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TRACES OF IRON IN PREHISTORIC FINNMARK

Abstract

The author discusses finds and traces of iron and slag in Finnmark. Three main groups of finds will be focused on; finds of iron, rust marks on antler- and bone-artefacts and copies of metallic objects. Through these finds a model for the character of iron distribution in the last millennium BC is proposed. With the aid of slag analyses the possibility of the production of iron is also discussed.

Keywords: iron production, iron slag, rust marks on antler- and bone-artefacts, replicas of metallic objects.

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Some of the most important archaeological sites in Northern Norway are located on the small island of Kjelmøy in Bøkfjorden, Varanger. The two sites, Makkholla and Mestersanden have been known to archaeologists for a long time and have formed the basis for a great deal of archaeological work on the transition from the Stone Age to the Metal Ages in Finnmark. Mestersanden was discovered in 1860 when a man called Jordan wanted to grow potatoes on the island and huge amount of antler and bone artefacts was dug out into the open. A thorough investigation was carried out by Ole Solberg in the years 1907, 1908, 1910 and 1931 with well-known publications from 1909 and 1911 (Solberg 1909 and 1911). Solberg characterised the location as a dwelling site from the Iron Age. He dated it to AD 800-1100 (Solberg 1909:124) but this has later been corrected to 900 BC, i.e. BC/AD (see Olsen 1991 for a thorough discussion) which gives us a very early date for the first artefacts made of iron in Finnmark. The dating is mostly based on ^{14}C dates from Kjelmøy ceramics and charcoal from Makkholla, Kjelmøy. The latter was of a layer that included a knife handle of antler and an iron fragment with the result 780-420 BC (Olsen 1984:46). Thus a very early date for the introduction of iron in Finnmark must be set on the basis of the Kjelmøy finds alone. As we shall see other finds also support this notion.

IRON IN FINNMARK

Although finds of iron date back a long time in Finnmark the finds are always small and scarce. They usually consist of small pieces of iron or slag like those recovered from the graves at Cieste, Mortensnes in Varanger. Here the finds consist of small pieces of iron sometimes found together with Kjelmøy ceramics, bone fragments and bark dated to the Early Metal Age (Schanche 1997:189). The knife from the grave at Kvalnes in Nesseby (Fig. 2) is the only find where the shape of the implement still can be seen. During the large excavations of 1991 and 1992 at Slettnes on Sørøya in Western Finnmark, three dwelling sites from the Iron Age were discovered. The three sites F7, F204 and F205 seems to add strength to the notion of limited but stabile use of iron in prehistoric Finnmark (Hesjedal et al. 1996:25-27). Small pieces of iron was found inside the house structures, which were dated to AD 80-250 and AD 700-900. The finds also included what was thought to be small pieces of iron slag (Hesjedal et al. 1996:31-32). The latter proved, however, to be unroasted iron ore that can occur naturally, but still it seems odd to find this ore on a dwelling site from the Iron Age. Naturally deposited iron ore is not a common thing to find at dwelling sites as far as I know, but I will discuss this problem later in the article.

