Chapter 9

Hunters in Transition

Sámi Hearth Row Sites, Reindeer Economies and the Organization of Domestic Space, 800–1300 A.D.

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Introduction

During the Viking Age and the Early Medieval Period, Sámi settlements over the vast interior region of northern Fennoscandia were extensively restructured. Habitation sites were established in areas that were rarely used for settlements previously. These new sites began to display new and distinct features in terms of the organization of domestic space. Hearth row sites are the most conspicuous expression of this new settlement pattern. They consist of large, rectangular hearths organized in a linear pattern (Bergman 1989; Hamari 1996; Hedman 2003; Hedman and Olsen 2009). This restructuring of settlement patterns, which also included the establishment of the so-called Stallo house sites in the northwestern alpine region (Storli 1994; Liedgren and Bergman 2009), took place alongside other pronounced changes: Sámi burial customs became geographically more unified and grave goods more elaborate and varied (Schanche 2000), while sacrifices and other ritual practices intensified significantly (Olsen 2003; Hansen and Olsen 2004; Fossum 2006).

These comprehensive and remarkably unified changes form the background to the current chapter. Focusing on the hearth row sites, our overall aim is to understand why this restructuring of Sámi settlement and domestic space took place and how it relates to other changes in subsistence, settlement and society during the Late Iron Age and Early Medieval Period. Our point of departure is the archaeological investigation conducted during the years 2007–2009 of hearth row sites in the north-easternmost parts of Norway and Finland, in connection with the project Home, Hearth and Household in the Circumpolar North

(HHH). These investigations shed new light on the questions addressed in this chapter.

Sámi hearths and Nordic archaeology

Hearths are the most common surviving elements of Sámi habitation sites from the Late Iron Age to modern times. Even in recent Sámi reindeer-herding sites, the stone-built hearth constitutes the most persistent and visible feature – pertinently so, given the central role the hearth played in the lives of Sámi hunter-gatherers and herders. In the dwelling, the hearth was the focal point of social life and subsistence activities, the place around which they gathered to prepare and consume food, to tell stories, to be warmed and to sleep and rest. Carrying strong religious significance, the hearth also provided an essential spatial node for the socio-religious division of domestic space (Ränk 1949).

Although Sámi hearths have recently become an object of interest to northern archaeologists, their inclusion into Nordic archaeological discourse has been a long and reluctant process. The study of the Sámi past has been strongly affected by national discourses and disciplinary research agendas. The long-held argument of the Sámi as originally 'foreign' to the Nordic landscape, and as lacking the dynamic complexities of the majority populations, contributed to a general acceptance of their past as primarily a matter for ethnographic description; in other words, the concern of a discipline dedicated to the study of distant, isolated, 'primitive' peoples (Olsen 1986; 2000; 2007; Hansen and Olsen 2004; Ojala 2009). Despite the fact that archaeologists and historians throughout the post-war era became increasingly engaged with the Sámi past, the conceptual and interpretative framework was long restricted by this 'ethnographic image' of a primitive culture exhibiting a limited and static repertoire of diagnostic traits.

The early studies of Sámi settlement sites typify this attitude. The ethnic classificatory term 'Lappish hearths' was introduced during the first systematic investigations in northern Sweden in the 1950s. Defining Sámi hearths as either circular or oval in shape, and with a chronology not predating the seventeenth century (Hvarfner 1956; 1957; Meschke 1979), the discovery of the first hearth row sites in the late 1960s created a serious conceptual challenge. Because of their age, shape and size, the large, rectangular hearths 'set themselves apart from the hearths of the Lappish type' and led to an immediate questioning of their Sámi origin: 'Their arrangement along an almost perfectly linear row is also peculiar with regard to Lappish hearths, which normally lack any orderly organisation' (Sundqvist 1973: 56, our translation; see also Christiansson and

Wigenstam 1980: 167). In Norway, the same parameters led to the conclusion that the hearth rows sites excavated at Juntavadda and Assebakte in interior Finnmark in the late 1960s were cremation burials (Simonsen 1979). In fact, the term Assebakte graves became canonized as the most common classificatory concept for the hearth row sites in Norway. In Finland yet another – 'neutral' – term, 'rectangular stone settings', was implemented, despite the overwhelming data speaking in favour of them as hearths (Hamari 1996: 131).

The confusing naming and interpretation of this site type clearly reflects how national borders and research traditions have hampered and bewildered research on what is actually the same archaeological phenomenon. As such, the fate of the hearth row sites accentuates one of the most crucial challenges facing the study of the Sámi past: to overcome its modern political economy of national (and territorial) compartmentalization. The research grounding of this chapter will hopefully set a new agenda by bringing together Swedish, Norwegian and Finnish scholars in the study of rectangular hearths.

Hearth row sites

A hearth row site is defined as a set of three or more equally oriented and regularly interspaced hearths organized in a linear pattern. The sites normally consist of four to eight hearths, although sites with as many as 14 hearths have been recorded. Some of the sites exhibit staggered or uneven hearth rows, constituted of what may be two (or more) smaller hearth rows aligned one behind the other. The hearths are large, normally rectangular, and may measure as much as 2.6×1.3 m. They are usually very solidly built, consisting of large frame stones and stone packing inside. It should be emphasized that these large, stone-lined hearths are much more substantial stove-like structures than the simple firepits that one finds in many other sites across the taiga zone of the circumpolar north. They do find their parallels in the High Arctic in Alaska, Canada and Greenland (Odgaard and Kanal 2003). At some sites the hearths lack the internal stone packing (cf. Sundqvist 1973), suggesting possible functional or seasonal variations. The hearths show traces of intense firing and were probably used inside a dwelling structure (Hamari 1996; Hedman and Olsen 2009).

Hearth row sites are found over most of the interior region of northern Fennoscandia that includes northern Finland, northern Sweden and northern Norway. They are yet to be discovered in the Russian north; however, the north-easternmost hearth row localities known to date are located just a few hundred metres from the Norwegian–Russian border (Hedman and

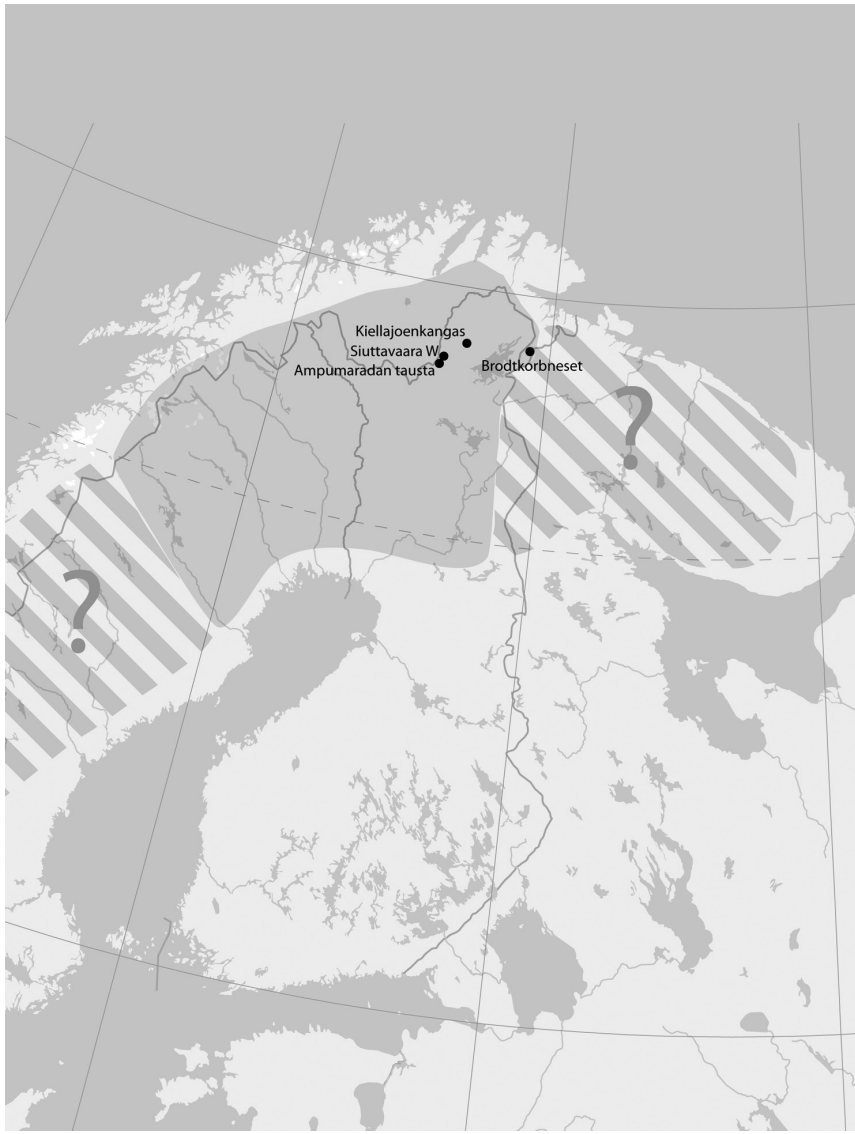

Figure 9.1 *The distribution of hearth row sites in Sweden, Norway and Finland.*

Olsen 2009). Since there is no plausible reason to believe that this modern state border has any relevance to their distribution, it is probably just a matter of time before they are found on the Kola Peninsula (Figure 9.1). More remarkable is a recent find of a hearth row site at Aursjøen, Lesja, Norway, which suggests that their distribution may even have included the mountain areas of southern Norway (Bergstøl 2008: 141–2).

