacturing centres in Old Rus', Scandinavia and the Baltic countries. The participation of the Sámi in trade with the Russians and Scandinavians is suggested by the weights discovered at the Liva 1 site. Similar lead weights were found at the Rebrauralven 1 site (Hedman 2003, fig. 6: 1).

By now, Liva 1 is the only hearth-row site known east of the Russian-Finnish border. However, the similarity of the geographic conditions, economy and culture of the medieval population of this region allows us to anticipate in future the discovery of similar sites in the territory of Murmansk Oblast and Northern Karelia.

Acknowledgements

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Gollevarre Revisited – Reindeer, Domestication and Pastoral Transformation

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Abstract

The Gollevarre complex near the River Tana in Finnmark, Norway, consists of 2,685 pitfalls and a campsite with the remains of 16 turf dwellings, all dated to the period 1200–1650 CE. The enormous amount of reindeer bones at the campsite testifies to both large-scale hunting and production of bone artefacts for a market. Why did this activity end and did its termination have any connection with pastoral development which took place at the same time? These questions were addressed through an expedition to Gollevarre by the archaeologists Sven Donald Hedman and Bjørnar Olsen, the biologist Knut Røed and the anthropologist Ivar Bjørklund. With the aid of 281 DNA samples from Gollevarre and other sites in Finnmark, we concluded that a) the emergence of pastoralism did not depend on the domestication of wild reindeer, since b) there were no genetic relations between the old stock of wild reindeer and the current stock of domesticated reindeer. Thus, the emergence of pastoralism in the 17th century seemed to be the result of the import of domesticated animals. Alternatively, but so far without DNA-proven facts, the current stock might reflect an old, but small, population of domesticated reindeer kept for transport purposes.

1 Introduction

In August 2014 Sven-Donald Hedman, Knut Røed, Bjørnar Olsen and the present author took off in a helicopter heading for a Sámi archaeological site called Gollevarre known for its old dwelling sites and numerous pitfalls for hunting wild reindeer (Fig.1). Being the archaeological part of our expedition, Sven-Donald and Bjørnar knew the site well. Knut has his background in DNA analyses of reindeer among other species, and as a social anthropologist I have myself an interest in reindeer pastoralism. With this background, we thought the four of us would provide a potent approach to understanding more of the story behind the Gollevarre site and the questions that it poses.

2 The Gollevarre site

The Gollevarre complex lies on the isthmus between the Tana River in the west and the Varanger Fiord in the east (Fig. 2). It consists of no less than 2,685 pitfalls organized in 14 different systems and a camp site with the remains of 16 turf dwellings, all of which are dated to the period from 1200 to 1650 CE. The pitfalls have been described by Vorren (1998) and some excavations of the dwellings took place in 1965 and 1966 (Munch & Munch 1998). The excavations revealed quite a few items related to the hunting of wild reindeer which must have taken place by means of the pitfall systems in the vicinity. Most important, there was an enormous amount of bones close to the dwellings, mainly skulls with the lower part of the ant-

Figure 1. Off to Gollevarre: From the left, Knut Røed, Sven Donald Hedman, Ivar Bjørklund. Photo: Ivar Bjørklund.

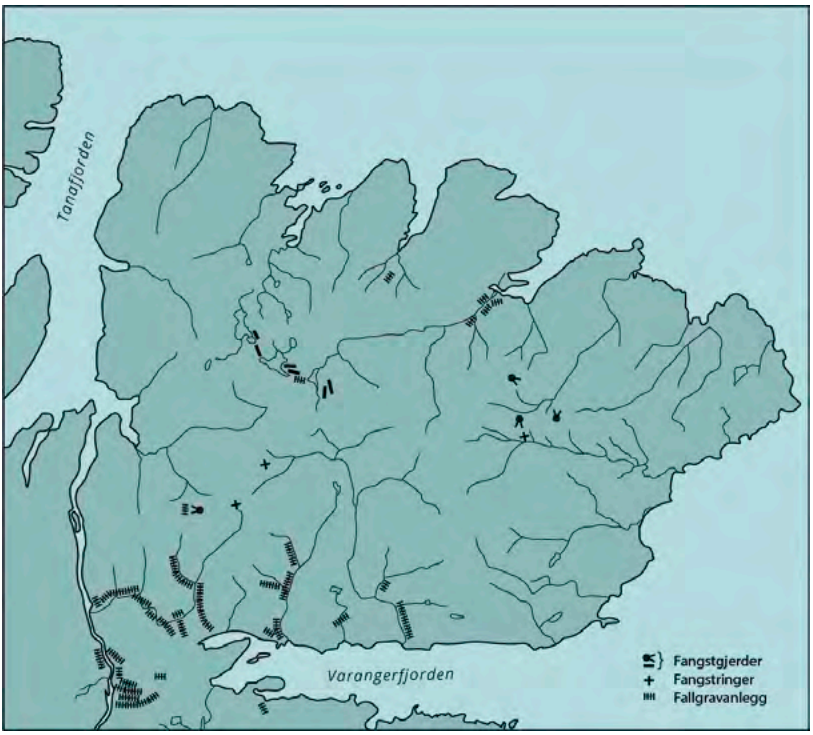

Figure 2. Map of the Gollevarre area. Drawing: Ernst Høgtun, Tromsø Museum - Universitetsmuseet.

Figure 3. One of the 2,685 pitfalls in the Gollevarre complex. Photo: Ivar Bjørklund.

lers – the upper part being chopped off. In the actual dwellings, finds consisted of the remains of knives, spears, arrow heads and honing stones. In particular, semi-finished spoons of antler were found, which together with quite a few knives indicated a local production of spoons and other items of antler. Due to the large number of processed skulls in the area, this was probably important production meant for a market (Vorren 1998: 127).

Vorren dated a handful of samples by ^{14}C and we dated a few more. Our results confirmed his assumption that this particular site had been in use for at least four hundred years, from 1200 to 1650 CE. The excavations suggested that it had been in more or less continuous use and the context made it obvious that hunting for wild reindeer was the sole reason for the camp. The pitfalls and the finds were indications of how the reindeer were caught and to some extent of how they were processed (Fig. 3). The ^{14}C dating indicated when these activities ended. In other words, we were facing the end of a very old type of resource extraction which had been of the uttermost importance for thousands of years as for instance documented by the rock carvings at Alta (Helskog 2012). The obvious questions then, became a) why did it end and b) is there any connection between this termination and the incipient pastoral development which took place in the greater area? The ultimate issue then, is the quest for the societal and economic context of the activities at Gollevarre and the kind of transformation which brought about its end, not only at Gollevarre but in the whole region of Finnmark.

As we know, the time of the youngest dated samples from this hunting site, 1600–1650 CE, is also the time when the first written sources tell about a new kind of activity, namely herds of domesticated reindeer being moved from the inland to the coast. The first reports are complaints in 1625 from Norwe-

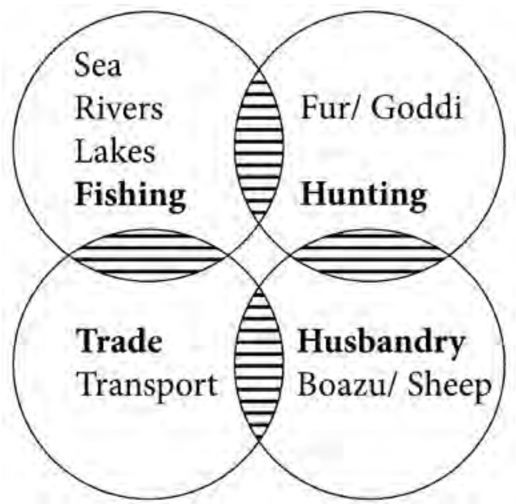

Figure 4. Multifaceted household adaption. Drawing: Ernst Høgtun, Tromsø Museum – Universitetsmuseet.

gians living in the coastal area of Varanger, claiming that "Sámi from the mountains" move their herds across the hay fields belonging to settlers and thus damaging their income (Niemi 1983: 186). Similar complaints multiplied all over Finnmark towards the end of the century and into the next and bear witness to the fact that reindeer pastoralism was becoming an important adaptation in the region.

3 The development of reindeer husbandry

Questions like those above bring us straight into the old debate regarding the development of reindeer husbandry in northern Fennoscandia. This debate unfortunately, has not always made a distinction between 'husbandry' and 'pastoralism', the latter being used synonymously for any kind of reindeer husbandry (Andersen 2008; Hedman 2005; Storli 1993). These authors have dated the emergence of pastoralism to the Viking Age, i.e. 800–1000 CE, referring to the information given by the Norwegian chieftain Ottar, pollen analyses or excavations of the so-called Stallo dwellings. Others have pinpointed pastoral development to the sixteenth or seventeenth centuries (Hansen & Olsen 2004; Mulk 1994; Vorren 1973). Common to both theories – whether reindeer husbandry is dated to 1000 CE or 1600 CE – is the idea that the development of pastoralism marked a profound change in Sámi culture and became a main strategy in their economic adaptation.

But instead of accepting a priori the idea of paradigmatic changes, it is better to take a closer look at the sources and see what information they can give us regarding the relations between humans and reindeer through time. The earliest references are given by the Norwegian chieftain Ottar when he visited King Alfred the Great in England in 890. Ottar gave the court a description of his travels in the northern parts of Fennoscandia and explained that he was in the possession of 600 'unsold' and 6 'tame' reindeer (Bately & Englert 2007). The first 600 were probably his food and trade supply, but the remaining 6 are now understood as draught animals kept at the farm all year around (Sámi: *hearggit*). In other words, domesticated reindeer were a fact at the time and had probably been so for a long time due to their necessity for trade and communication in the north.

According to Ottar, these domesticated animals, *boazu* as they are called in the Sámi language, made it possible to hunt *goddi*, the wild reindeer. These two nouns are proto-Sámi words, thus reflecting the coexistence of domestic and wild reindeer back to 1000–1500 BCE (Aikio 2006). The two terms refer to differences both in appearance and behaviour (Turi 2011 [1910]: 63). As documented in rock carvings, ancient pitfalls (e.g. Gollevarre), and written sources, hunting for the wild reindeer, *goddi*, was an important part of the Sámi means of livelihood up to the last couple of centuries (Bær 1926; Leem 1975 (1767)). Boazu, on the other hand, is the domesticated animal, the one used for domestic purposes such as transportation. Accordingly, domesticated reindeer were probably part of human adaptation in Northern Fennoscandia at least as far back as 1500 BCE, as documented by the archaeological remains

Figure 5. At the Gollevarre camp site. From the left, Sven Donald Hedman, Bjørnar Olsen and Knut Røed. Photo: Ivar Bjørklund.

of a Sámi type of sledge (*geris*) found at Ostrov Bolshoi Olenii in the Murmansk Fiord (Murashkin et al. 2016).

4 Hunting for a market

Ottar refers to the Sámi as hunters and fishermen along the coast who live and hunt in the mountains and fish in the sea in the summer. This is similar to the first descriptions which appear in written sources seven hundred years later (Anonymous 1895 [c.1580]; Schefferus 1956 [1673]). We are faced with household-based adaptions depending on multiple resources over a large area, in which reindeer hunting, fishing and husbandry alike played important roles (Bjørklund 2013; Hedman & Olsen 2009) (Fig. 4). In some areas like Varanger, sheep and goats were also part of this multitude of resource adaptations (Odner 1992). People were embedded in a network of markets and tax and barter relations where fur, reindeer skin, bone products, fish, meat etc. were exchanged for cloth, pewter, iron and copper kettles, knives, axes, rope and many other household necessities (Hansen 1984). Most important, their need for food and clothing could not be sustained by means of a domestic herd of draught animals alone, which probably never exceeded 20–30 reindeer (Bjørklund 2013). They had to rely on hunting wild reindeer to survive. First and foremost the outcome gave them food and reindeer skins needed for domestic purposes. But the large number of pitfalls, antlers and bone products at the camp site of Gollevarre, are evidence of the fact that they were also involved in markets and trade. Given the large herds of wild reindeer, they must have caught more animals than were needed for local consumption. It is this market opportunity which gives us the explanation behind the large pitfall complexes in Finnmark and elsewhere. Fur, processed meat (smoked or salted), clothing of hides, tools, combs and spoons, and glue made of bones were all-important trade items (Hansen 1984; Vorren 1998).