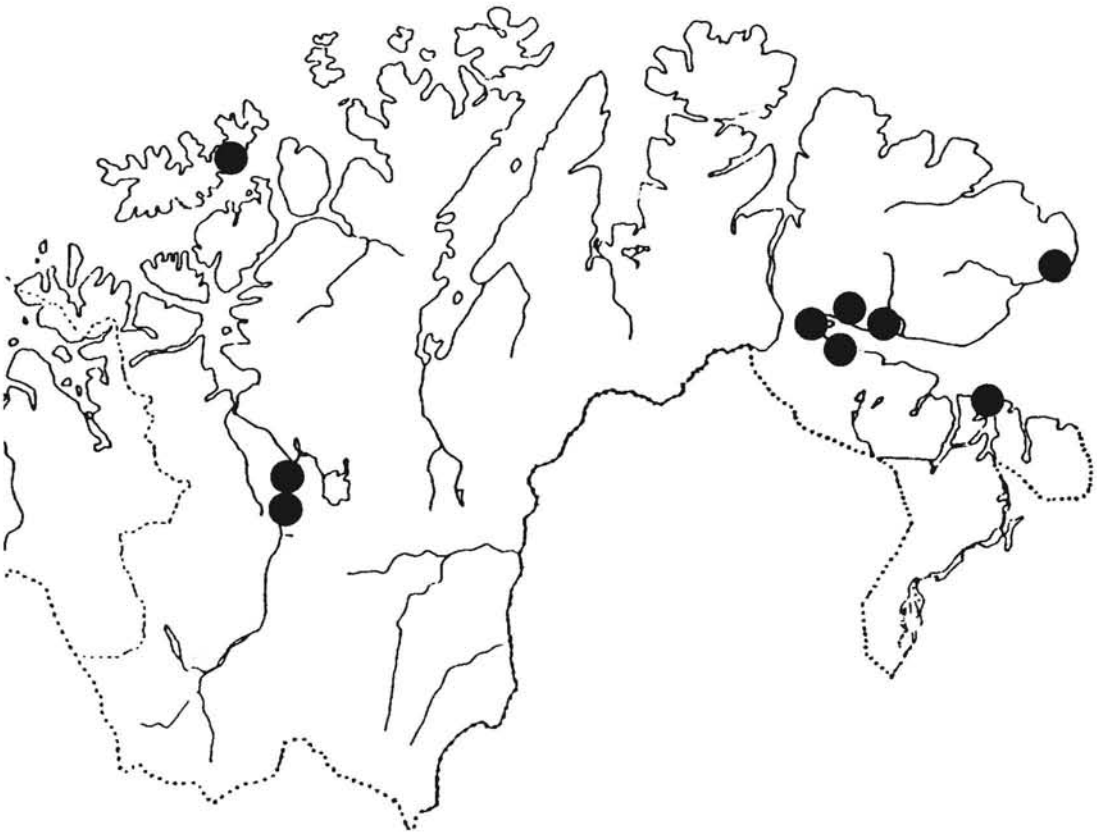

Fig 1. Archaeological sites in Finnmark from the Early Metal Age with iron and slag has been found.

As shown by the map (Fig. 1), there are several places in Finnmark where prehistoric iron has been found. As mentioned above, the magnitude of the finds are quite small compared to e.g. the iron production sites in the southern parts of Norway, but are in my opinion significant with regard to the question of early presence of iron in prehistoric Finnmark. Bearing in mind the probably small population of Early Metal Age Finnmark and the considerable time span involved between deposition and excavation one should not expect these finds to be large in quantity. There is, however, a second group of finds that may shed some light on this matter: antler and bone artefacts that show traces of iron, like patches of rust, adaptations to metal parts or marks of cutting with metal blades.

TRACES OF IRON

If we now consider the two sites at Kjelmøy, Mestersanden and Makkholla these of traces of iron are quite considerable in number. Iron artefacts have been found at both these sites, two fish-hooks with iron points and two knife handles with the blade still in place, but in addition to this, 56 knife handles that bear clear traces of iron blades have been found here (Fig. 3). Rustmarks, holes in the shaft to hold the blade in place etc. are evident on many of them and a lot of fishhooks and composite tools such harpoons bear the signs of adaptation to iron (Fig. 4 and 5) (Solberg 1909 and 1911; Olsen 1994:132). On closer inspection one can see that many of these bone artefacts must have been made by metal blades. The long and even traces left on the surface of the bone tools clearly indicate that metal tools and not lithic ones were applied in their production (Fig. 6). This point has been previously noticed by H. Winge, the zoologist working with the osteological material

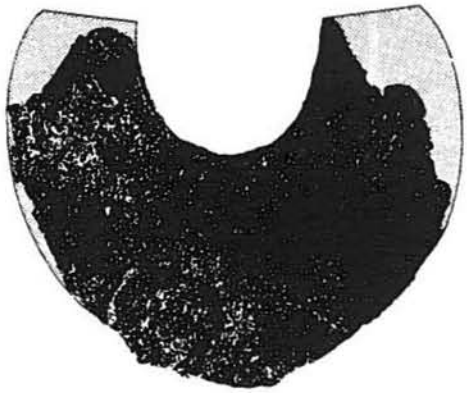

Fig 2. A knife from Kvalnes in Nesseby, Finnmark. The knife was found in an Early Metal period grave together with Sär2 ceramics and a plate of red slate.

Fig 3. Knife-handles from Mestersanden, Kjelmøy. The handles show patches of rust where the blade was placed.

(Solberg 1909:22; Olsen 1984:45-47). These traces of iron together with the actual finds of iron give a clear impression of a society where iron was an important and integrated part of technology.