The hearth row sites started to emerge around 800 A.D. They became especially numerous and widespread during the late Viking Age and Early Medieval Period,[1] while around 1300 A.D. their use seems to have discontinued rather abruptly. Their chronology thus coincides with a period of extensive cultural, economic and socio-political transformation in neighbouring Nordic societies. As briefly mentioned in the introduction, this period also brought a number of changes to Sámi communities that in several material respects are remarkably analogous to those represented by the hearth row sites.

Environmental setting

Northern Fennoscandia can be divided into four main environmental zones: (1) the arctic coastal zone, (2) the treeless high mountain zone, (3) the low mountain birch forest zone, and (4) coniferous woodland. These zones are intersected and connected by the numerous larger and smaller rivers and lake systems characterizing these northern landscapes. Hearth row sites are found in several of these environmental zones. They appear within the mountain birch forests as well as in the lower woodland, and some sites have also been discovered in areas near the coast in Norwegian Finnmark. Their main distribution, however, is within coniferous woodland away from the coast and below the high mountain areas. The most typical hearth row habitat is pine forest with rich sources of reindeer lichen. Such lichen woodland has for millennia formed important winter pastures for wild as well as domesticated stocks of reindeer.

The environmental setting of the hearth row sites differs from those considered typical for earlier prehistoric settlements, and suggests that a change in location preferences took place during the Late Iron Age (Hedman 2003; Hedman and Olsen 2009). While the earlier sites are found along the shores of lakes and larger rivers, the hearth row sites normally appear in what may seem more marginal forest areas away from the major bodies of water. The hearth row sites are typically situated on dry moraine outcrops in marsh areas, on forested terraces, or next to small creeks and tarns often surrounded by heathland rich in reindeer lichen (Hedman 2003: 50). Such areas are ideal for pastoral winter habitation and also afford good conditions for storing food in cold caches during summer. While access to water is still important for site location (see Hamari 1996: 129), immediate proximity to lake and riverbank areas seems less imperative.

In terms of paleo-ecological conditions, the general picture of fauna, flora and climate history of northern Fennoscandia is fairly well documented. A number of studies have also provided more detailed knowledge

concerning the conditions in the region dealt with here (Zetterberg et al. 1994; Korhola et al. 2000; 2002; Helama 2004; Kultti 2004; Ukkonen 2004). While the fourth millennia B.C. was characterized by gradual climatic cooling and withdrawal of pine forest, the Iron Age provided other changes. Based on the analysis of sub-fossil Scots pine tree rings (Zetterberg et al. 1994: 115–18; Eronen et al. 2002: 678–9; Helama et al. 2002: 683–6; Kultti et al. 2006: 387–8), it is suggested, with some exceptions, that there were two warmer periods: – (i) 865 to 1260 A.D., and (ii) 1480 to 1600 A.D. – with an intermediate period of cooling.[2] Other regional studies have dated the Medieval Warm Period variously as 900 to 1300 A.D. (Korhola et al. 2000: 291), 950 to 1350 A.D. (Kultti et al. 2006: 388–9), and 300–400 to 1300 A.D. (Seppä and Birks 2002: 197), which in general fit well with the local data situating the hearth row sites within the first warm period.

The most important terrestrial animal for past Sámi livelihood was the reindeer (Aronsson 1991; Storli 1991; 1993; Mulk 1994; Hedman 2003; 2005; Halinen 2005). Wild reindeer populations had summer pastures in mountain or coastal areas and winter pastures in forest regions. The herds migrated in spring to the mountain or coastal areas and in autumn back to the forest regions (Halinen 2005). These migrations may to some extent have been modified by the climatic changes. Today the northernmost coniferous forest areas are concentrated mainly in the river valleys, but during the Late Iron Age and Medieval Warm Period the pine forest areas were more extensive. The tree line was situated around 100 m above the current limit in Sweden, and 100–140 m higher on the Kola Peninsula (Kultti et al. 2006: 388). This probably made the lower mountain areas less suitable for wild reindeer during summer and may have decreased the wild mountain reindeer population. The Medieval Cool Period and the subsequent Little Ice Age (1550 to 1850 A.D.) (Korhola et al. 2000: 291), reversed this situation.

The HHH investigations

Four hearth row sites were investigated as part of the project. Three of these sites (Kiellajoenkangas, Siuttavaara, Ampumaradan tausta) are located in Finland, while the last one is situated in Norway (Brodtkorbneset). Since the late 1960s a number of hearth row sites have been excavated in Finland, Norway and Sweden (cf. Simonsen 1979; Bergman 1989; 1990; Furset 1995; Hamari 1996; Hedman 2003). However, these excavations have more or less exclusively been confined to the hearth structures themselves, yielding little information about what may have taken place in the areas outside and between the hearths (see, however, Sundqvist 1973).

In order to achieve a more comprehensive picture of the organization of domestic space at the sites, including activity areas and possible traces of dwelling structures, we chose to excavate a substantial area outside each hearth, varying in size between 20 and 49 square metres. During the excavations we applied a range of environmental archaeological techniques, providing evidence with which to interpret the specific activities that may have occurred at each site.[3] This was complemented by systematic sampling for soil chemical/physical analyses (phosphorus, pH and magnetic susceptibility). At Brodtkorbneset the sampling grid covered the entire site area and samples were collected at intervals of two square metres, while the more detailed sampling at the Finnish sites (0.5×0.5 m) was confined to the trench areas.

The stratigraphy of the area around the hearths was rather uniform at all sites and mostly consisted of natural podzol layers common to this northern woodland zone: a thick organic top soil (layer 1) followed by thin (3–6 cm) leached, grey-white subsoil (layer 2) and red brown, iron-rich soil (layer 3). Most of the finds occurred in the upper part of layer 2, or in the interface between layers 1 and 2. The hearths were treated as separate stratigraphic units and contained layers not observed outside of them (see below).

The Brodtkorbneset site

The Brodtkorbneset site in Pasvik, Finnmark, is situated right on the Norwegian side of the Norwegian–Russian border (Hedman and Olsen 2009). The site is the most north-eastern hearth row site currently known – although, as mentioned above, it is more than likely that the distribution of such sites continues on the Kola Peninsula. The site consists of seven linearly organized hearths placed at intervals of 8–15 m (Figure 9.2). The hearth row is oriented approximately east–west on a sandy terrace between the Brodtkorbneset promontory (and the Pasvik River) in the east, and moraine slopes in the west. The terrace is covered with lichen, moss, heather and pine trees, and prior to the excavation the hearths appeared only as vague moss- and heather-covered elevations.

All the hearths are rectangular and oriented perpendicularly in relation to the overall linear outline of the site. The length of the hearths lay within the range of 1.5–2.4 m, their width varies between 1 m and 1.2 m, and they reach a maximum height of 0.4 m above the surface. All seven hearths were excavated (trenches varying in size between 20 and 36 square metres), making this the most extensive and complete investigation of a hearth row site hitherto conducted. The excavation exposed well-preserved

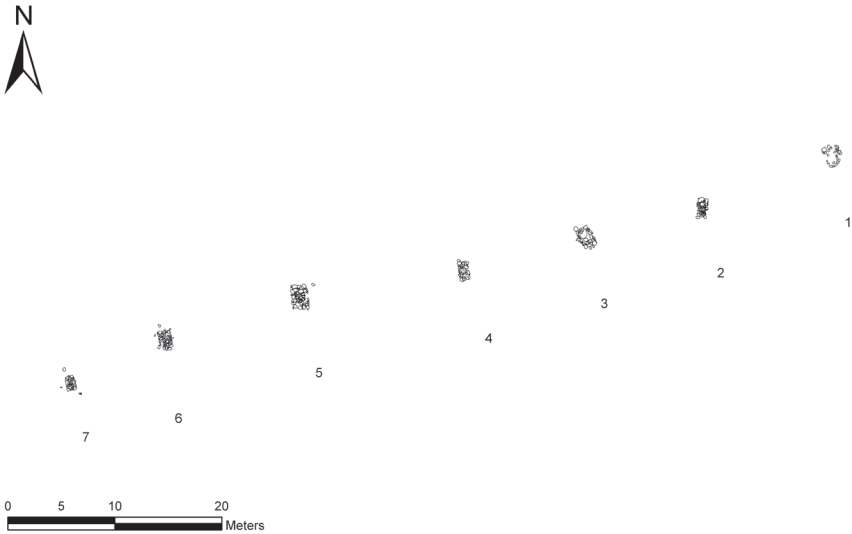

Figure 9.2 *The hearth row site at Brodtkorbneset, Norway.*

rectangular constructions composed of packed and partly layered stones confined by larger frame stones. The only exception was H1, which was severely disturbed by tree-root activity. Some of the hearths (especially the two largest hearths, H3 and H5) contained an upper, covering layer of very compact, sintered soil ('hearth concrete') rich in fragments of burned bones (Figure 9.3). Otherwise all hearths contained a layer of dark brown, fatty soil intermixed with the stones, and a red bottom layer formed by the release of iron oxide during the firing. Another common feature, though most manifest for the largest hearths, was that the northern end was built higher using larger stones, creating a platform-like impression (Hedman and Olsen 2009: 9).