This multitude of economic relations cannot be defined as pastoralism in any way. The latter implies a group of people being dependent on a herd of domesticated animals for their main subsistence and this was not the case as long as this multifaceted adaption existed. But the dating of the artefacts from Gollevarre and the statement by Chancellor Niels Knag in 1694 about the termination of trapping activities[1], make it clear that this adaptation had come to an end around 1650. Most authors have explained this termination with a reduced number of wild reindeer, pointing to taxation, intensive hunting and the introduction of firearms (Vorren 1973). Others have argued that the development of local hierarchies led to the ownership of reindeer and corrals and thus favoured a pastoral economy (Hansen & Olsen 2004: 212-214).

5 The emergence of pastoralism and the genetic paradox

What we do know from contemporary sources is that reindeer pastoralism was now becoming important among the Sámi all over Finnmark. Obviously, this transformation reflects existing biological and topographic knowledge among the Sámi involved, but was this such a paradigmatic and profound change as some authors have argued? We have to bear in mind the deep experience-based knowledge which the Sámi had accumulated regarding reindeer over a very long time, both due to the keeping of the tame *boazu* for domestic purposes and the hunting of the wild *goddi*.

Furthermore, could the particular case of Gollevarre shed light on the old debate regarding the origin and explanation behind domestication processes? One theory points to the demographic diffusion of domesticated species from certain core areas (Clutton-Brock 1999). But it is also well-known that domestication took place in different areas independent from each other (Larson et al. 2005). This again, raises the question whether the spread of domestication first and foremost involved the diffusion of husbandry techniques, making it possible for people to domesticate local stocks of wild animals (Vorren 1973).

Addressing these questions, the four of us who took part in this above-mentioned excursion to Gollevarre, had the possibility to draw on Knut Røed's capability in DNA analyses (Fig.5). By use of mitochondrial DNA (mtDNA) as a genetic marker, Knut and his team has studied the genetic impact of domestication processes and documented how a greater amount of genetic diversity had come about through the fusion of maternal lineages with different origins (Røed et al. 2008). They have furthermore studied reindeer bones from the Stone and Iron Age in Finnmark, revealing a 'complete absence of mtDNA haplotype clusters that were typical of extant domestic herds in the region' (Bjørnstad et al. 2012). The argument was that this reflected a distinct haplotype shift in late medieval times and proved that the contemporary domesticated reindeer population in Finnmark is not related to the earlier populations of wild reindeer. According to their conclusions at the time, the present population must have arrived from outside Fennoscandia.

In our approach, we presented DNA analyses of a much larger set of bone samples from archaeological sites than were available in the above studies listed above. Altogether 281 samples were used in our study, including the previously published archaeological, museum and extant samples from the Finnmark region (Røed et al. 2018). We thus had a more accurate chronology regarding the above cited haplotype shift. The DNA analyses confirmed that 'the mitochondrial genome in Finnmark reindeer underwent a massive genetic replacement since the medieval period, characterized by a significant loss of historically native haplotypes, together with the significant introduction of new ones' (Røed et al. 2018). In other words, there were no genetic relations between the old stock of wild reindeer, the *goddi*, and the current herds of domesticated reindeer, the *boazu*.

These finds invite two kinds of explanation. The first – and the one so far with the strongest support – is that non-native reindeer were introduced during a relatively brief period spanning the 16th and 17th centuries and formed the basis for a pastoral transition. We know that such massive import took place further east on the Kola Peninsula in the late 19th century, when Komi herders brought thousands of reindeer across the White Sea. However, there is no historical or folkloristic evidence of such an import to Finnmark during the period in question. It is fair to assume that such an event, which must have had profound consequences for the Sámi societies at the time, would have been memorized one way or the other. Therefore, a more gradual introduction through trade and barter in the middle ages might be a more reliable explanation for the possible origin of these non-local reindeer.

A second theory could be that these 'non-native genetic signatures' reflect an old, but small population of domesticated animals kept for transport and other domestic purposes. That would imply that this domestic stock must have been kept for a very long time under strict control to maintain their genetic integrity, not being able to mix with the maternal part of the wild reindeer population. We do know that such a controlled kind of management took place in other reindeer-dependent societies (Anderson et al. in press). As for Varanger, we should also bear in mind the statement from chancellor Hans Lillienskiold in 1698, writing that 'in the rutting season the male wild reindeer often breed with the domesticated ones (…) and their offspring represent the very best in endurance and strength'. This idea of controlled selection and culling is confirmed by Turi (2011 [1910]: 63) stating that catching wild reindeer calves was a good way to improve the breed of the domesticated herd. If these calves were male reindeer and the female calves were slaughtered, such a strategy would not leave any genetic markers in the domestic population, since the DNA markers that are used are only transmitted through maternal lineages. The same then goes for Lillienskiold's explicit mention of male wild reindeer.

So far, however, we do not have enough archaeological samples to support this explanation. Only the testing of more samples dated further back in time than those form Gollevarre, can indicate whether our current finds can be explained as an external import or a continuation of an old breed of domestic reindeer. Whatever explanation turns out to be correct, both theories bear witness to an indigenous creativity and competence which made the transition to pastoralism such a success.

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Notes

1 "The Sámi of Varanger gave the Chancellor (...) 9 live reindeer a year to be allowed to keep the pitfalls across the mountain between the Varanger Fiord and the Tana River and at Persfiord (…) These days they no longer maintain the pitfalls" (Nordnorske samlinger, bd. 1:21, my translation). In the original text, the word for "pitfalls" is "Reengarder", which could both refer to the pitfalls on the isthmus and the corrals located in the Varanger inland.

Inari Nukkumajoki 5, the Excavated History of a Sámi Winter Village

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Abstract

The excavation at Inari Nukkumajoki 5 was carried out in 2007 as part of the fieldwork of the project Home, Hearth and Household in the Circumpolar North (HHH). The main results of the excavation supported the earlier results of fieldwork at Nukkumajoki 2 in 1978–1985. The settlement is dated to the end of the 16th and the beginning of the 17th century. The main exploited animal at the site was reindeer that had been hunted but also domesticated on a minor scale. This study introduces an alternative interpretation to the discussion on the motivation of locations and the character of the sites at Nukkumajoki.

1 Introduction

The Nukkumajoki 5 (N5) site in in the municipality of Inari in Finnish Lapland (Fig. 1) is quite famous in the history of archaeology in Finland. It belongs to a chain of eight Sámi winter villages (Nukkumajoki 2-8, Lapinoja), which are located along and near the River Nukkumajoki, on both sides of the river (Carpelan 2003; Itkonen 1913). This narrow river flows towards Lake Inarijärvi in the north-east.

Extensive investigations of the Nukkumajoki sites were carried out in the 1970s and 1980s, while the latest excavation, at N5, took place in 2007. The largest excavations were conducted at Nukkumajoki 2 (N2) in 1978-1985 by Christian Carpelan, who has published their preliminary results (Carpelan 2003; Carpelan & Hicks 1995; Carpelan & Kankainen 1990; Carpelan & Lavento 1996; Carpelan et al. 1997). The final publication is still in progress. The results of the N5 excavation have previously been addressed only briefly (Halinen 2009; Halinen et al. 2013). On behalf of our research project (Home, Hearth and Household in the Circumpolar North, HHH), the present article tries to complement the lack of published results.

The Sámi winter villages form a coherent group of sites that are situated mainly in the northern part of Finnish Lapland, i.e. in the municipalities of Inari and Utsjoki, and have been dated from the 16^{th} to the 17^{th} century (Carpelan 2003:71). They have also been discovered in Näätämö, Sodankylä, Sompio Keminkylä and Kitka Siidas (Lapp Villages). The Lapp Villages are among the 16^{th}–18^{th} century historical villages of Sweden, Finland, Norway and Russia (see Wallerström 2017).

Site N5 was discovered in 1909 by Ilmari Itkonen, the son of a local clergyman who collected and recorded ethnographic and archaeological information regarding the parish of Inari (Carpelan 2003: 72; Itkonen 1913). The site consists of remains of several *goahtis* (8) (huts), fireplaces (7), and an oven (see Fig. 2). The most significant feature at the site is the linear organization of the structures. In this respect the organization resembles Árran (hearth-row) sites dating from the 8^{th} to the 14^{th} century in Northern Fennoscandia (Halinen et al. 2013; Hed-

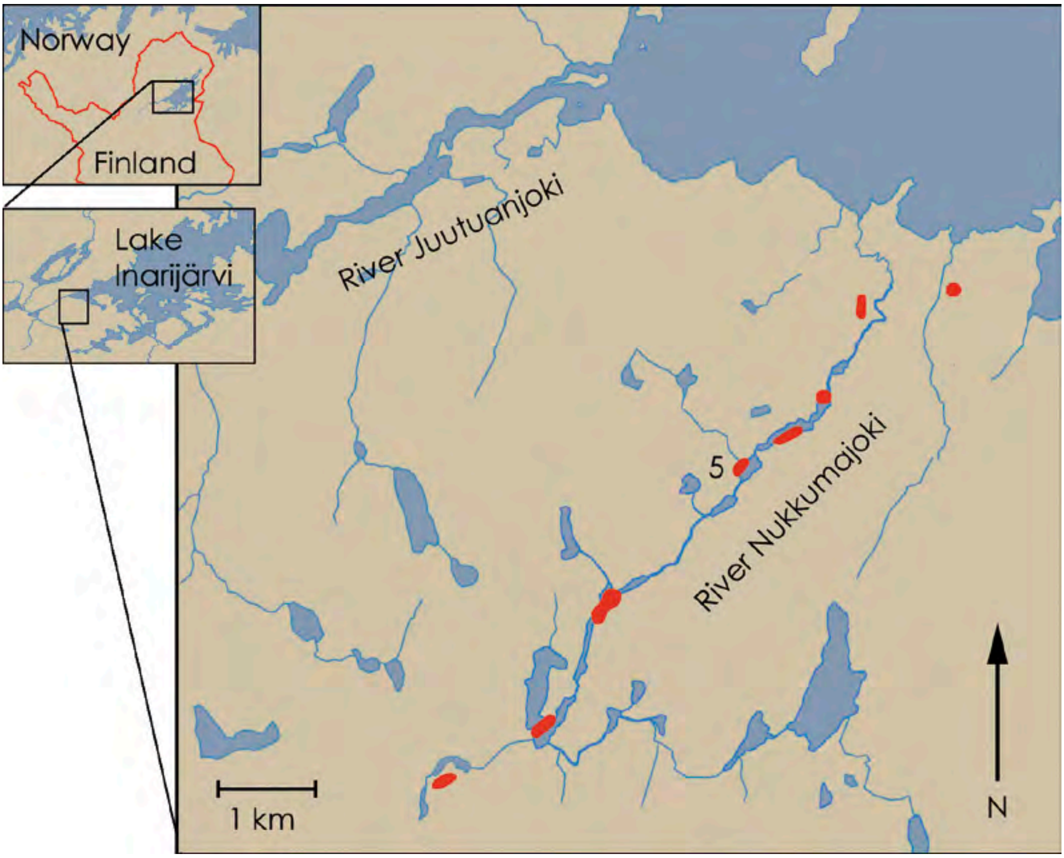


Figure 1. The location of the River Nukkumajoki sites, 5=Nukkumajoki 5 site, source: The Register of Ancient Monuments, The Finnish Heritage Agency. Drawing: T. Pirttimäki.

man 2003; Hedman et al. 2015; Hedman & Olsen 2009).

The site was mapped for the first time in 1913 by L. I. Itkonen, and he also excavated three goahti remains there (T.I. Itkonen 1948a: 199). Christian Carpelan mapped the site in 1981 and simultaneously conducted a trial excavation. The excavation conducted in 2007 by the author (Halinen 2007) concentrated on goahti no. 8 (original numbering according to Carpelan) and the surroundings.