Another point worth mentioning is the small amount of stone implements at Kjelmøy. Only flakes and scrapers of quartz and quartzite have been found at this site which in turn implies the picture of a diminishing lithic technology. This also seems to be valid in other parts of Finnmark too, at least in the coastal areas. In that respect the material from the site F7 at Slettnes is quite typical. This house-structure is dated to just after the birth of Christ and stone implements, apart from a few flakes, were not found at all (Hesjedal et al. 1996:25-27). This indicates that stone artefacts were no longer in use, and it therefore seems reasonable to interpret the last millennium BC in Finnmark as a time when tools made of stone were replaced by metal, most likely iron.

A further indication of this may be seen in a third group of artefacts that should be considered: bone tools which appear to be replicas of metal objects and forms. A lot of attention has been placed in the flint daggers of southern Scandinavia where the shape and even the flanges of the moulds for bronze daggers were "copied" in flint. Flint daggers have been seen as a response to the daggers made of bronze and copper and they show an attempt to accommodate domestic technology to the new designs of the metal-producing cultures (Lomborg 1973). Similar attempts are also evident among the bone and antler artefacts of Northern Fennoscandia, although the forms are not as obvious as these daggers. Ole Solberg points to one item in the material from Mestersanden, a large spearhead made of antler, with the remarks: *"Dass es sich hier um die Nachbildung einer metallenen Speerspitze handelt, liegt auf der Hand"* (Solberg 1911:354). Whether this metal was bronze or iron is hard to say, but the resemblance to metal spearheads is quite obvious. Another find from the same site bears the same kind of characteristics. It is a curved antler-dagger (Fig. 7) that is hard to ascribe to any practical function and it is tempting to see it as a response to the daggers of Sillankorva, Pyhäjoki at Savukoski in Northern Finland. The dagger from Kjelmøy shows some resemblance to these daggers and may be seen as a sign of contact between hunting and gathering-cultures of Finnmark and eastern metal producing cultures (Sundquist 1999:85-97). Other artefacts in Solberg's material [(e.g. Fig. 4n (Solberg 1911) and Fig. 74 (Solberg 1909)] may be interpreted in the same manner, although the resemblance is less obvious in these cases.

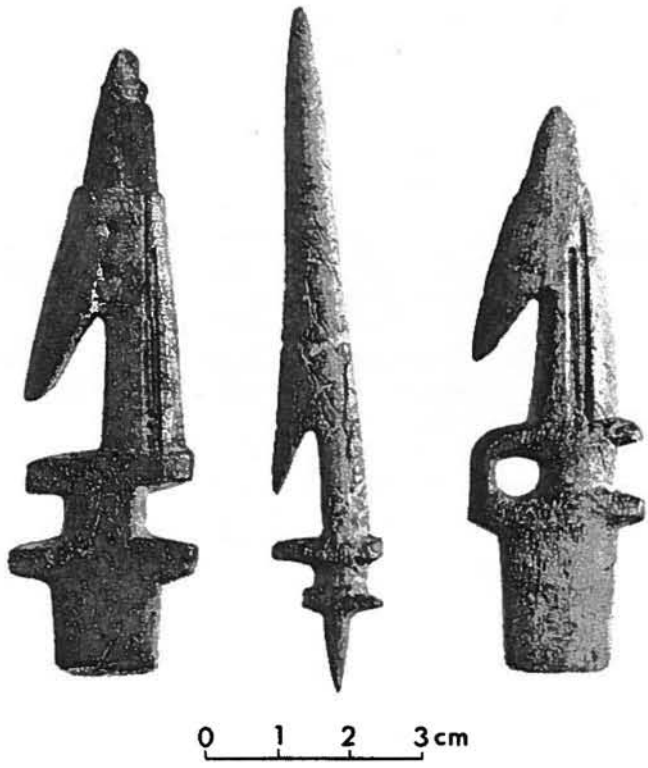

Fig 4. Harpoons from Kjelmøy with traces of adaptations to metallic points. The point was probably strengthened with a folded sheet of iron.

Another find to be mentioned comes from Suomussalmi in Northern Finland. It is a rim fragment of a Sär2-type vessel and this piece (Fig. 8) has a very distinctly made "ear" on the rim, a characteristic feature of metallic vessels used for cooking. The metallic pots are hung by this "ear" over the fire, but this does not seem to be the case with the ceramic vessel. The "ear" alone would probably not be able to bear the weight of a filled vessel and besides, there is no hole for this purpose in it. One possible interpretation is that this element was added to the ceramic vessel in an attempt to replicate metallic vessels that the potter had observed among metal producers. This is a further indication of contact between the hunter-gatherer cultures of the Sär2 complex and other cultures where iron has been produced. The source of this iron is hard to trace, but the Ananyino complex seems to be most likely in this respect (Gjessing 1935; Tallgren 1937; Olsen 1984; Sundquist 1999).