The faunal material was very rich compared with other interior prehistoric sites in the region, and contained more than 10 kg of bones (11,362 fragments). Most of the bones were uncharred and were found outside the hearths. Their distribution was very distinct and systematic, being almost entirely confined to the north side of the hearths (Figure 9.4). The largest amounts of bones were found at the three central hearths, H3–H5: for example, 7.6 kg of bone (5,240 fragments) were found in association with H3. Reindeer (*Rangifer tarandus*) is by far the most dominant species (c. 90 per cent), but a small but significant component of sheep/goat bones (*Ovis/Capra*) were also identified (Vretemark 2009). Other mammal species represented (in very small numbers) are arctic fox (*Alopex lagopus*), wolf (*Canis lupus*), duck species and grouse. Fish is well

Figure 9.3 *Hearth 5, Brodtkorbneset, excavated to expose the hearth (photo Bjørnar Olsen).*

represented in the charred material that primarily stems from the hearths themselves. The most frequent species are pike (*Esox lucius*) and common whitefish (*Coregonus sp*) (Vretemark 2009). The presence of cod bones (*Gadus morhua*), albeit in very small quantities, indicates contact with the coastal area, most probably through summer residence at the coast (Hedman and Olsen 2009; cf. Tanner 1929; Olsen 1984).

A total of 225 artefacts were recovered, the majority of which consisted of cut pieces of bronze or copper alloy (20 per cent) and (tinder) flint (32 per cent). The finds were concentrated at the hearths and the areas immediately surrounding them. Their even distribution around the hearths differs remarkably from the spatially confined bone distributions (see Figure 9.13: p. 177). The flint debris is that characteristic of firestrikers used to produce sparks and fire. Thin pieces of cut bronze or copper alloy are very commonly found at both Sámi sacrificial sites and dwelling sites in northern Fennoscandia and Russia, and have a wide chronological distribution from the Late Iron Age to early modern times (Serning 1956; Carpelan 1975, 2003; Zachrisson 1976, 1984; Odner 1992; Hedman 2003). As raw cut pieces, their function remains uncertain. One suggestion is that they were used as a kind of trade 'currency' (Odner 1992: 131). Their local importance is witnessed by the fact that they are often worked into ornaments such as trapezoid- and axe-shaped pendants (Serning 1956; Zachrisson 1984). A total of ten of these locally produced pendants were

found at Brodtkorbneset, in addition to two other bronze ornaments probably originating from the Ladoga area in Russia (cf. Makarov 1991; Ovsiannikov 1993). Among the other artefacts were four arrowheads, two firestrikers, an axe, a hide scraper, a knife and a fishhook, all made of iron. Bone/antler artefacts were very rare, although a fragmented composite comb was found and the iron knife contained a partially preserved bone shaft. In addition to tinder flint, the stone implements included hones/whetstones and a hammer stone. As with the bones, the artefacts were unevenly distributed among the hearths, with the central hearths being the richest. It is interesting that a 'mundane' artefact such as a tinder flint, while numerous in the deposits from the central hearths, was completely lacking from the two hearths at the extreme (H1 and H7) (Hedman and Olsen 2009).

Figure 9.4 *The distribution of bones (weight units) in the area around Hearth 5, Brodtkorbneset.*

So far radiocarbon dating has been conducted on 29 bone and charcoal samples from Brodtkorbneset. The bone samples consist of burned and unburned reindeer bones, while the charcoal samples stem from selected branches and outer growth rings of pine, the only tree species present in the material. With a few exceptions, the dates cluster rather nicely and suggest that the sites were most likely to have been in use sometime during the twelfth or thirteenth centuries.

The Kiellajoenkangas site

The Inari Kiellajoenkangas site is located between the mountain area in the east and the lower lake region and the Lake Inari basin in the west. This intermediate foothill environment is characterized by mixed bog, rivers and lakes. The site is situated on a sandy heath intersected by small lakes and in a mixed forest area of pine and birch. The ground vegetation consists of reindeer lichen, crowberry and lingonberry heather. The site contains nine rectangular hearths organized linearly along a ridge constituting the isthmus between two small lakes.

As with the other sites, the hearths are oriented perpendicularly in relation to the overall direction of the row. The distance between the hearths varies from eight to 21 metres, and it cannot be ruled out that the site is an aggregation of two or more smaller hearth rows (Figure 9.5). At the south-western end of the hearth row there is a circular hearth that is an exception to the otherwise rectangular hearth form. This hearth has not been investigated and it thus remains uncertain how it relates chronologically to the hearth row. The length of the hearths varies from 1.8 to 2.6 m, their width varies between 1.1 and 1.5 m, and their maximum height is 35 cm. Three of the hearths, H4, H7 and H9, were excavated (for the three Finnish sites the excavated area varied between 47 and 49 square metres).

The excavated hearths at this site are very large, measuring as much as 2.6 m in length. As with Brodtkorbneset, they contained bigger and more solid stones at one end – in this case the south-western end. The stratigraphical situation matched that described for Brodtkorbneset, and the fact that fire-cracked stones were present only in the top layer indicates that the hearths were not built piecemeal or rebuilt. Some internal detailed differences could also be observed: inside H7 and H9 there were slab stones under the fire-cracked stones, but not in H4.

The faunal material was much poorer than at Brodtkorbneset. The only identified mammal species is reindeer. Identified fish species are pike *(Esox lucius)*, in addition to unidentified *salmonid (Salmonidae)* and *cyprinid (Cyprinidae)* fish species. The recovered artefacts were also quite few, and included six pieces of cut bronze or copper alloy and seven tinder flint

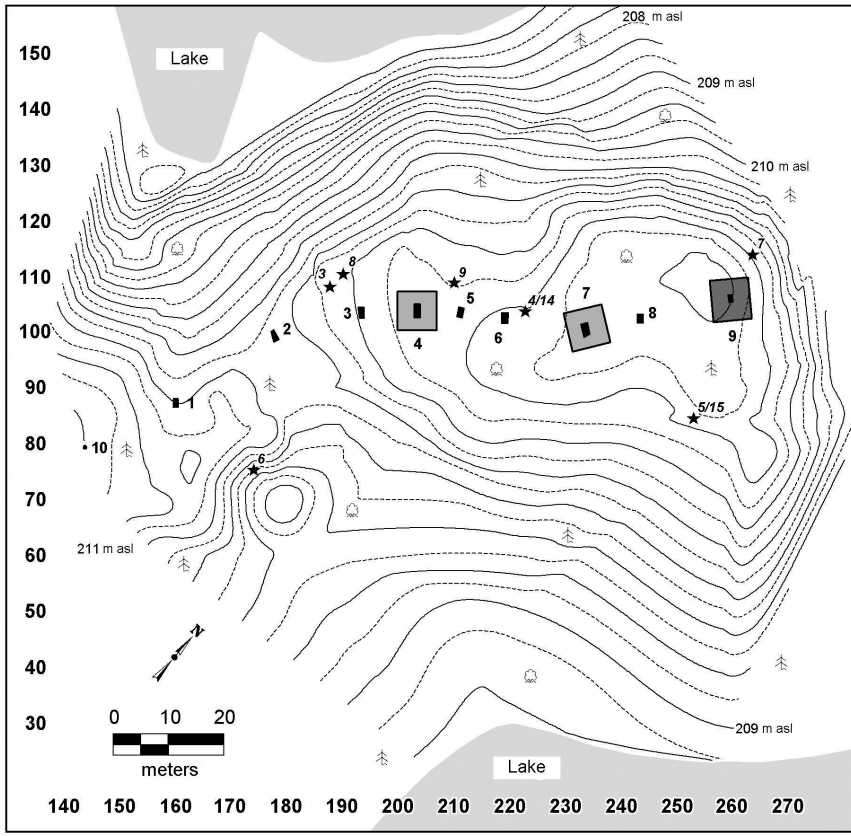

Figure 9.5 *The hearth row site at Kiellajoenkangas, Finland.*

pieces. An iron knife was found in association with H9. The most 'exotic' finds were three intact glass beads and a fragment of a fourth. Compared to bronze and iron implements, glass beads are quite rare in Sámi contexts. We are not aware of any typological parallels to Kiellajoenkangas beads in the Scandinavian and Finnish material, which may suggest that they originate from somewhere in the Novgorodian area of influence (cf. Mulk 1994: 185).