2 Historical setting

The Sámi live in the northern parts of Fennoscandia, from Central Sweden and Norway to the Kola Peninsula. The Inari region has been an area, where the Inari, Skolt and North Sámi have lived in their own territories. The boundaries between these populations have most likely remained unchanged for a long time, including small and bigger changes over the course of time. In the 16th century the Inari region belonged to the Inari Lapp Village, which had almost the same boundaries as the present-day municipality of Inari. The siida (Lapp village) system was established during the 16th century, but its background probably lies in an older siida system, based on family territories. The centre of the siida and the Lapp village was the winter village, where people, families and extended families gathered to spend time together in the winter and then dispersed into smaller groups for the snowless time of the year inside the

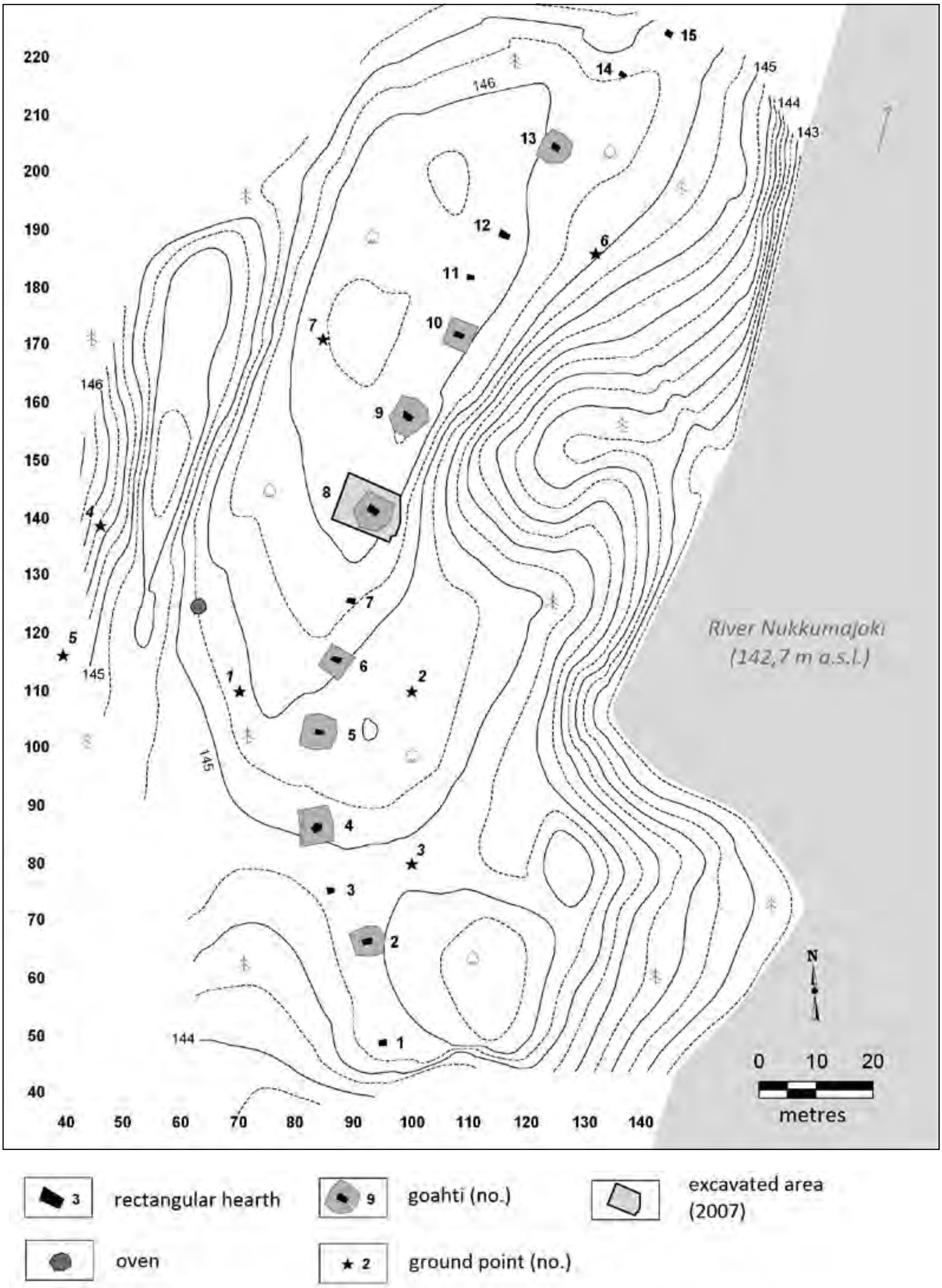


Figure 2. General view of the Nukkumajoki 5 site, contours at 25 cm intervals. Mapping: P. Halinen, K. Nordqvist, S. O'Ceallacháin, S. Sandell & J. Stenberg. Drawing: K. Nordqvist.

Figure 3. General view of the Nukkumajoki 5 site. Photo: P. Halinen.

siida territory. At the end of 16th century the crown wanted to gather the Sámi in villages in order to collect taxes. Christian Carpelan has proposed that the location of the winter village was regularized at the end of 16th century for the purpose of organizing taxation in Lapland. (Carpelan 2003: 71.) The intra-site organization of the villages was not regularized, and instead they developed independently, based on the traditions of the communities concerned. The winter-village system has recently been questioned (Eidlitz Kuoljok 2011; Wallerström 2017).

From the peace treaty of Pähkinäsaari/Nöteborg/Schlüsselburg between Sweden and Novgorod in 1323 and the treaty between Norway and Novgorod in 1326 the huge area in the north, from Lyngen Fjord to the River Ponoj, was shared by Norway, Sweden and Novgorod (Amundsen et al. 2003: 85; Hansen 2011: 356; Olsen 2011: 31). Even earlier these powers had military conflicts with each other. This area became a common taxation and trading area, where Bircarlians, Karelians, Novgorodians, Norwegians, Swedes and Finns were active in the Sámi territories. While the strength of influence of these actors varied, taxation and the pressure of trading activities were directed towards the Sámi area, *Sápmi*, at the beginning of 17th century. In different parts of the area, each actor made a variable contribution of activity.

At the turn of the 16th century, Duke Karl, later King Charles IX of Sweden, tried to organize the life of the people of Lapland. Sweden was at war with Denmark/Norway in Lapland and tried to expand its power and establish a system of tax collection and trade centres. For this purpose Sweden established marketplaces in Lapland, which were also a basis of secular and ecclesiastical administration: state rule extended to Lapland.

Inari has been considered an area that was influenced by three state powers during the 16th century. The Finns, and prob-

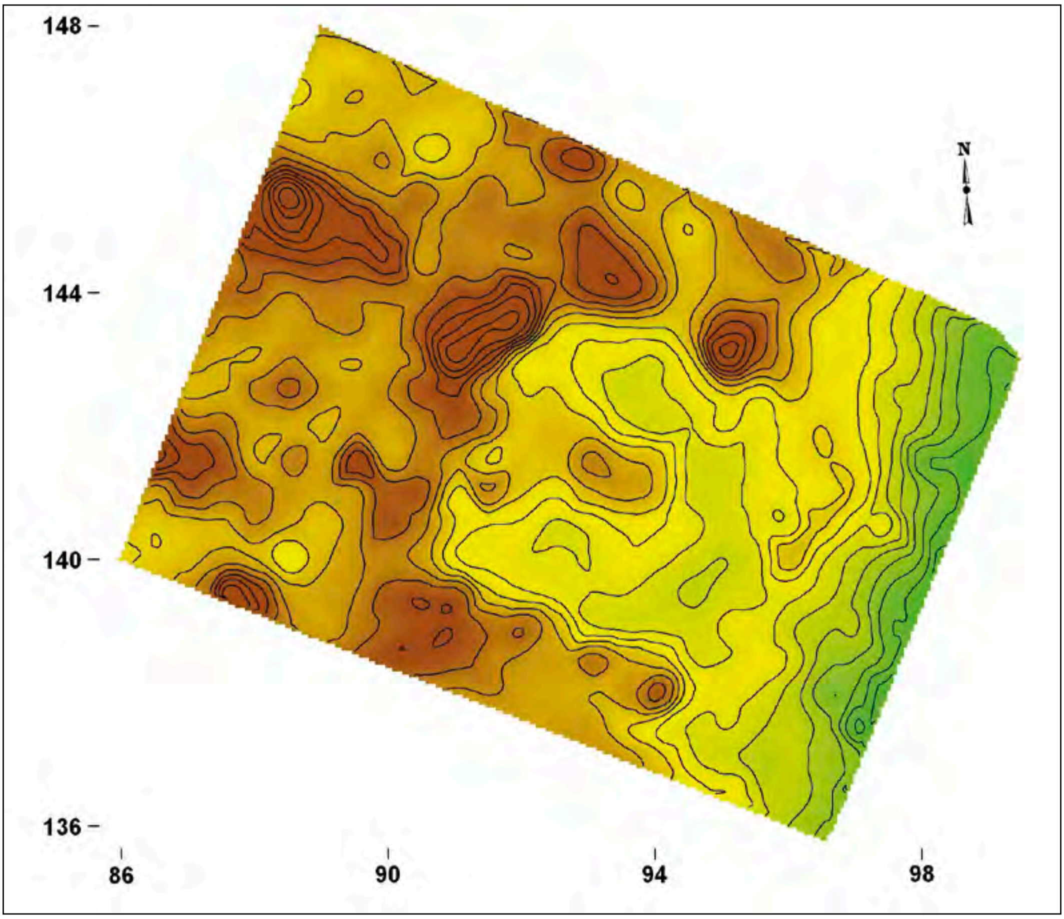


Figure 4. The surface altitude contours of goahti eight, contours at 5 cm intervals. Drawing: K. Nordqvist.

ably also the Swedes, engaged in an agricultural economy and hunting/fishing at the far end of the Gulf of Bothnia carried on trade and taxation with Sámi communities in Northern Lapland, including the Inari area (Halinen 2008; Hansen 2011: 356; Wallerström 1995; 2017). The earliest historical document regarding these Bircarlians is from 1328. In 1553 Gustavus Vasa, the king of Sweden (1523-1560), cancelled their right to tax the Sámi (Carpelan 2003: 71; Hansen 2011: 356), but the tradition of exploiting Sápmi continued in the 18th century (Wallerström 2017). The northern end of the Gulf of Bothnia was colonized by the Finns in the Late Iron Age or early medieval period, but when exactly the exploitation of Lapland was begun by the Finns is not certain (Koivunen 1985, Taavitsainen et al. 2009). Some of these colonies, inhabited by the Finns and Swedes, became towns during the 17th century, situated mainly in the river mouth areas. The largest towns gave names to sections of Lapland, such as Luleå Lapland, Umeå Lapland, Tornio Lapland and Kemi Lapland, which were formed according to the river system areas.

The Karelians exploited the northern regions during the Late Iron Age and medieval period, as well as the 16th century. They travelled along the waterways from the shores of Lake Ladoga to the northern end of the Gulf of Bothnia, Northern Sweden, Finland and Norway, and the Kola Peninsula in or-

Figure 5. The remains of goahti eight. Photo: P. Halinen.

der to trade and tax the Sámi and other local inhabitants. This exploitation was practised in close cooperation with and subordinate to the Novgorod city state. This interaction was partly violent and armed conflicts were common between Karelians/Novgorodians and Scandinavians. During the medieval period the Karelians tried to extend their influence to the coastal area of Finnmark, where the Catholic Church and Norwegian rule expanded towards the east. The fishing stations and the churches were built alongside each other to meet the demand of dried fish in Central Europe. In this respect, the northern natural resources were in great demand and sharing/exploitation meant competition between the powers concerned. (Halinen 2008; Hansen 2011; Wallerström 1995; 2017.)

3 The environmental setting

The Nukkumajoki area is located in a pine forest, the northern borderline is about 25 km to the northwest, in Muotkeduottar fjeld area. The River Nukkumajoki flows towards the northeast among low fells, tree-covered hills, rising between 120 and 160 m (c. 260-300 m a.s.l.) higher than the river valley (c. 140 m a.s.l.). The Muotkatunturi area and the Leammi fjeld areas (Márastatduoddarat and Vibosduoddarat) were treeless 1.000 years ago, but the treeless areas have expanded since then (Kultti et al. 2006: 388). About 1.000 years ago the Medieval Warm Period was as its warmest and after 1150 CE the temperature cooled by 1600, with the exception of some warmer short periods (c. 1400 and 1550) (Korhola et al 2000: 291; Matskovsky & Helama 2014: 1482; 2016: 444).