The finds that I have described so far do not give any definite answers to the distribution of iron in Early Metal Age Finnmark. Still, they provide an indication of the character of the use of iron in the period discussed here. A further indication may be provided by a closer inspection of the pieces of slag that have been found.

SLAG REMAINS FROM FINNMARK

An important point to be noticed regarding iron slag is that this material is preserved much better than pure iron is. Although this point is fairly obvious it is still important to emphasize for the following reason: The uneven way in which the objects are preserved may cause a bias in the archaeological record. In this case, iron may have rusted away after a few years while the slag is preserved virtually unchanged through time. It is therefore likely that archaeologically discovered slag corresponds much more to the original amount of slag than is the case for pure iron.

Thus, it does not seem probable that the slag remains from Finnmark are the result of any early production of iron. The small amount of discovered slag speaks against such a scenario. Only four sites from Finnmark have reports of slag being found: Slettnes, and Makkholla at the coast and Virdnejavre 106 and 112 in

Fig 5. Fish hook from Kjelmøy in which the folded iron still can be seen. The sheet of iron is now pointing upwards, but was originally wrapped around the point of the hook as in Fig 4.

Table 1.

Preliminary results of X-ray difractometric analysis
Toivo Kallaste, Estonian Institute of Geology
Object: Ore and slag samples
Subject: XRD analysis

Sample No. 1 (Ts. 8761 mp.)
Quartz (SiO_2); plagioclase ($NaAlSi_3O_8$, $CaAl_2Si_2O_8$); hematite (Fe_2O_3); probably sand joined with iron oxides

Sample No. 2 (Ts. 8761 mv.)
Non-homogenous slag, slightly magnetic. Brown part (ochre): goethite (FeOOH) with a slight admixture of lepidocrokite (FeOOH)g; sample of grey part: fayalite Fe_2SiO_4 and wustite FeO.

Sample No. 3 (Ts. 9433 i.)
Pure goethite (FeOOH)a

Sample No. 4 (Ts 8763 tw.)
Goethite (FeOOH)a; lepidocrokite FeOOH)g; quartz (SiO_2); plagioclase ($NaAlSi_3O_8$, $CaAl_2Si_2O_8$); probably soil joined with iron oxides.

the interior (see Fig. 1). Each of these finds consists of only a few small lumps of slag (Sundquist 1999:40-45). Morphologically, they have much more in common with *sprutslagg*, slag that is given off through hammering when the final iron objects are forged. An analysis of slag from Slettnes and Virdnejavre also proved this point (Table 1). The analyses was conducted by Toivo Kallaste at the Institute of History in Tallinn, Estonia, and conclude that only one of the four investigated samples, Ts. 8761 mv from Virdnejavre 106, proved to be iron slag. A visual inspection by the Finnish archaeologist Jouko Pukkila, University of Turku, Dept. of Archaeology, also indicated that the sample was slag from smithing and not from the production of iron. The other samples consisted of Goethite with different kinds of admixtures, but whether this was of natural origin or not was impossible to tell.

The amount of Early Metal Age slag found in Finnmark is, in other words, very small. In addition to the slag at the site Virdnejavre 106 mentioned above Virdnejavre 112 also contain remains of iron slag (Hood and Olsen 1988). This leaves us with only two sites that have confirmed finds of slag while several more sites contain fragments of pure iron and iron artefacts. Together with the depositional process discussed above, the picture forms that the archaeological finds of iron seems to be due to imported artefacts or traded iron rather than a product of a local iron industry. However, the archaeological work in Finnmark has mostly taken place on sites at or near the coast, which may not be the best suitable areas for iron production. The interior district was probably much more convenient for this purpose as is the case in Northern Finland [(e.g. Kajaani, Äkälänniemi (Schulz 1986); Kemijärvi, Neitilä 4 (Kehusmaa 1972); Rovaniemi, Sierijärvi (Kotivuori 1996)]. Essential materials such as ore and firewood would have been considerably more accessible in these parts than on the coast. And indeed it is in the interior of Finnmark, at the sites Virdnejavre 106 and 112, that we so far have recorded remains of iron being processed. Still at the present time there does not seem to be any reason to suggest early production of iron in Finnmark.