All three excavated hearths have been radiocarbon dated, and a total of five dates are currently available, all based on charcoal. Deciduous tree samples were obtained from H4, while only pine was present in the charcoal samples from H7 and H9. The dates range from the end of the tenth century to the beginning of the thirteenth century. The most likely dating of the hearths is from the end of the twelfth century to the beginning of the thirteenth century, which coincides well with the dating of the Brodtkorbneset site.

The Siuttavaara W site

The Inari Siuttavaara W site is situated on a terrace on the east side of the Inarijoki River. The terrace is flat and situated 15 m above the riverbed. From the terrace the terrain rises gently towards the east, but breaks off quite suddenly into a steep slope towards the river in the west. On the northern side of the site there is a ravine with steep slopes. The dominant tree species is pine with ground vegetation consisting of lichen, crowberry and lingonberry heather.

The site consists of six rectangular hearths organized in a linear pattern. The row is oriented perpendicularly to the terrace edge and the river, which indicates that the river was not a determining factor in its orientation. The hearths are spaced at intervals varying from 8 to 14 m on the remarkably flat site area. Near the hearth at the eastern end of the row (H1) there is a large hunting pit, which was excavated in 1995 and has been radiocarbon dated to the third millennium B.C. (Halinen 2005: 154). About 500 m to the south there is another, larger, hearth row site – Siuttavaara. This site contains 25 hearths in two rows arranged one behind the other with only a short break between the larger and smaller groups. Beside the hearth row there are three hunting pits and a Stone Age/Early Metal Period activity area, which is not properly dated. Four of the hearths have been excavated, and radiocarbon dates indicate a time range from the tenth to thirteenth centuries and on to the Late Medieval Period. The contexts of the charcoal samples, however, were not reliable in every case, which caused a wide range of dates. The hunting pits are radiocarbon dated to the first millennium B.C. The hunting pits clearly predate the hearth row sites, providing evidence for the use of this area for hunting and other activities since the Stone Age.

Two hearths at the Siuttavaara W site were excavated as part of the project, and for each an area of 49 square metres was investigated. The first hearth, H1, was situated in the eastern end of the hearth row and measured $1.8 \times 1.2 \times 0.15$ m. A remarkable feature was that it was mainly constructed of worked stones that had been given an angular shape (Figure 9.6). Both end sides of the hearth contained two bigger stones, though those at the south-western end were higher and more visible. The frame stones were longish in form and clearly bigger than those inside the hearth, which were fire-cracked and tightly packed. The finds were very sparse: only four fragments of unburned bone, two pieces of cut bronze or copper alloy, and one tinder flint. They were found mostly outside the hearth, in a zone which may have constituted the wall area of the dwelling. None of the finds were datable or had characteristic features for cultural interpretation. The only identifiable bone was an astralagus (ankle bone) from a reindeer.

The second hearth, H2, was situated as number three in the row from the east.[4] Its present size was 1.3 × 1.1 × 0.15 m; the short length is at least partly due to the fact that the stones from the northern end of the hearth had been removed. The stones used in its construction were stones that had been shaped naturally. On the northern side of the hearth there was an area of discoloured sand, which included burned bone fragments and a lot of fire-cracked stones. When it was observed, we did not know whether it was what remained of an earlier fireplace or refuse from H2. The bones were reindeer and unidentified mammal bones (probably reindeer as well). Its radiocarbon date, 3844±33 BP (Hela-2155), clearly indicates that it relates to the earlier activity documented in this area, making it almost contemporary with the dated hunting pit nearby. The finds from H2 were very few: a piece of cut bronze or copper alloy inside the hearth, two tinder flints beside it, in addition to some quartz and burned and unburned bones. The unburned bone fragments consisted of two pieces of reindeer bone found on the south-eastern and western sides of the hearth. Most of the burned bones were found in the hearth and in the Stone Age refuse area on the northern side.

The two radiocarbon dates, one from each excavated hearth, are almost identical and suggest a likely dating to the end of the tenth century or to the beginning of the eleventh century. This makes the Siuttavaara W site earlier than the two previous hearth rows described. However, caution

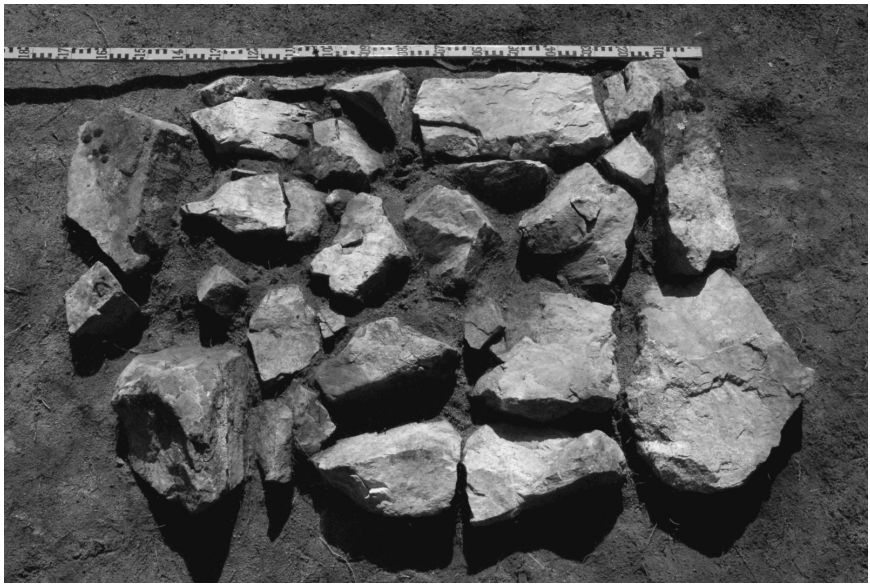

Figure 9.6 *Hearth 1, Siuttavaara (photo Petri Halinen).*

must be taken due to the low number of dates and the fact that they are based on charcoal from pine, which may skew the dating to produce a slightly older result.

The Ampumaradan tausta site

The Inari Ampumaradan tausta site is situated on a flat, elevated terrace on the eastern side of the River Inarijoki. The flat terrace ends in a steep and deep slope towards the river in the west while the terrain rises gently on the eastern side of the terrace. The vegetation is similar to that of the two previous sites. It is important to note that despite the fact that both this site and Siuttavaara W are located close to the Inarijoki River, they are not located at the river bank but on high terraces above the river bed. The steep slopes down to the river suggest that access to the river was not the crucial issue but rather the terraces themselves and what they 'afforded' in terms of settlement space and proximity to fuel, pasture and migration routes.

In contrast to the previous sites, the Ampumaradan tausta site is small and contains only three hearths, organized in a semi-linear pattern. An additional hearth is situated about 200 m to the north. Compared to the other sites the hearths are also quite small, 1.5–1.7 m long and 1.0–1.2 m wide. The distances between the hearths are 10 and 14 m. At the site there are also 25 hunting pits, of which one (hearth five) was excavated in 1995 (Halinen 2005: 154) and yielded a radiocarbon date to 2905±75 BP (Ua-10446). Traces of earlier sites are also present in terms of quartz residues to be spotted on the surface.

The hearth in the middle of the row, H2, was selected for excavation. Its size was $1.7 \times 1.2 \times 0.08$ m. The excavation exposed a rectangular hearth with its western corner disturbed and the original stones dispersed towards the west. Apart from a few larger frame stones, the hearth is peculiar in that it consists of packed small, rounded stones, probably originating from the riverbed (Figure 9.7). The hearth was low as it contained only one layer of these stones. Most of the stones inside the hearth were fire-cracked and the reddish sand layer underneath them confirms intensive firing. The finds only consisted of two fragments of cut bronze or copper alloy. No bones were preserved.

One radiocarbon dating of charcoal (pine) provided a dating that corresponded well to those from Siuttavaara W. This suggests, taking into consideration the caveats already noted, that these two sites belong to a slightly earlier phase than the Brodtkorbneset and Kiellajoenkangas sites – and were probably in use by the end of the tenth century or to the beginning of the eleventh century.