The profile of the Inari area is quite low – there are no high fjelds, which means that climate changes do not radically affect forest conditions. If the general temperature rises or declines, the overall picture of the composition of trees does not change inside the

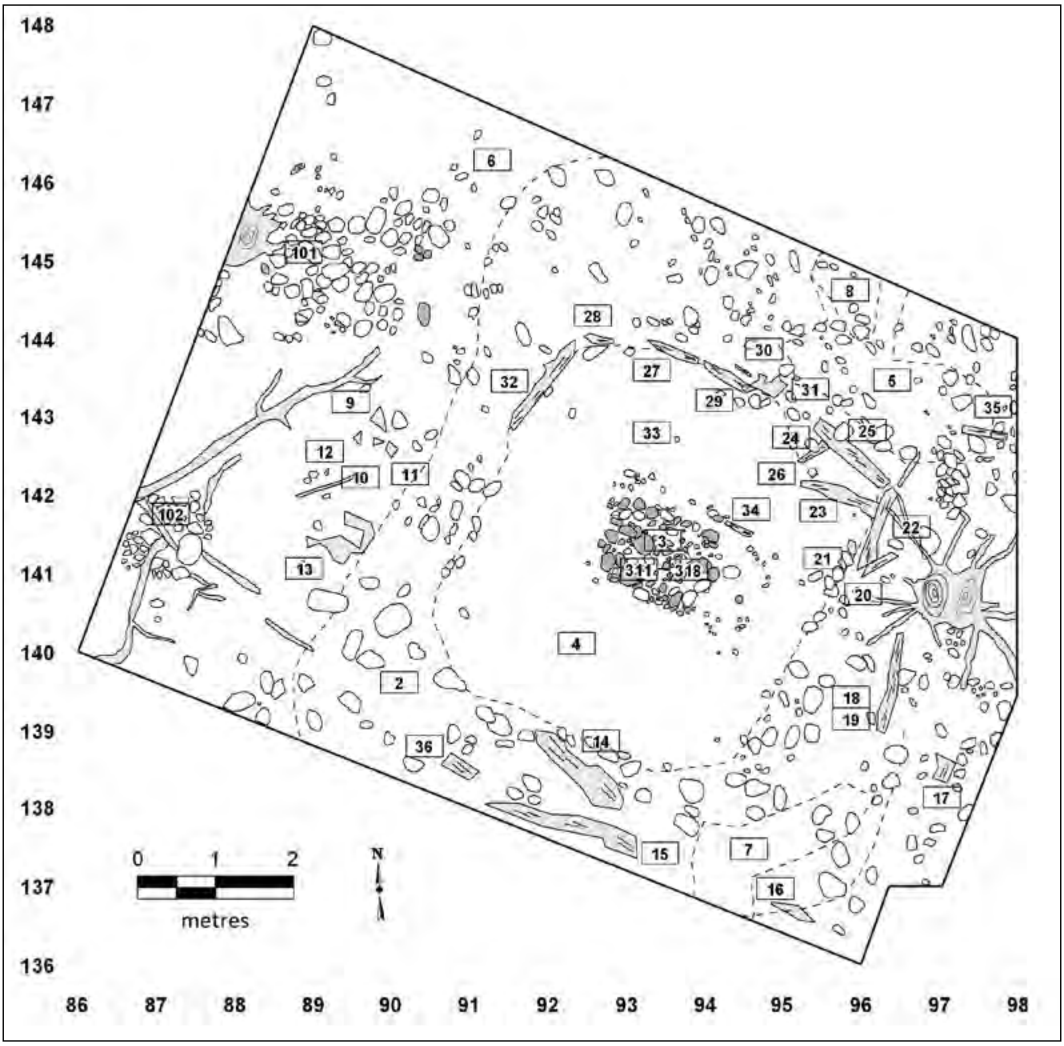


Figure 6. Units and constructions of goahti eight, 1=turf layer, 2=the wall, 3=the hearth (incl. 311-318), 4=the floor area, 6=the outside area (incl. 5, 7, 8 bone concentrations), 9-36=the wooden constructions, 101-102=the stone cairns. Drawing: A. Herva, V.-P. Herva & K. Nordqvist, digit.: L. Kunnas & K. Nordqvist.

forest area. However the treeline on the fjeld slopes rose or descended over time and in the process of climate change – the changes are slow and they are more visible close to the mountain areas. In the forest area, these changes can be observed as cooler temperatures, which meant that people had to prepare themselves better for the winter than previously.

At Nukkumajoki 5 the predominant species in the faunal material is reindeer (*Rangifer tarandus*). Reindeer lived in the area and was hunted. The morphology of the bones does not make it possible to determine whether the bones are of wild forest reindeer, wild mountain reindeer or domestic reindeer. In the Várjjat (Varanger) area it has been possible to identify forest reindeer bones from sites dating from as early as c. 2000 BCE as well as from the Late Iron Age and medieval period (Bjørnstad et al. 2012; Røed et al. 2018). Earlier it has been assumed that the post-glacial reindeer species was wild mountain reindeer (Hakala

Figures 7-10: Fig. 7. The turf layer removed. Fig. 8. The wall layer removed. Fig. 9. The bottom layer, with only the profile strip and hearth unexcavated. Fig. 10. The bottom layer, with only the hearth unexcavated. Photos: P. Halinen.

1997; Halinen 2005). In material from the Varanger area from c. 2000 BCE the reindeer could be observed to be larger than present-day mountain reindeer (Bjørnstad et al. 2012; Schanche 1994). This evidence implies that the forest reindeer was one of the primary reindeer species in the eastern part of northern Fennoscandia also in the 15th and 16th centuries. The bone material of winter sites in the Pasvik area indicates hunting near the site and/or the domestication of reindeer (Halinen et al. 2013; Hedman & Olsen 2009; Hedman et al. 2015). Because the DNA testing of the recovered bones at Nukkumajoki has not yet been carried out, the determination, however, is not definite. There is a more detailed discussion on the faunal material from N5 takes in the section on osteological analysis.

European elk is the other large mammal which lives in the area. It was hunted already in the Stone Age, and is still hunted (Halinen 2005). No elk bones have been recovered at the N5 site, but the environment is most suitable for it. There must be good reasons why people of N5 did not hunt elk – the same concerns N2, where altogether nine *goahti* were excavated (Carpelan 2003).

The natural forests of Inari consist mainly of pines hundreds of years old (Zetterberg et al. 1994). Living in these forests are smaller mammals such as hare, fox, wolverine and wolf and a large mammal, bear, which have been hunted for fur and food, for making world safer. The bear hunt was strictly regulated and followed set rituals. The forests were also the home of forest fowl / capercaillie. Beaver lives in the waters of the River Nukkumajoki water system and it was hunted for fur and food. In this water system, pike (*Esox lucius*) and whitefish (*Coregonus lavaretus*) are the most common fish species. They were fished and goose was hunted in the River Nukkumajoki area. It can be as-

Figure 11. The hearth, with the turf layer removed. Photo: P. Halinen.

Figure 12. The hearth, with the upper layer of stones removed. Photo: P. Halinen.

Figure 13. The hearth, with almost all the stones removed. Photo: P. Halinen.

sumed that the environmental change did not have much effect on the ratio of the species hunted over the course of time in medieval and Early Modern times.

4 An overview of the Nukkumajoki 5 site

Site N5 consists of 15 remains of goahtis. Eight of them are the remains of turf huts and seven of them are rectangular hearths with no trace of hut constructions and therefore are probably remnants of a more lightweight structure, the lávvu. Hut no. 8 was selected for excavation (Fig. 2). The dwelling remains are organized in a row parallel to the river, just like the rectangular árran hearths 300-700 years earlier. The site is on the north-west side of River Nukkumajoki, next to a widening of the river. The river bank rises 2–3 m to almost a flat terrace where the dwelling remains are situated. The forest of the area consists of pine, but in the site area, the *šillju*, the vegetation consists of birch, lingonberry and meadow grasses that has been influenced by humans (Fig. 3).

5 Excavation strategy and observations of the excavation

The excavated area consisted of the goahti area and small areas on the western and eastern side of the visible wall constructions (Fig. 4). On the surface, the roundish wall was visible as a low prominence along with the oblong rise of the fireplace in the middle of the round wall area (Fig. 5). The excavation was carried out with the stratigraphic method; seven stratigraphic units were identified. They consisted of the turf layer (Y1), the wall (Y2), the hearth (Y3), the floor (Y4), and the outside area (Y6). The stone cairns on the east side of the goahti were units Y101 and Y102. The wooden constructions were units Y9-Y36. The bone concentration areas were units Y5, Y7 and Y8. (See Fig. 6.)

The constructions of the goahti consisted of a hearth in the middle of the floor area, slightly bit higher wall circle with stones moved from the floor area, and the decayed remains of wall timbers within the wall (Figs. 7, 8, 9, 10). Outside the goahti, on the west side, there were two small piles of stones. The bigger one had been used as a fireplace in its early days, but had later been covered by stones, most probably for storing and later for heating in the hearth.

The hearth was almost rectangular (Fig. 11, 12), measuring 140x107x15 cm. The top layer consisted of small stones, 10-20 cm in diameter. Under the top layer there were larger stones inside, one in the east side of the hearth and another one almost in the centre. The eastern one was flat on the surface and its shorter end pointed to the middle of the hearth (Fig. 12, 13). The stones under the top layer were fire-cracked and the soil was full of charcoal and burnt bone fragments. Clearly the hearth had been used in high temperature and afterwards it had been covered again with new stones – which were not so badly damaged by fire. Also the flat stone, probably a baking or roasting stone, was covered with these new stones. Inside the hearth the finds consisted mostly of burnt and unburnt bones, and a flat metal ring piece of brasswork (Figs. 14, 15). Tinder flint was also found close to it.

The stones were cleared from the floor area, which was levelled almost to the horizontal plane. The eastern side of the floor was 15–20 cm lower than the western side (Fig. 4). There was no clear trace of a line of wood or stone that could indicate the intra-site division of the floor area into the *boassjo*, *uksa* and *luoito* respectively. On the north-eastern side of the hearth there were the approximately 50 cm long remains of wooden log/pole, laid north-west south-east – as the possible remains of a dividing floor construction between the boassjo and the luoito.

The wall area consisted of cleared stones, sand and wooden constructions (Figs. 6, 9-10). The wooden constructions were probably mostly wall constructions, because the

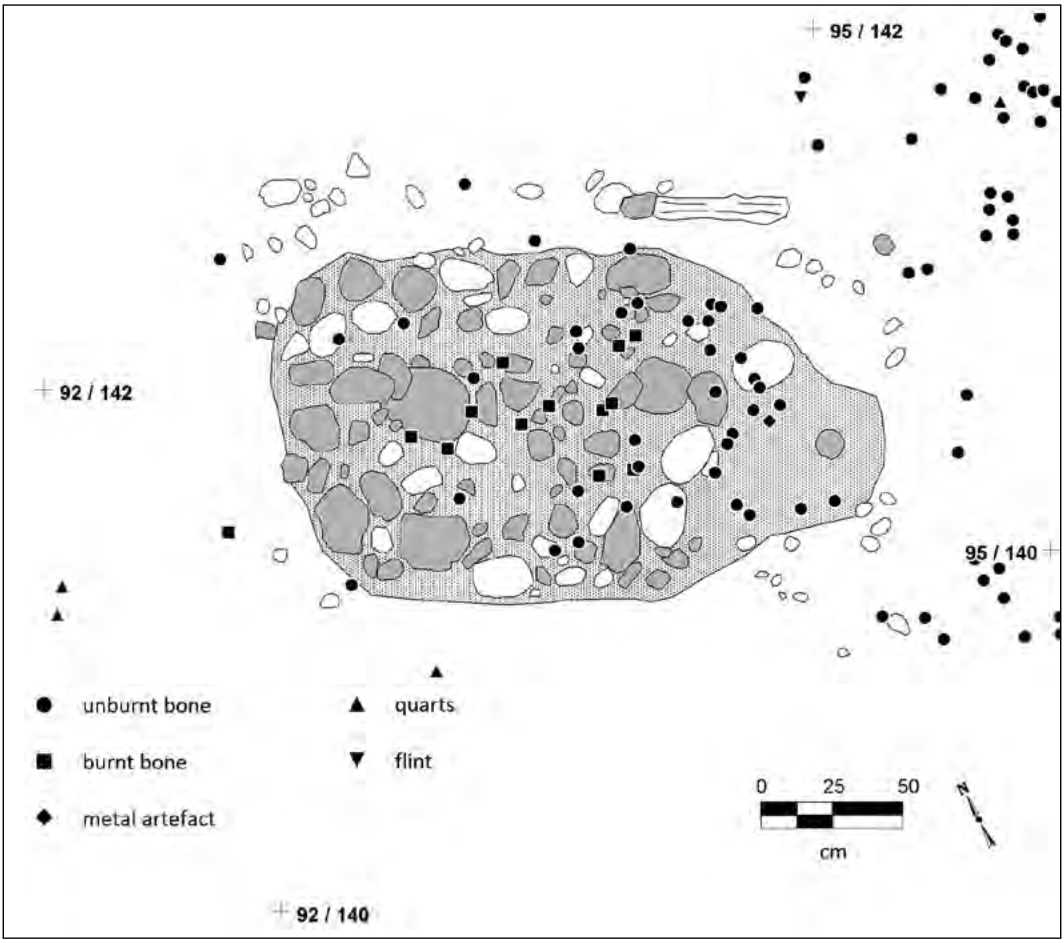


Figure 14. The hearth with finds, measured with total station. Drawing: K. Nordqvist.

floor area was surrounded by logs, shaping the hut and the floor area mainly into hexagon, but sometimes as an octagon (Carpelan 2003: 76; Halinen 2009: 104). It is also possible that the arches of the roof had collapsed and remained in the wall area. In addition, the wooden wall constructions had been covered by sand, probably taken from the floor area. There were no visible traces of a turf layer, but apparently the hut was covered by turf. The reconstruction of a turf hut includes a ditch which surrounded the hut but at N5 there were no traces of that kind of ditch. (Carpelan 2003: 76.)