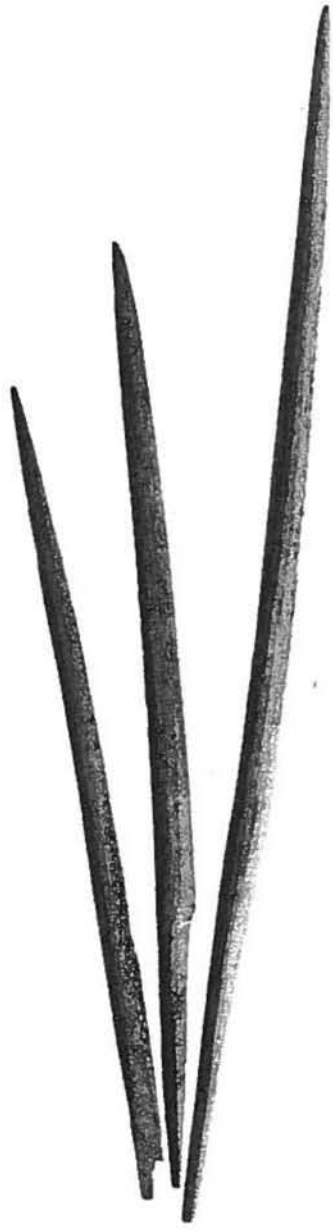

Fig 6. Arrows for hunting birds. The long and smooth cutting surfaces on the parts of the arrows were probably made by metal blades.

SLAG AND ASBESTOS CERAMICS

A fairly recent and highly disputable theory concerning the production of iron has been put forth by the Swedish scientist Birgitta Hulthén (1991). She suggests that iron was been made inside Chrysotile-tempered ceramic vessels. Because of their insulating capacity and high resistance to heat the asbestos-tempered pottery would, according to Hulthén, have been quite suitable as ovens for iron production (Hulthén 1991:16-36). The arguments which she suggests are as follows:

– chemical analyses conducted by Linder in 1966 of an organic layer on the inside of the potsherds show only the occurrence of soot. No traces of food remains or fat can be traced according to Hulthén (Linder 1966, Hulthén 1991). Thus the vessels were not meant for the cooking of food. The layer of soot is a remnant after the burning of charcoal inside the vessels.

Further chemical analysis shows that these vessels were also subjected to temperatures of 900-1000°C and that the asbestos and also the clay was able to withstand such considerable temperatures.

Holes that go through the walls of the vessels are frequently found in this kind of pottery. This is interpreted by Hulthén as a means of forcing air into the vessels while smelting iron in order to achieve the temperatures necessary for this kind of process.

Likewise, there are traces of repairing techniques where bundles of asbestos or iron thread were used to hold cracked vessels together. This is in Hulthén's opinion a good indication that the vessels did not need to be watertight to function. A cracked vessel would serve its purpose just as good any asbestos tempered vessel.

Hulthén also classifies the asbestos-tempered vessels according to the percentage of asbestos that they contain. The only type of asbestos that is in question here is Chrysotile, a serpentine mineral that she claims is very often found in this kind of pottery (Hulthén 1991:17). She also claims that the percentage of Chrysotile tempering is very high. For imitated textile-pottery, percentages of 50-60% are suggested and for the Sär2 ceramics, and especially the Kjelmøy ceramics, more than 90% of Crysotile fibres are mixed with 10% clay. The latter she labels asbestos ware because the clay barely binds the whole thing together. It is also these types of vessels that supposedly served as vessels for the smelting of ore into iron.

Superficially, this theory may look like a probable explanation to a possible link between asbestos-tempered ceramics and traces of the early processing of iron in Northern Fennoscandia. However, when examined

Fig 7. A curved dagger from the Kjelmøy finds of antler. Possibly an item inspired by curved daggers like the ones found in Savukoski, Northern Finland.