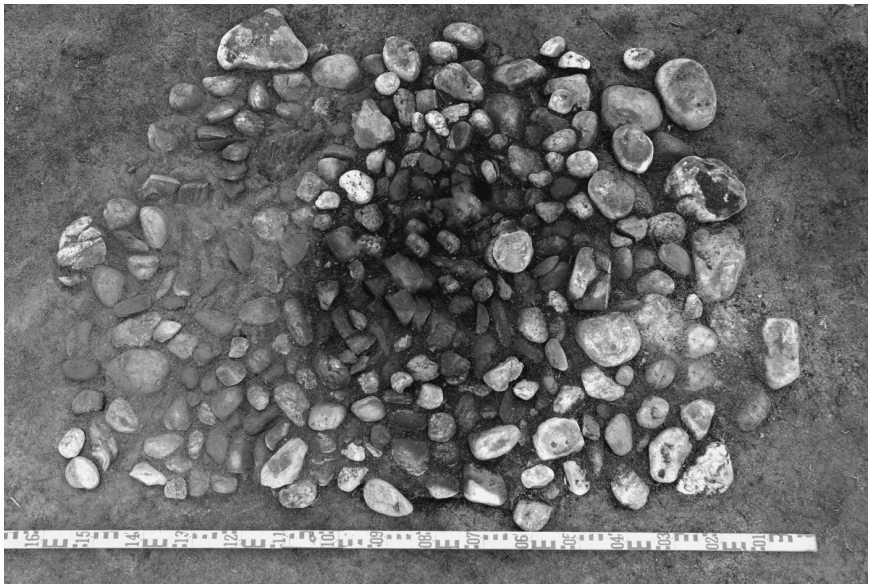

Figure 9.7 *Hearth 2, Ampumaradan tausta (photo Petri Halinen).*

Hearths and dwelling

The basic question is: 'What do the hearths at these sites represent in terms of dwellings and domestic entities?' Despite the substantial area excavated around each hearth, no clear traces related to possible dwelling superstructures – for example, post holes were not found. This negative result resembles earlier investigations, although their limited scales prevented them from reliably scrutinizing this issue. The question thus remains as to whether the hearths represent dwellings or not, but it seems rather unlikely that they do not, for several reasons. The hearths are normally very solidly built, and even in 'lighter' cases such as the Ampumaradan tausta site the amount of stones suggests that heat storage is an important rationale for their construction. Used in an outdoor context, most of the heat would escape into the air and large amounts of fuel would be needed to maintain the heat.

At Brodtkorbneset, the clustering of artefacts around the hearth suggests activity and disposal patterns more in compliance with a dwelling than an open-air site (cf. Olsen 1998: 116ff.). Although the artefact distribution may be claimed to go well with Binford's 'drop and toss zones' for outdoor hearths (Binford 1978: 339), the artefacts recovered here are less likely to be subjected to such 'drop and toss' behaviour. In addition, the systematic distribution of bone refuse clearly suggests spatial patterns

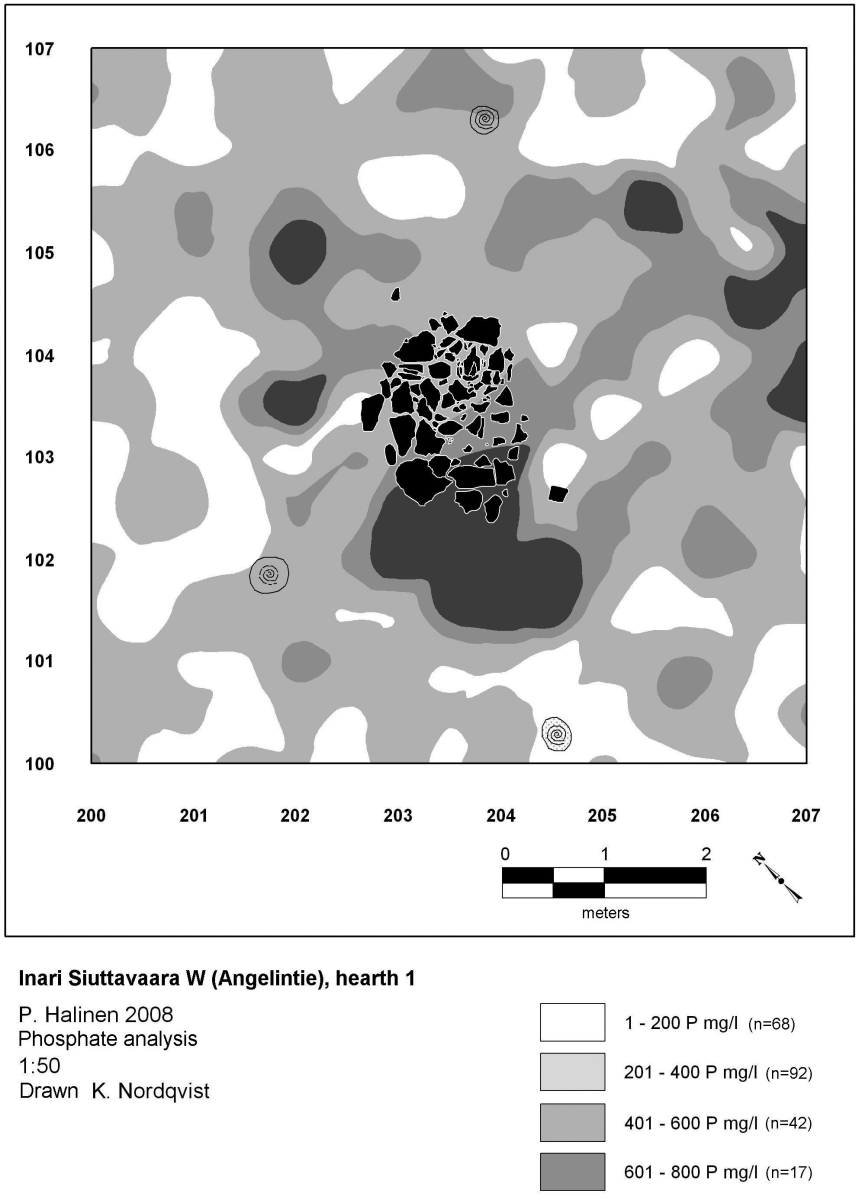

Figure 9.8 *The distribution of phosphate at Hearth 1, Siuttavaara W.*

in accordance with dwelling and entrance structures. At the sites with less favourable preservation conditions, the spatial signatures of the phosphate analyses provides patterns clearly in accordance with what is expected from the confined space of a dwelling and also with historical information

concerning the spatial structuring of Sámi dwellings (Figure 9.8, see also Figure 9.11: p. 175).

Given these depositional spatial signatures and the lack of solid building structures, it seems most likely that the hearths were part of a circular tent dwelling with a highly transportable superstructure of light poles and hides or rugs. This type of dwelling was used by the Sámi during both summer and winter. However, there is a significant difference between the light, conical *lávvu* used during summer and seasonal migrations and the more solid winter tent *(goahti)*. The latter was constructed using a framework of paired curved poles *(baeljek)* and was in recent centuries covered by woven wool rugs. The *baeljek* construction also gave the winter tent a more oval floor outline that would even fit large hearths (Figure 9.9). Thus, it seems more likely that the rectangular hearths were used as part of a *goahti* rather than inside a conical tent of the *lávvu* type (see Bjørklund, Chapter 5, in this volume for a detailed description of Sámi dwellings).

From what can be inferred from the intensity and distribution of finds, faunal material and soil chemical signatures, the human groups associated with each hearth were rather small, probably consisting of nuclear families. The hearth lines may thus be seen as representing co-residing households.

Figure 9.9 *The uncovered frame and* baeljek *of J. Pingis'* goahti *in Rautasjaure, Sweden, 1909 (photo Gustaf Hallström/Photo c690 Forskningsarkivet, Umeå universitet).*

Seasonality, settlement pattern and economy

All the investigated hearths are large and contain an assemblage of packed stones, normally kept inside a frame of larger rim stones. This design creates good heat radiation and also provides an effective heat reserve. Although by no means identical, the size, solidity and constructional features of the hearths suggest that they were used during the colder part of the year – as also implied from their inferred *goahti* superstructure.

Ethnographic material from the eastern Sámi, and the Skolt Sámi in particular, may be used in support of an interpretation of the hearth row sites as winter settlements (Tanner 1929; Nickul 1948; cf. Tegengren 1952). The winter villages *(talv-sijd)* were used from December to April and they served as aggregate sites for the entire community *(siida),* which dispersed into family-based units during other seasons. The winter village was commonly located alongside smaller lakes or tarns and thus away from the major waterways (Keilhau 1831; Tanner 1929). This was a 'relaxing' site characterized more by social reproduction and networking than subsistence activities. The community mostly lived on stored resources, and access to reindeer pasture and firewood were the main factors that determined the location of the winter site. These very same factors caused the winter village to be moved at intervals of 5–30 years (Tanner 1929: 104–6; cf. Nickul 1948: 54–6).

In a number of ways, the settlement system of the east Sámi *siidas* provides a plausible model for interpreting the seasonality and settlement patterns of the investigated hearth row sites. For example, the fact that in the vicinity of the Brodtkorbneset site there are two more hearth row sites, also with seven hearths, fits well with the pattern of 'moving' winter villages. More generally, the new environmental preferences indicated by the location of the hearth row sites also comply with the location of the historical *talv-sijds*.