In the south-east wall of the hut there were larger stones, which had moved af-


Fig. 15. The flat metal ring (KM 37149:353). Photo: T. Vaara.

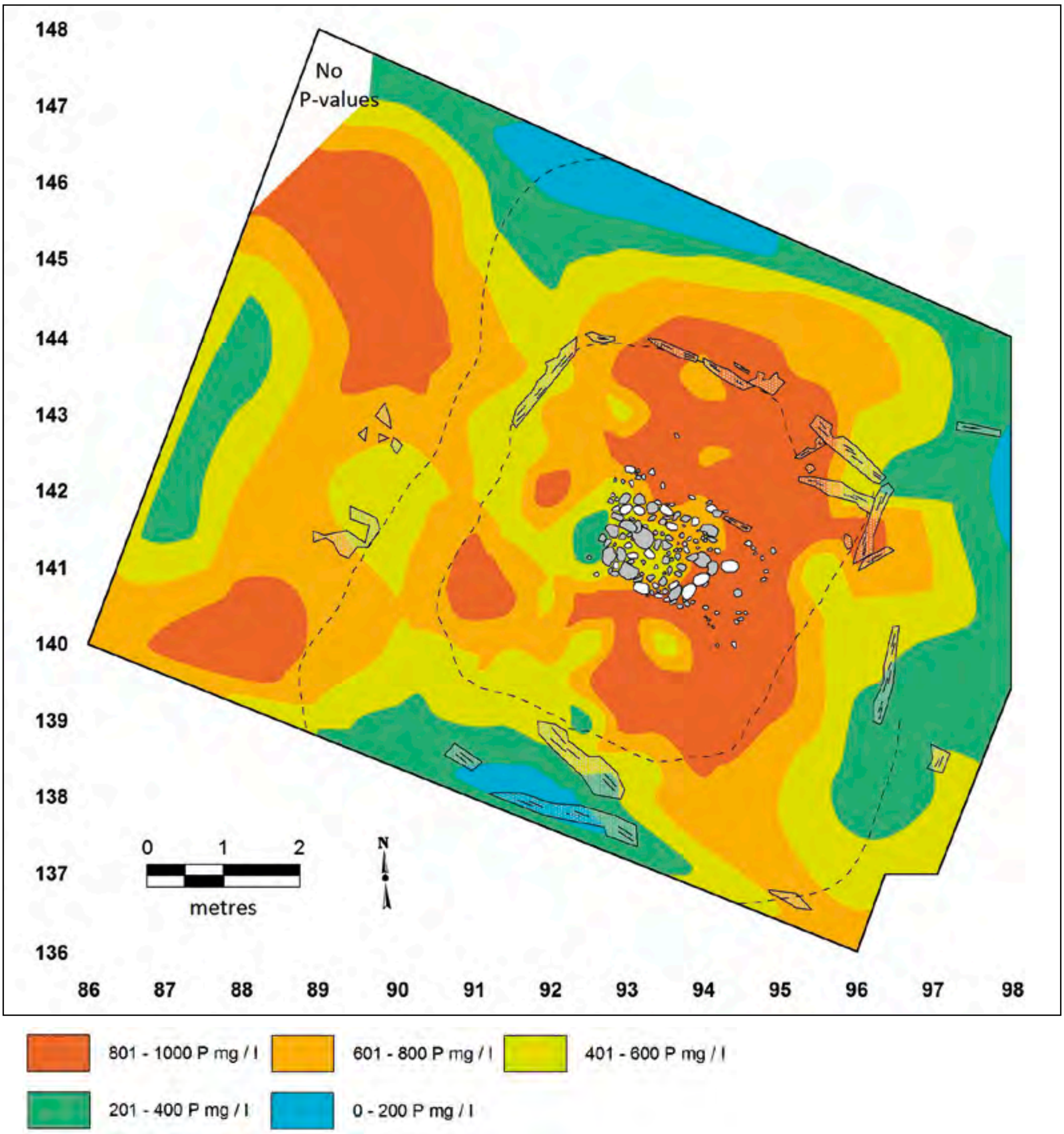


Figure 16. Soil phosphate map, diluted P-values. Drawing: K. Nordqvist.

terwards to their present location (Fig. 6). Under them there were a humus layer and finds from the period of use of the hut, i.e. the stones had probably been brought there after the bones had the discarded and the humus (wall) had developed. At the same spot there was a depression in the wall implying a doorway. On the west side there was a lower depression in the wall, which could as well imply a doorway (Fig. 4).

The soil phosphate values were highest on the eastern side of the hut floor area and on the western side of the hut (Fig. 16). The first area is the rear part, the boassjo and eastern side of the luoitos. The front, the uksa, and the eastern side of the hut have lower phosphate values. The higher phosphate values indicate more organic waste in the soil, probably implying an area of higher activity as well.

Figures 17-20: Fig. 17. An iron knife (KM 37149:8). Fig. 18. A fragment of knife (KM 37149:340). Fig. 19. A fragment of a knife (KM 37149:399). Fig. 20. A fragment of knife (KM 37149:1020). Photos: T. Vaara.

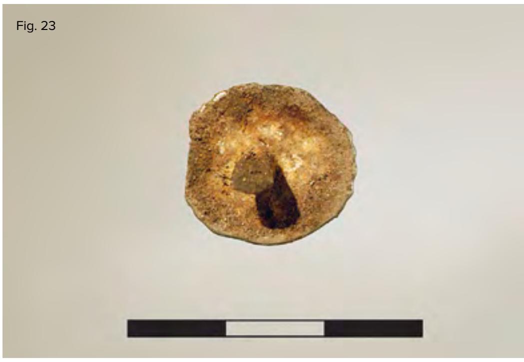
6 The finds

The find material was catalogued for the collections of the National Museum of Finland under the main number NM 37149. The metal artefacts from the site consist of blades or blade fragments of iron knives. They are few in number: only one complete iron knife (Fig. 17), four blade fragments of iron knives (Fig. 18-21), a fragment of an iron axe (Fig. 22), two round tin rivets (Fig. 23-24), a rectangular iron rivet (Fig. 25), a flat metal ring (Fig. 14), and a fragment of an iron nail (Fig. 26).

The knives resemble the earlier finds from Nukkumajoki 2. The complete iron knife is almost identical to the knife published by Carpelan (2003: 74). According to him, knives of this kind were made in Russia, Finland, Scandinavia and the Baltic countries. The blade fragment of an iron knife resembles the table knife found commonly at N2 and in other late medieval and Early Modern period sites in Southern Finland. Knives of this kind were imported from Central and/or Western Europe and they are dated to 16th and 17th centuries (Carpelan 2003: 74). Three fragments of iron knives (Figs 19-21) and iron axe (Fig. 22) are not identifiable or possible to date.

The tin rivets have a convex and a round surface, with a peg on the concave reverse side. The surfaces of the rivets are plain with no decoration. The main elements of the rivets are tin and lead (see Table 1). The form of the iron rivet is flat and rectangular with a peg on the reverse side. They are probably from the decorations of a belt or some other kind of leather artefact. The metal ring is a small flat ring, the function of which is unknown. It was probably a decoration for clothing clothes. The main elements of the ring were arsenic, copper, tin and lead (Table 1).

The knife, two fragments of knives, the



Figures 21-24: Fig. 21. A fragment of a knife (KM 37149:1024). Fig. 22. A fragment of an axe (KM 37149:239). Fig. 23. A tin rivet (KM 37149:987). Fig. 24. A tin rivet (KM 37149:1008). Photos: T. Vaara.

fragment of an iron nail, and the fragment of an iron axe as well another metal rivet and an iron rivet were found beside the wall (Fig. 27). The flat metal ring was found next to the east end of the hearth. The fragment of an iron knife (Fig. 19) was found in the floor area, on the north side of the hearth.

Eleven flakes each of flint and quartz were found. They were in the floor area and within the wall. Some of them were found also outside the goahti. Inside, the flint was found on the rear side and quartz on the front side. Outside most of the finds consisted of flint. (See Fig. 28) The quartz was probably used in the same way as flint; the flint was used for lighting the hearth with strike-a-lights. It is also possible that the quartz is a remnant of earlier, probably prehistoric, activities in the area.

The bone assemblage consisted of 19,477 (28,594 g) unburnt and 230 (31 g) burnt bone fragments. The identified animal species were reindeer, hare, beaver, goose, whitefish and pike.

Most of the bones were found outside the goahti, on its south-east and north-east sides (see Figs 29, 30 and 31). Some bones were found also inside the goahti, in its eastern part, and in the hearth. Most of the burnt bones were found inside the hearth. The hare (Fig. 32) and beaver bones were found outside the goahti: hare bones were found on the north side and the beaver bones were found on the south-east side of the goahti. The pike bones were found inside the hearth, except for three teeth, which were found on the north-east side of the goahti.

7 The chronology of the site

Site N2 has been dated to the end of 16th and the beginning of 17th century according to several radiocarbon dates, finds and stratigraphic observations (Carpelan 2003: 73;

Figures 25-26: Fig. 25. An iron rivet (KM 37149:1016). Fig. 26. A fragment of an iron nail (KM 37149:534B). Photos: T. Vaara.

Carpelan & Kankainen 1990). It has been assumed that the Nukkumajoki sites were not contemporary, but followed each other chronologically. As a matter of fact, some of the Nukkumajoki sites were occupied simultaneously from the 16th to the 17th century (Carpelan 2003: 71).

Two radiocarbon dates were analysed at site N5. Samples 32 and 35 were taken from the hearth and near the hearth, respectively. They were identified as deciduous tree charcoal; in this region the most likely tree species being birch (*Betula*) – in any case the leafy trees have a short life span, which does not make the old-wood effect plausible. Sample 32 was dated 385±25 BP (Hela 1667) and sample 35 was dated 325±25 BP (Hela 1666). In sample 32, 68,2 % probability gives 1510-1600, 1610-1640 CE, 95,4 % probability gives 1480-1650 CE. Sample 35: 68,2 % probability gives 1440-1510, 1600-1620 CE, and 95,4 % probability gives 1440-1530, 157-1630 CE. The radiocarbon dates (see Figs. 33 and 34) for site N5 imply the same life-span as at site N2. The finds also support this date.

8 Osteological analysis

The bone assemblage consisted of 19,477 (28,598 g) unburnt and 230 (31 g) burnt bone fragments. The predominant animal species was reindeer (*Rangifer tarandus*), which was identified in 1,809 fragments, but most likely the majority of identified large mammals, mammals, artiodactyls, ungulates and ruminants (2,691 fragments) are reindeer. The identified middle sized mammals were hare (*Lepus timidus*) and beaver (*Castor fiber*), but only single bone fragments of these species were identified. The same concerns greyland goose / bean goose (*Anser anser / Anser fabalis*), whitefish (*Coregonus lavaretus*), and cyprinids. Pike (*Esox lucius*) was identified in 17 fragments, but only one individual could be determined. (See Table 2.)