at a closer level, problems start to arise. Hulthén claims for example to have found good evidence to support this hypothesis from the previous mentioned site Virdnejavre 112 (Hulthén 1991:34). At this location, two sherds of Kjelmøy ceramics were found with slag adhered to them. This phenomenon has also been registered on two occasions in Sweden (Hulthén 1991:34, Spång 1997:149). The notion that these items had to be connected to the production of iron seemed likely and the suggestion that the ceramics had served as a kind of lining inside an oven for iron smelting was suggested by Hood and Olsen (Hood and Olsen 1988:114). However, no traces of the oven could be found and Hulthén's later suggestion seemed to fit these finds nicely, but a closer examination of the finds reveals that the slag is most probably caused by the smithing of iron and not production. A cross-section of the potsherds in question shows that the ceramic ware is affected by the heat from the slag only in the contact zone and not deeper into the ware itself (Bartalotta et al. 1988). This suggests that the hot slag and the ceramics had been in contact for a very short time before the slag cooled off, which in turn indicates that the slag had found its way to the ceramic vessel by accident and is not due to a deliberate act. One reasonable explanation for this could be that the ceramic vessel had been used close to the working of iron e.g. as a container for water during the forging of iron into tools and that the slag produced during this conduct has found its way into the vessel. In my opinion such a scenario is much more in accordance with the other archaeological evidence from Virdnejavre and other sites and renders a better understanding of how iron has been processed in Finnmark.

A CRITICAL EXAMINATION OF HULTHÉN'S THEORY

The theory suggested by Hulthén that the asbestos-tempered ceramic vessels could have served as ovens for iron production entails many weaknesses when inspected at a closer level and her research on asbestos ceramics seems insufficient (for a thorough discussion see Sundquist 1999). I would like to point out a few problems here:

– Chrysotile has not been found as a temper of any ceramic vessel in Norway or Finland. The mineral occurs naturally in these parts, but seems to be unsuitable for use as temper (Carlson and Meinander 1968:55; Lavento and Hornytzkyj 1996:51). Anthophyllitic and Actinolotic asbestos seems to be the only forms of as-

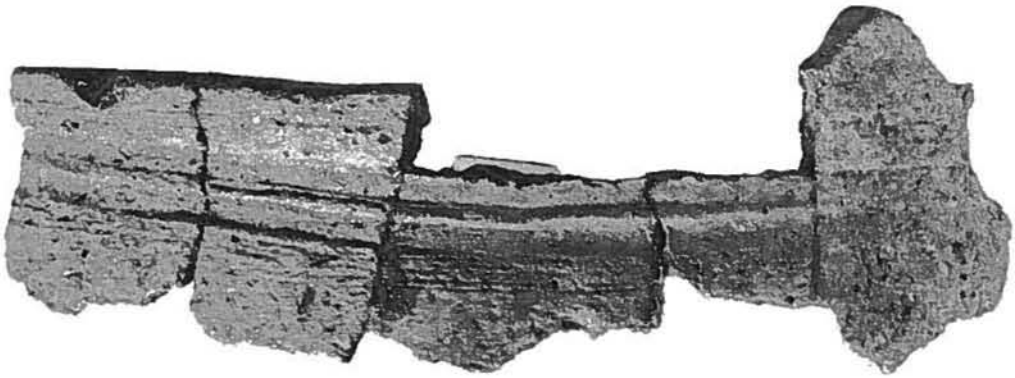

Fig 8. Sär2 pottery from Northern Finland with an "ear" on the rim. The "ear" is probably a feature that the potter has seen on metallic vessels. Photo by Timo Syrjänen, National Museum of Finland 1978.

bestos that has been used as a temper for ceramic vessels. This also seems to be in concordance with Swedish research on the subject (e.g. Linder 1966), but Hulthén finds Chrysotile in every potsherd that she examines (Hulthén 1991). As an example we could look at the previously mentioned material from Virdnejavre 112. Some of the potsherds from this material were examined, including the pieces with fused slag, by the Archeometry Research Group in Buffalo with the conclusion that the ceramics from this site were tempered with 20% Actinolite in 80% clay (Bartalotta 1988:123). From the precisely same material Birgitta Hulthén finds Chrysotile-tempered ceramics with the ratio 90% Chrysotile to 10% clay (Hulthén 1991:34). The division between what Hulthén labels as "asbestos ware" and "ordinary pottery" is therefore highly questionable and should be used with great caution.

– The slag analyses that Birgitta Hulthén puts forward as a part of evidence for her hypothesis does not seem to be slag from iron production. The Norwegian metallurgist Arne Espelund has examined the results and he does not agree with the conclusions that Hulthén suggests. *"B. Hulthén's theory of production of iron in asbestos ceramics is highly questionable in view of the presented slag analyses"* (Espelund 1992:260, author's translation).