Archaeological materials, however, often resist being matched harmoniously to ethnographic examples. Also, in this case the retrieved material urges some caution. While the amount and variety of finds from the Brodtkorbneset site may fit well with a communal site occupied throughout a substantial part of the year, the material from the three other sites is meagre and less conclusive. Much of this is probably due to poor preservation conditions. However, the variation in hearth morphology, size and the number of hearths at these sites may be indicative of other seasonal or socio-economic conditions. The faunal material adds further nuances to the ethnographically derived models of the winter villages.

While the preserved bones from the Finnish sites are far too few to support any firm conclusions, the Brodtkorbneset assemblage allows for some interesting modifying interpretations. Several features indicate a

settlement involved in subsistence activities rather than living on stored resources, as assumed by the winter-village model. The cut marks on pike jaw bones indicate the possible procurement of freshly caught fish for drying[5] and the recovered pike vertebrae were all from near the tail part of the spine, suggesting that the fish-rich (and dried?) parts were produced for consumption elsewhere (Vretemark 2009: 10). The same can be said of the pike bones of the Kiellajoenkangas site, which also suggest processing for storing/drying (Halinen 2009). Lake and river fishing were predominantly carried out during spring and fall (when drying also took place), although fishing for pike with nets under the ice during winter is known as well (Tanner 1929: 125, 134–7; Nickul 1948: 21–53). The reindeer bones show an even spread of body parts including meat-rich limb bones, as well as less meat-rich bones such as crania, ribs and vertebrae (Vretemark 2009: 5–6). This suggests that the reindeer consumed were not stored products brought in from other seasonal sites, but had been slaughtered on or near the site, either by killing domestic ones or by hunting from the site. Hunting and slaughtering would most likely take place during autumn, although less extensive late winter snow hunting is also known historically among the Skolt Sámi (Tanner 1929: 116; cf. Tegengren 1952: 105–6). Taking these mixed material suggestions into consideration, it cannot be ruled out that the Brodtkorbneset site was used during fall or late winter/early spring, or that it was used biannually during different seasons. Returning to the same site during other seasons was not uncommon among the late Skolt Sámi (Tanner 1929: 127–9, 216–20).

Having said this, most data still speak in favour of the hearth row sites as primarily cold-season settlements, which in addition to the winter months proper may have included late fall and spring occupation (as suggested by the pike bone remains from Brodtkorbneset and Kiellajoenkangas). Moreover, the organization, frequency and morphology of the hearths make us inclined to believe that the majority of these sites were aggregate sites where the local community gathered and which separate them from family-based sites. Caution, however, must be taken when considering smaller sites such as Ampumaradan tausta, which may represent smaller units cooperating for short-term hunting or herding purposes.

Hunters and herders?

Reindeer is overwhelmingly dominant in the faunal material, which triggers the question as to whether they were of domesticated or wild stock. Pitfalls for trapping wild reindeer are found in the vicinity of all the investigated sites, which, while clearly predating them, suggest that the hearth

row sites were located in areas that provided excellent hunting grounds. The presence of arrowheads at Brodtkorbneset is clear evidence that hunting took place (Hedman and Olsen 2009). That reindeer hunting still was a very important part of the Sámi economy is also reflected in the fact that by far the greatest quantity of iron arrowheads known from the Sámi settlement areas date to the very time of the hearth row sites (Serning 1956; Wegraeus 1973; Hedman 2003; Sommerseth 2009). In fact, the collective hunting of wild reindeer is recorded among the Skolt Sámi as late as the early nineteenth century (Rathke 1907: 159), and even later among the Sámi in northern Finland (Tegengren 1952:101–4).

Thus for a long period, hunting was practised alongside reindeer herding among the Sámi, by the very same groups. Although pastoralism did not become a dominant mode of production among the eastern Sámi before the nineteenth century and early twentieth century (Tanner 1929; Tegengren 1952), the keeping of small stocks of domesticated reindeer is clearly older. However, when this small-scale herding emerged is uncertain, as is the extent to which its economic significance has fluctuated in the more distant past. The fact that the location of the hearth row sites differs from the typical location of earlier inland sites may be indicative of a new economic adaptation. Although some of the investigated sites are situated quite close to large rivers (Inarijoki, Pasvik), their location on elevated terraces above the actual riverbanks, making the river difficult to access, suggests that it was not the immediate 'affordances' (Gibson 1979) of the river that were decisive. One possible interpretation is that access to reindeer pastures, and thus the importance of domesticated reindeer, had become imperative to the location of the sites (Hedman 2003). It cannot be ruled out, however, that this new settlement pattern reflects intensified hunting (due to increased trade and taxation), and/or changes in hunting practices.

The age composition of the individuals represented in the faunal material from Brodtkorbneset shows that predominantly adult reindeer were slaughtered, which has been read as an indicator of the hunting of wild animals rather than the killing of domesticated ones (Vretemark 2009: 2). This, however, is inferred mainly from modern patterns of commercial reindeer production, where calves are more commonly selected for slaughtering. In small pastoral herds, the slaughtering of old animals may be considered advantageous, and age composition is hardly a reliable means to determine whether the reindeer in the past were domesticated or not. In all likelihood, small herds of reindeer were kept for transport and decoy purposes, while hunting maintained its importance.

What may be seen as a surprising clue that domesticated reindeers actually were kept at Brodtkorbneset is the presence of sheep/goat bones, which in itself is rather unique in such an early Sámi context. These bones

stem from both meaty and less meaty parts of the body, indicating that the animals were slaughtered at the site (Vretemark 2009: 7). In modern times the Skolt Sámi primarily kept sheep for their wool, and since these animals are not well suited for moving long distances in snow, the animals were transported from the winter to spring sites in sleds pulled by reindeer (see Figure 9.10, and Nickul 1948: 67). Consequently, and given that this was not a sedentary site, the documented presence of sheep (and goat) implies the need for a draft technology that involved domesticated reindeer. The fact that only young individuals are represented (Vretemark 2009: 8) may indicate the wool-producing importance of older animals not selected for consumption.

The intriguing concurrence between the Medieval Warm Period and the time of the hearth row sites may have been advantageous for the introduction of domesticates other than reindeer into the Sámi economy. To what extent this climatic warming also played a role in the possible introduction of reindeer herding, albeit on a small scale, is far more uncertain. On the one hand it probably reduced the extent of mountain summer pastures due to forest growth; on the other hand, it may have increased the pasture productivity and lichen growth in the woodland areas. This was probably disadvantageous for the wild reindeer stocks migrating to the mountains, and possibly made traditional reindeer hunting less productive in some inland areas. This, and increased productivity in the woodland area, may have initiated a closer relationship to more stationary populations of forest reindeer and in turn stimulated the introduction of herding (cf. Tegengren 1952: 106–9).

Hearth row sites and the organization of domestic space

The most conspicuous feature of the spatial organization of the sites is of course the linear organization of the hearths. Another remarkable spatial feature, most obviously observed at Brodtkorbneset, is the repeated pattern in bone refuse disposal. The spatial distribution of the bones shows a clear and systematic clustering to the north side of the hearths. The lack of comparable faunal material from the three other sites prevents direct comparison, but the phosphate analyses (mainly reflecting bone disposal) have produced soil signatures in remarkable spatial concordance with those observed for Brodtkorbneset (Figure 9.11, see also Figure 9.8).

An immediate interpretation of this spatial patterning is that it reflects refuse clearance and butchering activities structured by the orientation of the entrance and thus the front and focal side area of the dwellings. Due to the shared orientation of the hearths at each site, the entrances to the dwellings all faced in the same direction and thereby led to a systematic

Figure 9.10 *Moving from the winter village: sheep on sledge in Suenjel 1938 (after Nickul 1948: 166, plate XLVII).*

spatial patterning of activities and refuse disposal. This assumption is complicated by historical and ethnographic information regarding the Sámi organization of domestic space (Figure 9.12). As summarized by Gustaf Ränk (1949), the hearth mediated a basic social and cosmological

dualism between the front and back spaces in the *goahti,* as also reflected by its two opposite entrances. The inner part of the dwelling (the *boassu* area) was the male area, leaving the front part as the female (and common) domain. The *boassu* was considered sacred, as was the attached back entrance. Sacred objects and hunting weapons were stored here, and as with the slaughtered wild animals, they could only enter the *goahti* through the second doorway (cf. Yates 1989). However, the *boassu* area also served as the kitchen area of the dwelling, the place where meat and fish were cut and prepared for cooking. Thus, according to the ethnographic schemata, it may well be the back side of the dwelling that leaves the most visible imprints in the archaeological and soil chemical record.