The osteological analysis of the bone material was carried out by Eeva-Kristiina Harlin, MA (2008). The description, references and the results are based on her report. The identification was done by comparing bones with bone material kept at the Finnish Museum of Natural History and by using several books as references (During 2003; Hillson 1992; Schmidt 1972). The age determination of the reindeer individuals was carried out by using the stage of ossification of the bones (Hufthammer 1995) and eruption of the teeth (Miller 1974). These methods can be used only when dealing with immature individuals. The age determination of full-grown animal teeth is based on four stages of description (unworn, somewhat worn, worn, highly worn). Sex determination was based on observation of features of iliac bone (Os ilium) (During 2003). (Harlin 2008: 33.)

artefact and its NM 37149 extension	Al %	Si %	P %	Mn %	Fe %	Ni %	Cu %	Zn %	As %	Se %	Sn %
metal ring (353, Fig. 14), a	1,67 ±0,263	0,51 ±0,084	2,53 ±0,058	0,00 ±0,006	1,03 ±0,025	0,04 ±0,008	28,74 ±0,299	1,68 ±0,030	49,27 ±3,961	0,03 ±0,010	7,85 ±0,002
metal ring (353, Fig. 14), b	1,78 ±0,326	0,37 ±0,094	2,17 ±0,065	0,00 ±0,008	0,94 ±0,029	0,06 ±0,012	62,42 ±0,362	2,16 ±0,041	13,96 ±1,682	0,02 ±0,010	7,00 ±0,136
tin rivet (987, Fig. 23), a					0,40 ±0,013		0,70 ±0,009		0,40 ±0,046		92,80 ±0,187
tin rivet (987, Fig. 23), b					0,44 ±0,013		0,72 ±0,009		0,49 ±0,049		91,82 ±0,185
tin rivet (1008, Fig. 24), a				0,04 ±0,011	1,11 ±0,018		0,08 ±0,004		0,48 ±0,140		37,03 ±0,140
tin rivet (1008, Fig. 24), b					0,40 ±0,014		0,16 ±0,006		0,45 ±0,124		59,80 ±0,183

artefact and its NM 37149 extension	Te %	Pb %	Bi %	Ti %	In %	Y %	Re %	Cr %	Ta %	Ir %
metal ring (353, Fig. 14), a	0,08 ±0,059	6,29 ±0,092	0,28 ±0,038							
metal ring (353, Fig. 14), b	0,00 ±0,012	9,02 ±0,088	0,12 ±0,034							
tin rivet (987, Fig. 23), a		5,28 ±0,092	0,08 ±0,004	0,28 ±0,054	0,06 ±0,017					
tin rivet (987, Fig. 23), b		6,13 ±0,098	0,09 ±0,005	0,23 ±0,053	0,08 ±0,018					
tin rivet (1008, Fig. 24), a		60,91 ±0,076		0,20 ±0,041		0,08 ±0,004	0,07 ±0,007			
tin rivet (1008, Fig. 24), b		37,45 ±0,064				0,10 ±0,004	0,07 ±0,008	1,30 ±0,036	0,04 ±0,010	0,23 ±0,009

Table 1. Percentage distribution of elements, two series – two sides of the artefact, time of measurements 30,5 s. PXRF analysis conducted by Ville Rohiola.

Species	**MNI***	**fragments**
Lepus timidus (hare)	1	1
Castor fiber (beaver)	1	1
Rangifer tarandus (reindeer)	28	1 809
Artiodactyla (artiodactyls)		15
Ruminantia (ruminants)		1
Ungulata (ungulates)		11
Mammalia (mammals)		40
Megamammalia (big mammals)		2 624
Mesomammalia (middle sized mammals)**		1
Anser Anser/Anser fabalis (greylag goose/bean goose)	1	1
Coregonus lavaretus (whitefish)	1	1
Esox lucius (pike)	1	17
Cyprinidae? (cyprinids?)	1	1
Teleostei (bony fishes)		25
Frag. Indet. (unidentified)		14 929
Total	34	19 477

* Minimal number of individuals ** most likely beaver

Table 2. Number and minimal number of individuals (MNI) of bone fragments in goahti eight, based on Harlin 2008: 34-35.

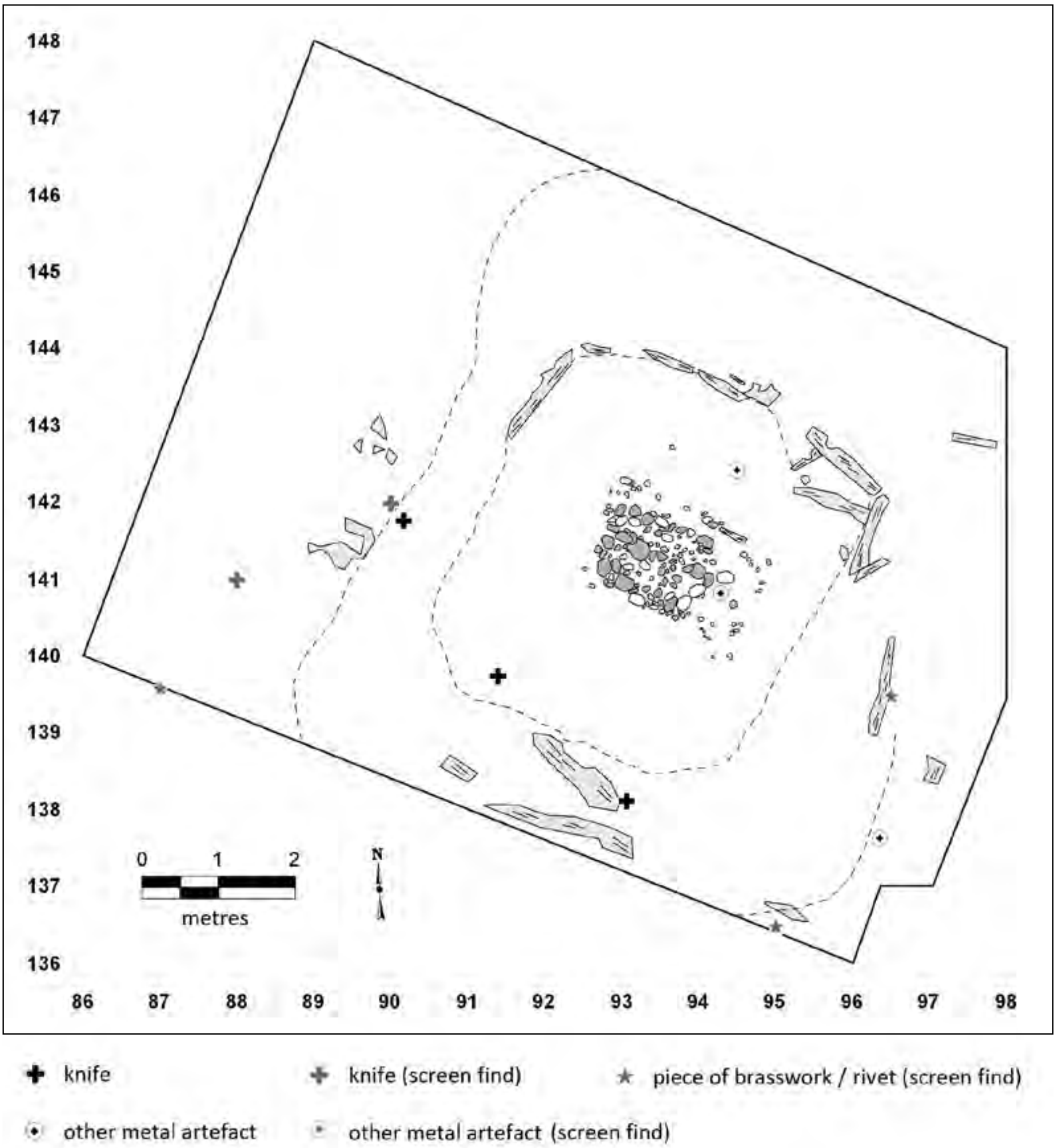


Figure 27. Distribution map of metal finds. Drawing: K. Nordqvist.

The analysis revealed a wide range of animal species, see table 2. The predominant species was reindeer. Most or rather all of the bones, which were determined as artiodactyls, ruminants, ungulates, mammals, and megamammals, should be identified as reindeer, because no other large mammals, such as European elk, were identified (Harlin 2008: 35). The rib bone of the mesomammal is most probably of a beaver. The number of bone fragments of hare and beaver, which are medium-sized mammals, the greylag goose/the bean goose, a large aquatic bird, the whitefish, and Cyprinidae, was only one fragment of each species. Seventeen bone fragments of pike were found.

The body part distribution of the bones of reindeer, and artiodactyls, ruminants,

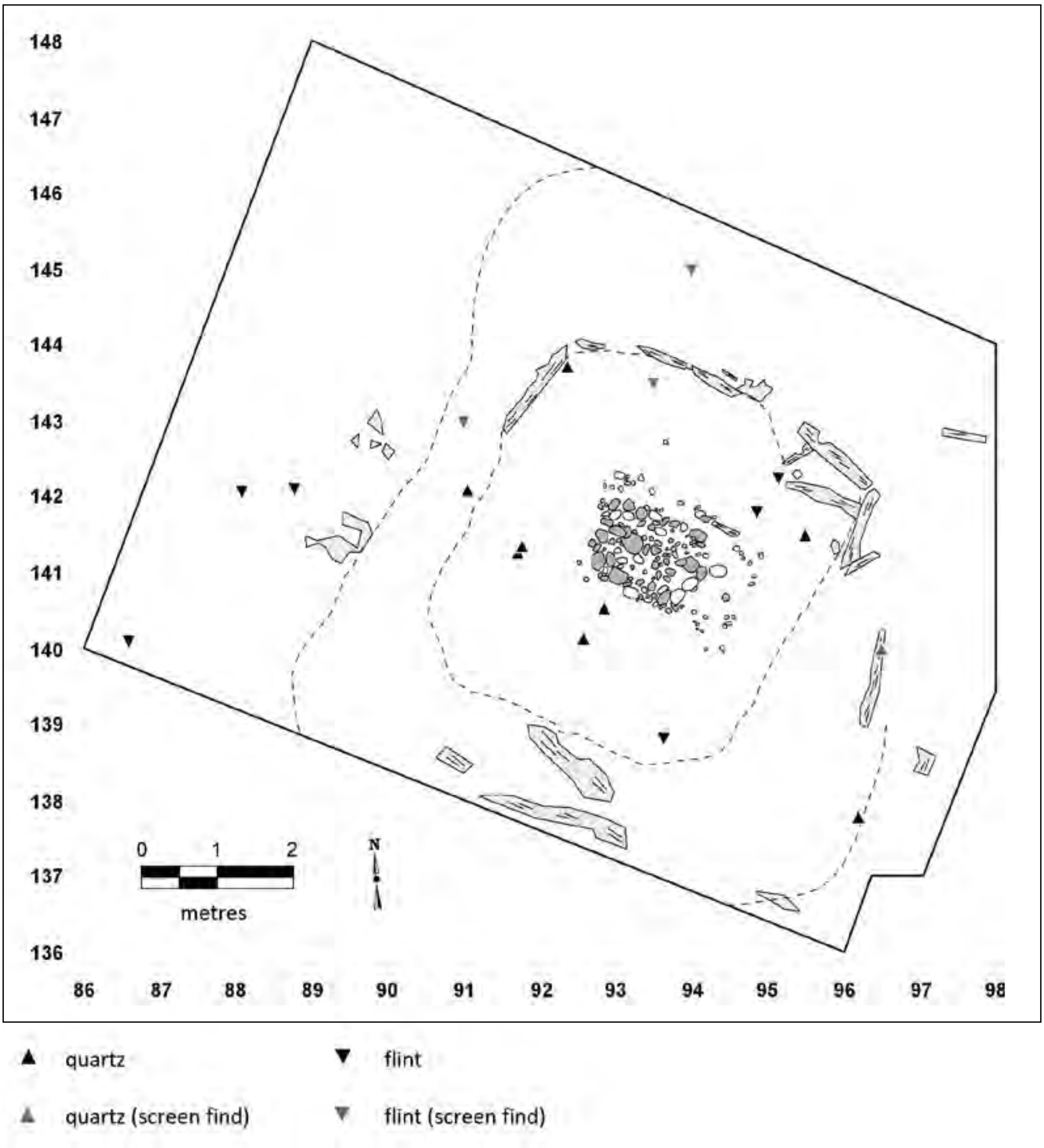


Figure 28. Distribution map of quartz and flint finds. Drawing: K. Nordqvist.

ungulates, mammals, and megamammals, is presented in Table 3. The general picture of the material shows that at least some of the carcases were brought whole to the site. The figure and the table show a clear emphasis caused by natural and human selection. Some of the bones were discarded before being brought to the site or they were transported from the site. For instance, bones of the upper leg (pelvis and femur) are partly missing. (Harlin 2008: 40.)