– The holes in the ware of the vessels that were supposedly used for the forcing of air into the vessel are mostly placed at or near the rim. The holes are quite small and probably used for pulling together cracks that started to occur near the rim, which is quite a typical feature among cooking vessels that are used repeatedly (Sundquist 1999:74).

Hulthén's theory also implies other questions like why potsherds are such a common artefact in archaeological excavations in Northern Fennoscandia, while slag occurs quite seldom? She also fails to answer the question of why the ceramic vessels should have been used this way? Asbestos is by no means a necessary mineral for the production of iron, a simple oven like those at Sierijärvi in Rovaniemi would be much easier to build and probably much more effective than Hulthén's asbestos ware would be (Kotivuori 1996:106-111). I therefore sincerely doubt that iron was ever produced inside asbestos tempered vessels, and I would claim that these vessels were primarily used as cooking pots. Experiments show that the asbestos tempering in no way prevented that kind of use; on the contrary these vessels seemed to be particularly fit for the purpose (Sundquist 1999). The asbestos tempering provided a vessel that was light, thin walled with good heat conductance through the ware, yet a very solid and subtle kind of ceramics. Asbestos-tempered ceramics are also known from ethnographic studies as having been used as cooking vessels.

J.G. Wilson visited the Oropom people of Karamoja in northern Uganda in the late 1960s. He discovered two kinds of pottery that were in use among these people. He described one of them as having a "pronouncedly soapy feel" to it (Wilson 1973:300). This was tempered with talc, a mineral that is known as an additive

in prehistoric ceramics from many sites in Northern Fennoscandia. The other type of ceramics was tempered with amphibolitic asbestos and these pots were preferred in the preparation of food. The reason for this was that the asbestos tempering lengthened the life of the article, seemingly reducing the amount of cracks that occurred through repeated domestic use (Wilson 1973:301). In other words, the asbestos tempering made the vessels particularly fit as cooking-pots. It is therefor hard to see any reason to why the asbestos tempered pottery of Northern Fennoscandia should have been used in any different way.

PRODUCTION OR TRADE

As the previous discussion shows, the present material gives little reason to assume any local production of iron in Finnmark, despite clear evidence for the use of iron artefacts and also for the forging of iron into tools. This indicates that the introduction of iron was based on import from outside sources and that artefacts and probably also wrought iron were articles of trade in the first millennium BC. This has also been proposed by other archaeologists (e.g. Gjessing 1935:18; Carpelan 1975:31; Olsen 1984:47). A good indication that wrought iron was traded in Northern Fennoscandia at a later stage comes from Rakanmäki near Tornio. The excavations at Rakanmäki in 1985-1987 revealed among other artefacts an iron currency bar, an artefact that is known as an article of trade in the first millennium AD (Hallinder 1978:33; Mäkivuoti 1988:64-65). The site was dated to AD 200-800, but still this kind of trade could possibly be a continuing tradition in these areas stretching further back in time and with eastern trading partners. In the last millennium BC the complex of the Ananyino-culture seems to be one possible source for the imported iron.

But *why* was iron traded and not produced in Finnmark? All the resources for the production of iron are abundant, iron ore, wood for charcoal etc. can easily be obtained, but iron was still imported and not produced. Is the answer to this simply that the lack of skilled workmen prohibited a local iron industry from developing or could the causes be more complex than this? It seems odd to me that over a period of nearly one thousand years the northern hunter-gatherers should have failed completely to acquire this kind of knowledge if this skill was desired. Maybe the question should be rephrased to "why did the people of Finnmark not *want* to produce iron?" One reason could be that there was little demand for iron because of a well-adapted technology that could function with very small amounts of metal. The finds from Kjelmøy and Slettnes suggest that this could be the case. The archaeological evidence may be taken as an indication of a "small tool tradition" where small amounts of metal together with bone and antler may have provided the essentials for the tool-making industry. A technology with composite tools that may have consisted of small blades for cutting edges, sheaths of iron for strengthening the points, tiny arrowheads etc. This type of composite tool technology would need very small amounts of iron to function, since a substantial proportion of the artefacts were made of bone, antler and wood. One may assume that a culture like this would not find it beneficial to put much effort in producing iron themselves, but that they would rather be apt to trade the little iron they needed from others. This kind of technological tradition would leave very few traces and, combined with a relatively mobile way of life, would be very hard to recover by archaeologists. Maybe the void of archaeological finds from the first millennium AD (e.g. Schanche 1992) that has been a problem in Norwegian archaeology could be explained in such a way.