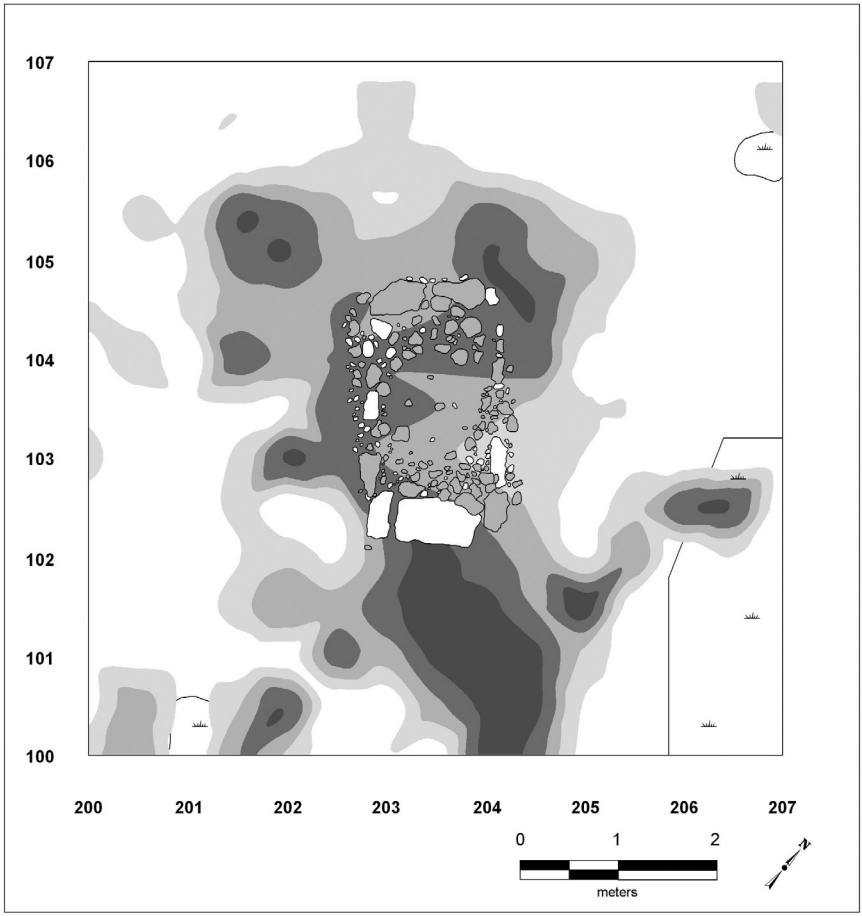

Figure 9.11 *Distribution of phosphate at Hearth 4, Kiellajoenkangas.*

It is interesting to note that the clear spatial patterning of bone refuse is not matched by the artefact distribution at Brodtkorbneset (Figure 9.13). Artefacts are found evenly distributed around the hearth, with most of them next to the long sides. These divergent patterns of distribution could indicate that the bones were more likely to be deposited in accordance with the prevailing social and cosmological schemes. The proposed rules for how and where to handle meat and food within and next to the dwelling (cf. Ränk 1949; Mebius 1968; Edsman 1994; Grydeland 2001) may have been decisive for the discrepancy. However, as mentioned, the generated pattern of bone disposal may simply be the result of a dwelling with just one entrance that determined the direction and spread of refuse disposal. Moreover, according to the dualist interpretation, domestic products such as milk, and also domesticated animals such as goats and sheep, should be kept separate from game and 'wild' products, and should enter the house through the front entrance (Yates 1989). The fact that the bones of goat and sheep are found in the same 'back' areas (and same deposits) on Brodtkorbneset as reindeer and wild animals provides another cautionary tale about being too overenthusiastic in the reading of the ethnographic record into archaeological analysis. Nevertheless, it is still intriguing that the bones of these species were found in the same deposit with a rare iron axe and two trapezoid pendants – and that all the arrows were found in what corresponded to the northern section of the dwellings.

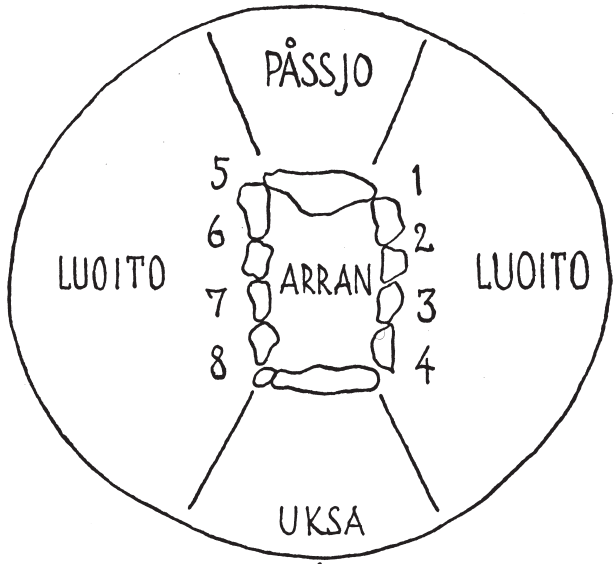

Figure 9.12 *A model of the division of Sámi floor space (after Ränk 1949).*

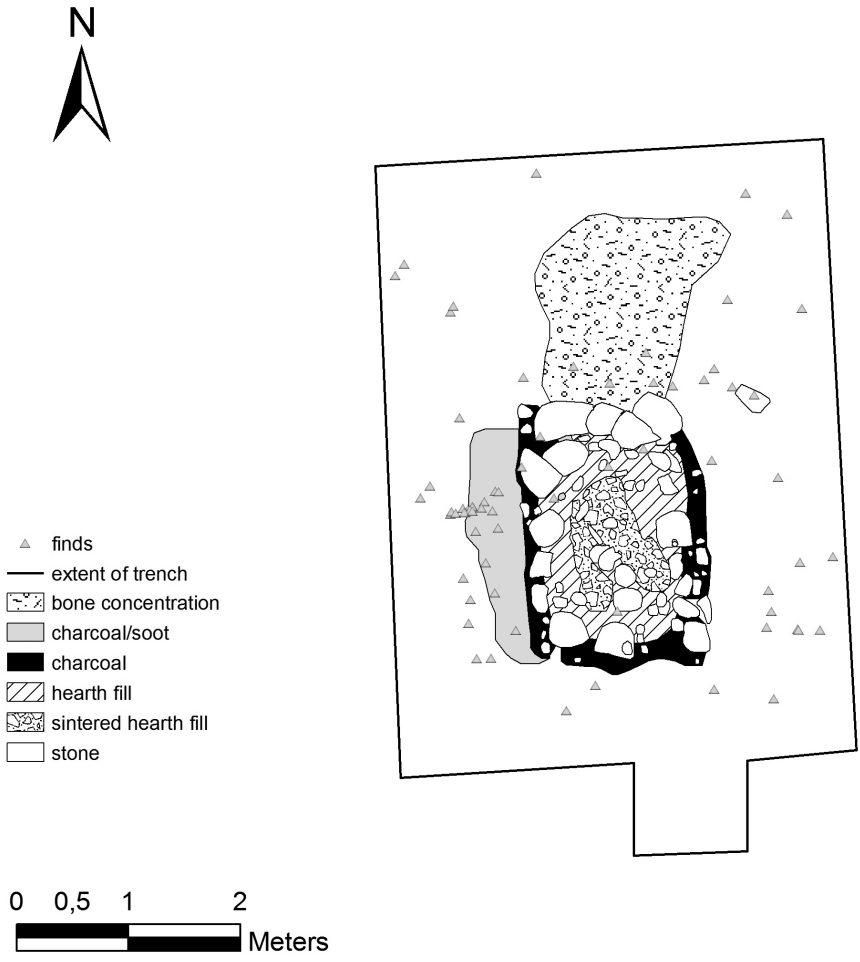

Figure 9.13 *Artefact distribution in the Hearth 5 area, Brodtkorbneset.*

Linearity and difference

The most conspicuous spatial feature of the hearth row sites is nevertheless their formalized linear organization. The significance of this spatial pattern should be considered both on a site-specific and more wide-ranging regional level. Although we cannot say for sure that all dwellings associated with the hearths were occupied at the same time (although most of them probably were), the organization of the site nonetheless testifies that it was constructed and conceived of as an entity. Even if a hearth row had emerged in an accumulative manner, by subsequent hearths being added to abandoned ones, those added must have been constructed

and arranged according to the order of those previously built. Possible ancestral hearths would thus have acted as effective members of a hearth row site, also suggesting a more liberal and inclusive conception of contemporaneity than the one normally guiding archaeological chronologies (Olivier 2001: 66; Olsen 2010: 126–8). This possibility notwithstanding, it is important to emphasize that a hearth row site was something more than a number of co-residing units of people. As with all settlements, it was a hybrid site also entailing a number of other inhabitants, including animals and things.

How then should we interpret the linearity so constitutive for the identification and naming of these sites? As with the principle of symmetry, a linear settlement pattern has been associated with egalitarianism (e.g. Levi-Strauss 1979: 133–9, 291–2). By arranging each hearth next to the other, emphasis is placed on the commonality and equality among the people and families occupying the site. This, however, does not mean that we are dealing with a society that actually was egalitarian or without social differentiation beyond that associated with age and gender. As a number of studies have convincingly argued, there is no direct fit between social relations and material manifestation (i.e. Hodder 1982; Schanche 1994; Hayden 1995; Osborne 2007). For example, in his discussion of hearth rows and communal longhouses in the Late Dorset culture of northern Canada, Max Friesen argues that 'this evidence for overt signalling of equality may indicate the presence of the exact opposite: longhouses and hearth rows may have been constructed as acts of resistance to a growing tendency towards inequality or incipient hierarchies' (Friesen 2007: 207; see also Olsen 1984: 105–6; 1994).