There were several traces of butchering on the bone surfaces. Bad preservation and the poor quality of the bones had the effect that the traces were not always visible. Owing to this, it was not possible to notice clearly any marks of skinning or dismembering the body. The analysis of processing the

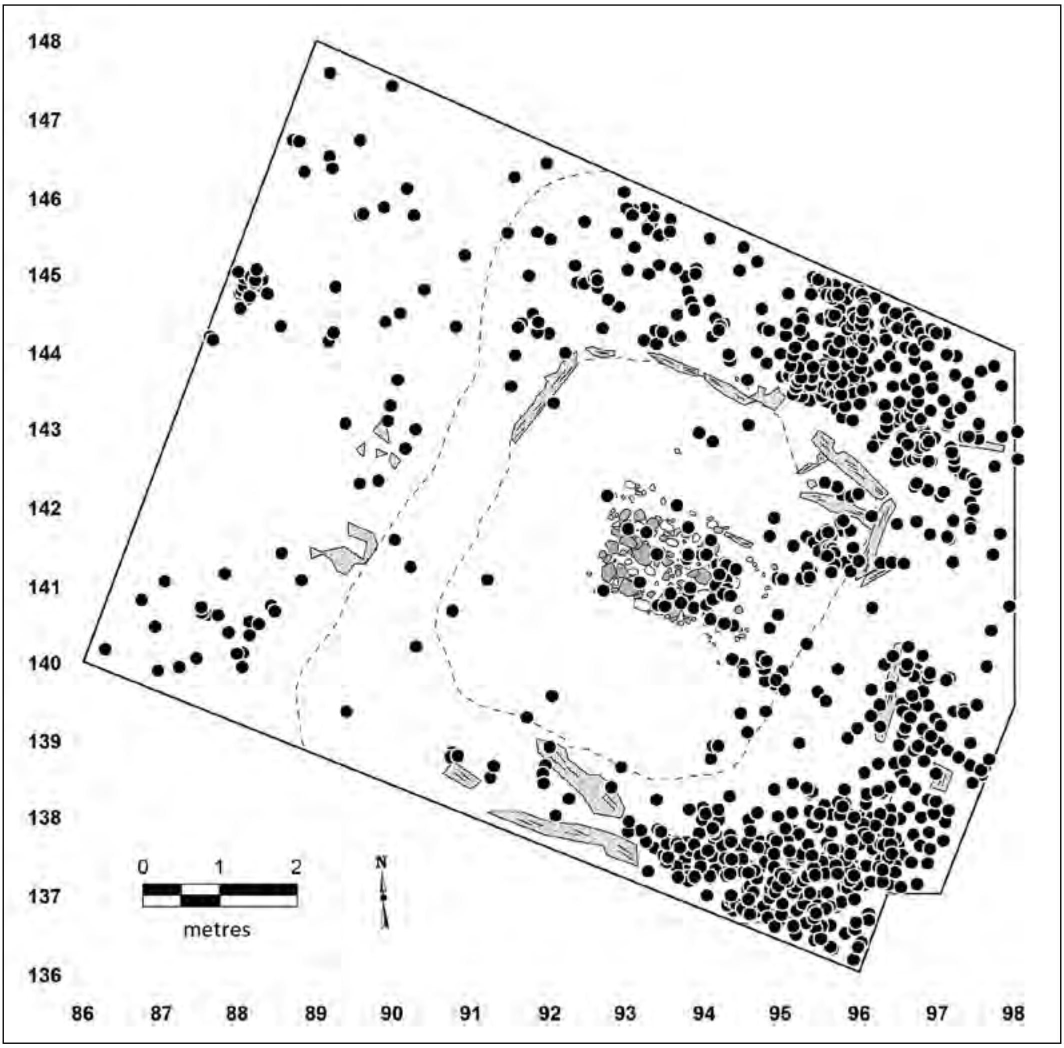


Figure 29. Distribution map of unburnt bones (measured with total station). Drawing: K. Nordqvist.

body was based on traces of extracting meat or marrow from bones. (Harlin 2008: 40.)

Traces of butchering were visible in following body parts: cranium, lower jaw, humerus, scapula, radius, ulna, pelvis (coxae), femur, tibia, metacarpal, metatarsal and digits. In these cases marrow was extracted by cleaving the bone with a knife. (Harlin 2008: 41-44.)

In the occipital bone, which was attached to the cervical vertebrae, cut marks were clearly visible. This indicates dismembering the skull, the cranium. Lower jaw bones had some cut marks, but some of them included marks of being broken. They were cut for extracting marrow and the delicious lip flesh. The trocklea of the distal end of the humerus was split in the middle of the bone. This implies probably dismembering the steak and knuckle from each other. There were several cut marks in the radius and ulna. The radius contain a lot of marrow, but the ulna only slightly. The tuber of the proximal ulna had been cut away in many cases. This indicates dismembering the steak and knuckle from each other – just like in the humerus. In these cases (humerus and ulna) the broken bones

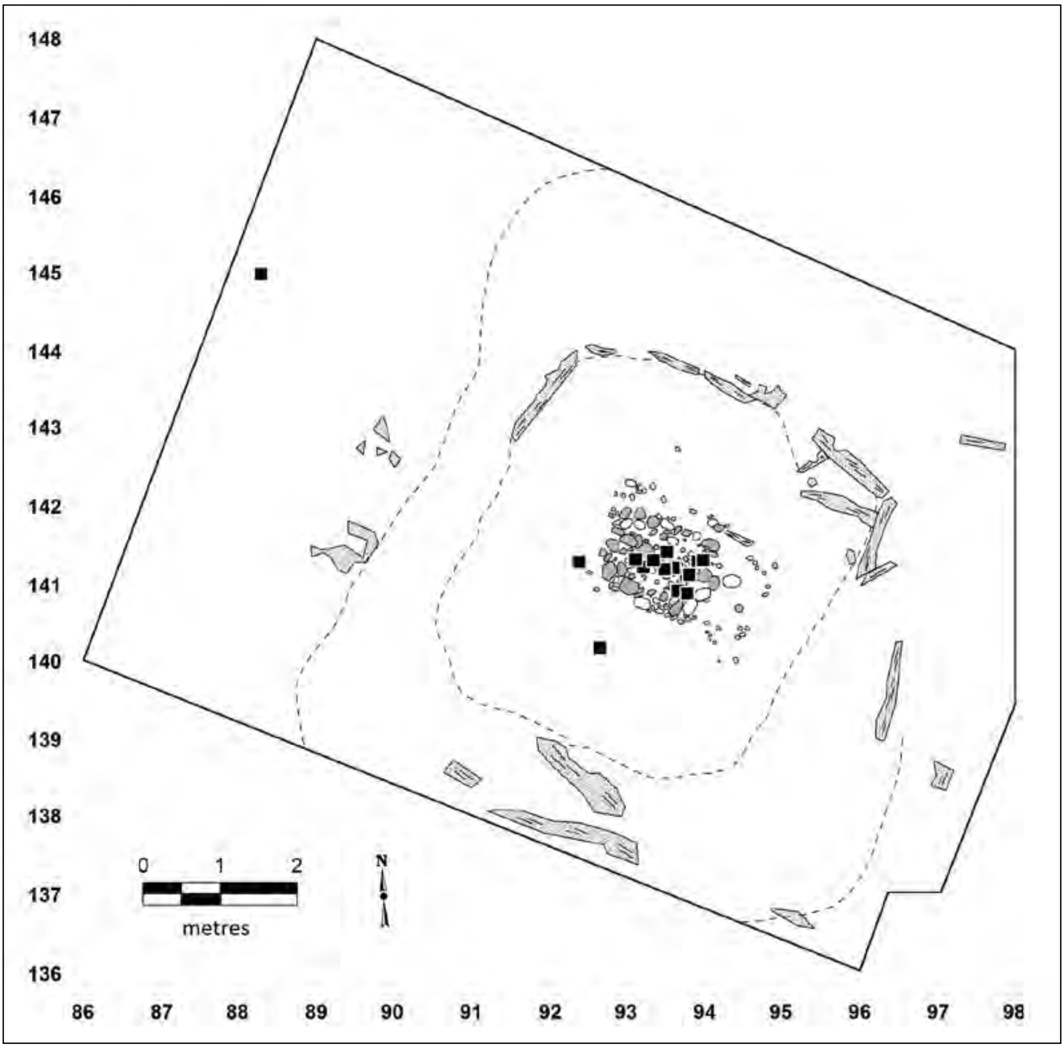


Figure 30. Distribution map of burnt bones (measured with total station). Drawing: K. Nordqvist.

imply that the carcase had been solid when the dismembering was carried out, or the traces can be connected to the exploitation of the bones in the cooking process later on. The pelvis (coxae) bones include several cut marks. Often they were near the acetabulum, or the articular cavity. Some of the cut marks may be from dismembering the rump steak from the carcase. For extracting marrow femur and tibia were cleaved with a knife in upper- and lower half of the proximal and distal ends. The tibia and attached flesh (back knuckle) are suitable for broth. The metatarsus and metacarpus contain a lot of marrow, which was extracted by striking a knife in the proximal end or diaphysis, or into both ends, one after another. The first and second, and sometimes also the third phalanges were cleaved horizontally or vertically for extracting marrow. (Harlin 2008: 41-44.)

The age determination of the reindeer was based on the analysis of ossified and unossified bones of adolescent individuals developed by Hufthammer (1995). The largest group of unossified bones were the distal ends of radius (see Table 4). Almost half of

Figure 31. Reindeer bones in the cleaning process. Photo: P. Halinen.

Figure 32. Hare bone. Photo: P. Halinen.

the identified distal ends of radius belonged to individuals under 36–48 months. According to phalanges bones, the youngest individual was less than 18 months old. (Harlin 2008: 36.)

The wear of teeth was observed in masticating surfaces of loose and attached teeth. It was observed whether the teeth were unworn, somewhat worn, worn or highly worn. According to this analysis the material tends to be from old animals, the teeth of which were mostly worn or highly worn (see Table 5).

There was only one iliac bone (Os ilium) in the material that permitted the determination of sex. The features of this particular bone are male. (Harlin 2008: 37.)

As a conclusion, the diet of the N5 people was based mainly on reindeer. Hunting reindeer is most favourable in autumn before the rutting period of males (in September), as they are fattest at the time. There is only a few mammal bones other than reindeer. The proportion of animal species is quite the same as in N2 (Söderholm 2000). The individuals that were brought to the site, were immature and full-grown, but the youngest was under 18 months, probably 3–5 or 10–15 months. Most of the immature animals were three years old. The majority of the animals were quite old, but there is a strange feature: only mandible bones of old individuals were brought to the site while there are bones of younger individuals. At least some of the carcases were brought whole to the site, but it is quite clear that bones attached to meat are partly missing. This might be connected to trading meat. The anklebone measurements indicate small and large-sized animals. It is unclear if the size difference can be connected to the age or sex of the animals. One possibility is that wild reindeer hunting and milking the reindeer were practised. (Harlin 2008: 46-47.) Reindeer herding included small herds, which were kept close to the site – the equally distributed pattern of body parts would also support the possibility of reindeer herding (Hedman et al. 2015: 14). In addition to herding, reindeer hunting was still practised.

The use season of the site was mainly winter, although autumn the most favourable hunting season for wild reindeer. The aim of autumn hunting to acquire a food supply for overwintering. Some bones of greylag goose / bean goose point rather to the snowless season. Waterfowl was hunted in spring, summer and autumn – it is not possible to determine the hunting season more accurately. One possibility is that both waterfowl and reindeer were hunted in autumn.

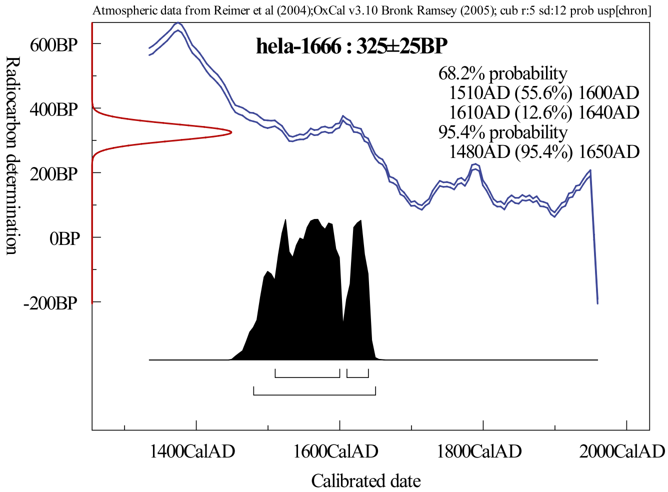


Figure 33 Date of sample 32.