The problem could also be viewed from a different angle. It is possible that the production of iron has been connected specifically to agricultural people and to the agricultural way of life. Iron currency bars have been connected to agricultural centres in Middle Sweden by several archaeologists (e.g. Hallinder 1978; Mäkivuoti 1988; Edgren 1993) and the eastern cultures, such as the Ananyino, were sedentary, agricultural complexes very different from the hunter-gatherers of Finnmark. Thus, one possibility may be that the iron production of the time has been seen as connected specifically to these areas and to this kind of culture. In other words, the production of iron was viewed as a part of the agricultural and sedentary ethnic "label". The partaking in this process by hunter-gatherers could therefore be perceived as a crossing of ethnic boundaries: much the same mechanism that prevents hunter-gatherers from engaging in agricultural activities. Producing iron would to them be as alien as growing corn or herding sheep. It might be adequate to compare this situation to the ethnic division on which reindeer herding is based today. In Norway this line of work is monopolized to those of Sami origin by law, but the general understanding of this division is evident among Norwegians and Samis and is very seldom debated. The herding of reindeers is a sign so typical of the Sami ethnic label that an outsider cannot engage in this activity without rec-

ognising the ethnic dimension involved. Still, apart from language and tradition, there is no practical reasons to suggest that a person perceived as a Norwegian cannot establish his own herd of reindeer. There is nothing to indicate that he or she would perform badly or run the herd poorer than a person of Sami origin, but such an activity would present an unquestionable break of ethnic rules and would probably be viewed as highly provocative among both Sami and Norwegians. Division of work based on ethnic principles exists therefore even today and my proposal is that the production of iron in the first millennium BC in Finnmark could represent a division of labour in much the same way. The hunter-gatherers of Finnmark perceived the production of iron as belonging to a culture very different from their own. A sedentary and agricultural culture of which they were not a part. The production of iron would therefore represent a very difficult ethnic barrier to cross. A barrier that is similar to the ethnic dimension of the herding of reindeers. This suggests an explanation to why the people of that time did not take up iron production although they had the means and the skills to do so. The production of iron was laden with ethnic stereotypes that could not easily be set aside. The reason thus being of an ideological kind rather than a practical one, iron production was not a part of the hunter-gatherers' ethnic identity.

CONCLUSIONS

Several finds of iron, iron slag, replicas of metal artefacts and traces of the processing of wrought iron in Finnmark indicate a very early use of the metal. Finds from Kjelmøy, Virdnejavre and Slettnes suggest that iron was introduced during the last millennium BC and that it must have been a quite common and well-known material towards the end of the millennium. Other indications such as the lack of lithic implements, artefacts of bone that show traces of metal blades or points etc. support this notion. Despite this there does not seem to be any indication of iron being produced in Finnmark. The slag samples that have been submitted to analysis show no traces of production, but seem to be the result of the forging of wrought iron. The theory presented by Birgitta Hulthén, that iron should have been produced inside asbestos-tempered ceramic vessels, seems highly unlikely and finds no support in the archaeological material from Finnmark.

Thus it may be reasonable to assume that the iron in Finnmark was traded from elsewhere and processed into tools when necessary. One likely source for this wrought iron seems to be the Ananyino culture, a large cultural complex in Russia that was producing metal at a very early stage. Several archaeological finds from Northern Fennoscandia show contact with his culture. A contact that seems to end in the rather changing and turbulent times around the beginning of the common era (e.g. Carpelan 1975 and 1979, Olsen 1984, Jørgensen and Olsen 1988, Henriksen 1995). The early production of iron that is evident in Northern Finland at this point may be seen as a reaction to the decreasing trade eastwards, and as an indication that a shift in the direction of the trade was imminent. There is archaeological evidence from Northern Norway suggesting such a shift in trading relations from an easterly to a southern direction in the first centuries AD [(for instance blubber-oil seems to become an important object for trade (Henriksen 1995)]. It seems plausible, in my opinion, to draw the conclusion that iron has been a subject for trade in Finnmark from the middle of the last century BC and possible all the way to the present day. A combination of ethnic preferences and little demand for the metal may be the reason why iron was not produced in these areas. Whether new information may shed light on this assumption remains to be seen.

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