Although the row-organized hearths at first glance may look similar to each other, they actually exhibit clear distinctions. These differences include the construction, size and morphology of the hearths themselves, which also, as witnessed at Brodtkorbneset and Kiellajoenkangas, covariates with the amount of bone refuse, as well as the richness of the finds. It should also be noted that the linear outline of the sites is occasionally erratic, modified or broken. Although such variation may be caused by a number of factors, including post-depositional processes, there are still ample reasons to suggest that this also signifies differences between households. Studies of Sámi burials, sacrificial sites and settlements elsewhere in Sápmi have suggested emerging social differentiations within the Sámi societies during the Late Iron Age and medieval period (Odner 1992; Storli 1994; Zachrisson et al. 1997; Schanche 2000; Hedman 2003; Hansen and Olsen 2004; Halinen 2009).

Such emerging differences may be related to the status and prestige ascribed to successful hunters or herders, and/or to a successful involvement in trade networks (Hedman 2003; cf. Hayden 1995). An emerging

reindeer pastoralism may possibly have caused tensions in relation to property rights versus common access to resources. Such internal inequality may even have been related to the control of fire. To be able to light and keep the fire in the hearths was vital to survival during the Arctic winters, and to be dependent on others a possible sign of inferiority. It is possible that the uneven distribution of flint and firestrikers at Brodtkorbneset site indicates such differentiated access and dependency. The two firestrikers were found at a central hearth (H5), and the central hearths also contained numerous finds of tinder flint. In contrast, the two most peripheral hearths (H1 and H7) were curiously lacking flint finds.

As already argued, in discussing the potential social significance of the hearths we should be careful in seeing the material side as somehow epiphenomenal or residual to the social side. Things and material structures do not just reflect or mirror a society existing behind the material, but are themselves indispensable parts of this very social fabric (Latour 2005; Olsen 2010). In other words, the hearths were not just expressions of households and communities; they formed integral parts of these collective and composite entities. Taking the hearths seriously as social constituents also implies being attentive to their material characteristics. Despite the impression of equality and sameness imbued by their shape and organization, the hearth rows do also exhibit differences (Hedman and Olsen 2009). The hearths themselves (and associated assemblages) may therefore have contributed to both creating and masking social differences, and as such, played a key role in mediating the opposition between equality and difference, stability and transition.

Hearth row sites, ethnic consolidation and the socio-economy of the North

As previously mentioned, hearth rows became a common feature of Sámi settlement organization during the Viking Age and Early Medieval Period. Given the vast areas affected by this change in settlement organization (cf. Figure 9.1), a proper understanding of it necessitates that the hearth row sites are seen in a wider, interregional context that includes both Sámi and neighbouring societies. Seen from this perspective, their standardized spatial outline may be seen as part of a greater process of formalization and unification of Sámi material culture that took place during this period (Hansen and Olsen 2004: 125–41; Fossum 2006).

In terms of the settlement outline, the same linear pattern is reflected in the organization of the so-called *stallo* house sites that spread throughout the northern Norwegian/Swedish alpine zone (Mulk 1994; Storli 1994; Liedgren et al. 2007; Liedgren and Bergman 2009). Ritual and

religious practices also became formalized and unified over larger areas, as manifested in sacrificial practices (Serning 1956; Zachrisson 1984), bear burials (Myrstad 1996) and the spread of the scree-grave burial custom (Schanche 2000; Fossum 2006). Also, with regards to implements and ornaments, the Sámi material repertoire at this time appears as something distinct due to its mixture of foreign (primarily eastern) and local products and styles (Serning 1956; Makarov 1991; Wallerström 1995).

In general, these processes of unification and formalization led to a new 'visibility' of Sámi material culture. From being rather anonymous and regionally patterned during large parts of the Iron Age, Sámi material culture snaps into focus in the late Viking Age as something distinct and widespread, making its recognizable imprint on the vast territory ranging from the South Sámi area to the Kola Peninsula (Hansen and Olsen 2004: 140–41).

These processes of interregional material formalization and unification may be seen as responses to ongoing social and economic processes which took place within neighbouring societies; processes that seriously affected interethnic relationships and thus Sámi societies themselves. The Norse societies become Christianized during the late Viking Age, local chiefdoms gave way to kingdoms and state formations, and in the east the emerging Novgorod trade empire subsequently started to spin its extensive trade network throughout the North.

The effect of all this was an interethnic situation that was under more tension. While earlier interaction was mediated by locally redistributed economies and shared religious values (Odner 1983; Price 2002; Olsen 2003; Hansen and Olsen 2004), the new regimes created a less symmetrical and less predictable sphere of interethnic contact. The intensification of the fur trade (and possibly taxation), particularly (although far from exclusively) as effectuated by Novgorodian interests, put the Sámi economy under pressure, causing a far more direct interface between the 'local' and the emerging European 'world system'. One archaeological signature of this trade is the ornaments of eastern origin found at sacrificial sites (Serning 1956), in burials (Schanche 2000) and at hearth row sites (Simonsen 1979; Hamari 1996; Hedman 2003; Hedman and Olsen 2009). As briefly mentioned, there are ample reasons to suggest that the surplus of this trade acted to create or accentuate processes of social differentiation within Sámi societies.

Within such a turbulent context, the formalization of settlement organization, as reflected in hearth rows and linearly organized *stallo* house sites, together with the unification of religious and ritual practices, may be seen as a way of responding to and coping with this new situation (cf. Olsen 2000; 2003). While also playing a role in terms of negotiating local social processes as suggested above, on a grander scale this material mobilization

may have acted to consolidate identity and values and to manifest rights to land and resources. While Sámi ethnic identity was previously meaningful in a primarily local way, and thus differentially manifested, the new material utterances helped to create this identity as something relevant and distinctive on a larger geographical scale. Probably for the first time, Sámi culture and identity emerge as something relatively unified and recognizable within most parts of what is today considered Sápmi. Hearth rows contributed to this process of ethnic consolidation and unification. Moreover, by being constructed over increasingly larger areas, their presence may have reminded travelling traders and tax collectors of the people to whom this land belonged (see also Wishart and Loovers, Chapter 4, in this volume,). Against the backdrop of state economies and trade networks competing over Sámi resources, the hearth rows may have thus also acted as a mutually comprehensible if tacit statement of Sámi rights to pastures and hunting grounds.

Conclusion

The large rectangular hearths, with their peculiar linear organization, were long considered as displaying 'non-Sámi' features. Stereotyped conceptions of Sámi culture as static and spatially disorganized clearly grounded such opinions. On a par with Sámi material culture more generally, the extensive repertoire of hearth row sites brought to archaeological attention over the past 30–40 years clearly challenges these and other prejudiced concepts. In this chapter, we have argued that the order and symmetry implied by the row-organized hearth sites were probably related to both the role they played in internal social dynamics and in negotiating regional processes of change. As such, their conspicuous design and spatial order were clearly historically contingent, responding to transitional processes in one of the most decisive epochs of Sámi and northern history.

The material also provides a thought-provoking supplement to narratives based on the ethnographic record. Although there may be significant commonalities with settlement patterns and subsistence practices, as depicted for the Skolt and eastern Sámi societies from the late sixteenth century to the early twentieth century (cf. Tanner 1929; Tegengren 1952), the material also suggests ways of dwelling and organizing domestic space that do not conform to the historical and ethnographical information. Nor does it comply well with basic socioeconomic taxonomies separating hunters from herders, or 'simple' from 'complex' societies. Those who tented at the hearth row sites nearly a millennium ago may well have been both reindeer hunters and herders, and their pastoral skills were not restricted to just reindeer.

Acknowledgements

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Notes

1. The Viking Age is commonly dated to c. 800–1050 A.D. and the Early Medieval Period to 1050–1200 A.D.
2. Due to the low sample size covering the period from 1200–1430, it has presented two different temperature curves – a cooler one and a warmer one (Zetterberg et al. 1994: 115), and cooler periods c. 1260–1320 (i), 1440–1480 (ii) and 1781–1850 (iii).
3. We applied phosphorus, pH, and magnetic susceptibility analysis. The phosphorus tests were used to develop phosphorus concentration diagrams which give an impression of the distribution of organic matter, and in particular the concentration of wastes from food processing and the concentration of domestic animals. The magnetic susceptibility tests allow one to make generalizations on which rocks had been disturbed.
4. During the initial survey and recording of the site one hearth situated between H1 and H2 was missed and has later been added to the record. To be consistent with the official heritage record the old numbering is used here.
5. Cutting the front jaw section of the pike head was done prior to splitting the fish along its spine to facilitate better/faster drying (cf. also Itkonen 1921: 65).