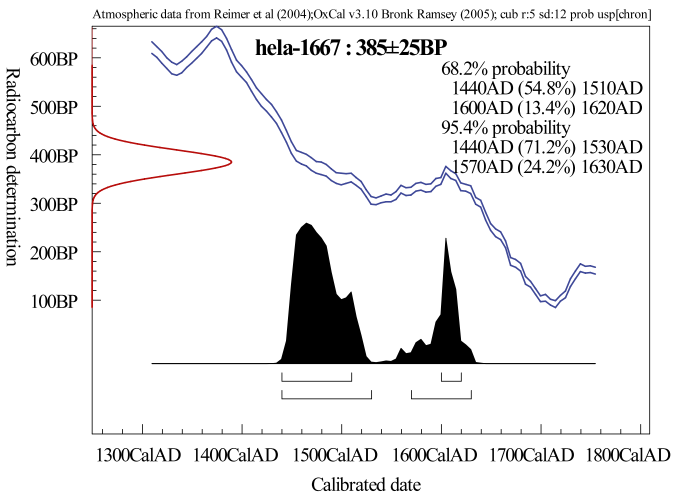


Figure 34. Date of sample 35.

the stones from the floor area had also been removed. The logs were placed in the margins of the floor area, just like in N2. They belong to the wall construction: they were usually laid hexagonally or octagonally on the sides of the floor and the sand was put outside the area marked by the logs. In N2 the logs have the floor area a hexagonal shape, but at N5 it was octagonal (see Figs. 8-9 and 15). Goahtis of this kind, or quadrangular ones, have ethnographic parallels in Inari and the Kola region dated to the beginning of 20th century, e.g. fishing huts at Munhaissaari in Inari, Evaska and Mihvel at Nuortijauri about 150 km east of Inari, and the spring hut of Kiuril Mošnikov at Njautsjauri (Paulaharju 1915a: figs 4-8; 1915b: figs. 23-27, 30-33, 42-46). The shapes of that floor area of these ethnographical parallels vary from quadrangles and pentagons, and from hexagons to octagons, with the base of the walls form made from two to four superimposed logs. The wall/roof constructions remain the same from the quadrangular to the octagonal floor area – the wall/roof construction cannot be proven from the archaeological record.

9 Discussion

The remains of the goahti resemble the goahtis at the previously excavated site N2 (Carpelan 2003). In the case of N5 there was no ditch around the goahti, which means that the sand in the wall construction was taken from the inside section, not from outside ditches. The goahti is situated on a gentle slope (see Fig. 4) and the floor area was dug slightly deeper than the surrounding ground; the sand had drifted into the wall area, where

The ethnographic parallels from the beginning of the 20th century contain only one door, but earlier parallels from the 17th and 18th centuries also indicate a back door (Hansen & Olsen 2004; Ränk 1949; Yates 1989). This back door was only for males and females were restricted from using it. It was used for bringing the meat inside the goahti. Maria Inkiläinen (1999) has pointed out that the N2 material does not support this gender-based division as clearly as the

	MNI	MNE
Rangifer tarandus		
Os occipitale	5	
Os temporale	4	6
Maxilla	1	2
Mandibula et dentes P2-M1	9	15
Atlas (1.)	13	
Atlas (2.)	4	
Scapula	9	14
Humerus	12	18
Radius	18	30
Ulna	12	17
Vertebrae		66
Os ilium	3	4
Os iscium	5	8
Os pubis	4	6
Sacrum		1
Femur	4	4
Tibia	28	42
Malleolare	13	21
Patella	6	10
Telemetacarpus		8
Metacarpus	14	26
Pisiforme	2	3
Scaphoideum	16	25
Lunatum	9	16
Metatarsus	16	31
Calcaneus	17	30
Astragalus	26	49
Centrotarsale	22	34
Ecto+mesocuneiforme	7	11
Cuneiforme	7	10
Phal. 1		96
Phal. 2		53
Phal. 3		40
Mammalia		
Cranium		42
Maxilla/Mandibula		8
Vertebrae		639
Costae		144
Scapula		17
Coxae		3
Ossa longa		1787
Phalanges		18

	number of ele-ments	time of ossification in months
radius, distal sin.	5	36-48
ulna, proximal sin.	1	40-48
ulna, proximal dex.	1	40-48
femur, caput sin.	1	36-48
femur, caput dex.	2	36-48
femur, trochanter minor dex.	1	36-48
tibia distal sin.	1	18-30
tibia proximal sin.	1	38-42
tibia proximal sin.	1	18-30
calcaneus sin.	3	18-42
metacarpus, distal sin.	2	18-30
mc/mt distal	2	18-30
phal.1, proximal	1	18-30
phal.2, proximal	1	18-30

Table 4. Number of unossified bone elements, based on Harlin 2008: 36.

	un-worn	some-what worn	worn	highly worn
mandibula (sin) P			4	
mandibula (dex) P			7	
mandibula (sin) M			1	2
mandibula (dex) M			1	1
loose teeth	9	11	51	5

Table 5. The wear of teeth, based on Harlin 2008: 36-37.

Table 3. Distribution of body part, minimum number of individuals (MNI), and minimum number of elements (MNE), based on Harlin 2008: 38-39.

ethnographic sources describe. In N2 there has been depression in the wall-circle, which has been interpreted as a door (Carpelan 2003: 72). The N5 goahti had a visible depression on the eastern side of the wall – but not on the same line as the rectangular hearth. There were three larger stones in the depression which had been put there after abandoning the goahti, but when the walls still were standing and visible. This doorway can be interpreted as the back door. This interpretation can be supported by comparing goahti N5 with the N2 goahtis, where the main door was on the west side. The River Nukkumajoki is to the east of the goahti (Carpelan 2003: 72). At Brodtkorbneset site in Northern Norway most of the bones were found in the boassjo or close to the assumed back door (Halinen et al. 2013: 159-161, 173-177; Hedman & Olsen 2009: 17). A look at the distribution map of unburt bone finds (Fig. 31) at N5 shows that most of the finds were found around the assumed back door. These details indicate that the front door was situated on the west side and the back door on the east side of the goahti. Does closing the back door with stones at N5 imply a symbolic closing of the 'heathen' back door influenced by the Christianization of Lapland in the 17th century? The turf hut remained visible for several decades.

The find distribution, the soil phosphate values, the back door, the boassjo, the hearth and so on support the conclusion that the organization of domestic space was the same as in the goahtis mentioned in ethnographic sources from the 17th and 18th centuries. It is possible to observe the same features in both cases, in N5 and in the goahtis of 17th and 18th centuries, i.e. the hearth, the boassjo, the uksa, and the luoitos.

The hearth was almost rectangular and its size (140x107x15 cm) resembles that of the rectangular hearths dating back to the end of the Iron Age and the medieval period (Halinen et al. 2013; Hedman & Olsen 2009). There was one characteristic feature which is different in the N5 hearth and rectangular hearths, namely the boassjo stone(s), usually situated at the rear of the hearth. While the visible boassjo stone was not present in the N5 hearth, it is included in the rectangular hearths from the Late Iron Age and Early Medieval Period. The boassjo stone and its meaning have been described in ethnographic sources from 17th to 20th century as well (Ränk 1949: 103). It was usually a visible larger stone, covering the whole end of the hearth. The boassjo stone was situated between the boassjo and the hearth and it was a sign of the division of the floor area division: the boassjo is the sacred space of the hut (Fossum 2006; Yates 1989). The N5 hearth and the rectangular hearths were packed full of stones, but all the fire places / hearths with a boassjo stone from the 17th to the 20th century were not necessarily packed full. The boassjo stone was sometimes used in cooking or for helping in the cooking. The flat stone on the east side of the hearth (Fee figs. 10-12) was covered with roundish stones, but it was probably used for roasting or baking. According to the distribution of bones, the cooking took place, in the eastern, i.e. rear, part of the hut, and the baking/roasting stone is well suited to this context. The hearth at N5 was of almost the same construction, function and position as the Late Iron Age / early medieval period hearths and fire places of the 17th–20th centuries in Sápmi.

The osteological analyses of reindeer bones do not exclusively reflect reindeer hunting. Small-scale reindeer herding was also practised. Some of the carcases had been brought whole to the site, which means that hunting was practised quite close to it. Although the equal body part distribution can be observed, the bones attached to the meat are partly missing. This reflects probably meat production for commercial purpose. The reindeer bones and greylag goose / bean goose bones point to autumn and winter, but waterfowl also to the other snowless seasons of the year.

The find material consisted predominantly of reindeer bones, but there were also finds of some metal objects. These artefacts point to ordinary everyday life: eating and working with knives and axes, as well as wearing clothes and living. Some of the knives had been imported from Central Europe. The inhabitants of the site sold hides, meat and probably antler objects in turn. Trading was most likely of quite small scale, although at N2 the number of discovered objects was clearly higher than at N5. How does this fit the vision that the sites along the River Nukkumajoki were founded in order to collect tax by the crown (Carpelan 2003: 71)? Some rectangular hearth-row sites from the early medieval period are similar in nature to N 2 and N5, but some sites also differ from them (Halinen et al. 2013; Hedman & Olsen 2008; Hedman et al. 2015). These sites were used for everyday life: eating, sleeping, hunting, practising religious worship etc. How do they differ from the sites along the River Nukkumajoki? One could say that exclusively by virtue of the solid construction of the dwellings, since the structure of the site and find distribution are almost the same. So far, the Nukkumajoki type sites have been found only in Inari, Utsjoki and in some places in

Eastern Lapland. If sites of this kind were founded for collecting taxes, why have they not been found in the other parts of Sápmi that belonged to the Swedish crown? Therefore, there have to be other reasons as well.

The main use period of the rectangular hearth-row sites was 900–1200 CE, but they were used insignificantly also later – at N5 they have been recorded among the solid hut remains (see fig. 2). This was the main structure of these sites: in each hut the find material was different and there are observable differences between the huts (see e.g. Halinen et al. 2013; Hedman & Olsen 2009). The structure of the villages were formed by the life and means of livelihood of hunter-gatherer / small-scale reindeer herder societies. The use of hearth-row sites decreased during the 13th century when the Medieval Warm Period changed to colder conditions at the end of the 12th century (Matskovsky and Helama 2014: 1482). At the same time in Northern Scandinavia the larger scale reindeer herding economy started to take place and expand towards South and Eastern Fennoscandia, to the areas where *stallo* sites and hearth-row sites appeared earlier (Carpelan 2003; Halinen 2016; Hansen & Olsen 2004). In Scandinavia the hearth-row sites were replaced by sites that were more open and were dispersed in the landscape and which belonged to the reindeer herder societies (Halinen 2016; Mulk 1994). Large scale reindeer herding did not reach the Inari region before the 19th century. Instead, the economy of the area remained to be based on wild reindeer hunting. In broader perspective the bases of the society of Inari remained the same, only the now cooler climate placed demands on building constructions: the people of Inari built more solid huts for surviving colder winters better. This meant continuity in the way of life and in the economy.

10 Conclusions

Interpreting the Nukkumajoki 5 site is based on the excavation carried out in 2007. It belongs to a chain of winter dwelling sites along the River Nukkumajoki, which have all been dated to the end of the 16th and the beginning of the 17th century. The constructions observed at N5 clearly resemble those of N2. The goahtis have the same features in both sites, goahti no. 8 at N5 had a main door and a back door, which was later destroyed or at least covered. The floor shape of N5 is octagonal, which deviates from the hexagonal floor areas at N2. In broad outline, the organization of the domestic space of the Sámi goahtis remained the same from the 10th to the 18th century. On the other hand, the constructions of the goahtis clearly changed: from early medieval light goahtis to the 16th–17th century solid goahtis, and again to the light goahtis of the 17th–18th centuries. Although the constructions changed, the idea of dwelling sites remained the same in broad outline. There was a clear continuum from the early medieval period to the 16th–17th centuries: the idea of hearth-row sites, and its tradition, lived on at the Nukkumajoki -type dwelling sites. The hearths, the organization of domestic space, the organization of the site, and the means of livelihood remained the same. The tradition continued for over 500 years in Inari. The winter dwelling sites were there and the tax collecting by the Swedish crown was carried out on-site, but the sites were not necessarily founded for taxation.

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