

# The Handicrafts of Iron Age Pottery in Scandinavia

## Regionalities and Traditions

BY THOMAS ERIKSSON & ANDERS LINDAHL

### Abstract

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During the last 35 years almost 5000 ceramic thin-sections have been analysed at the Laboratory for Ceramic Research, Lund University and of those have 1650 analyses been performed on material from the Iron Age in Northern Europe (here c. 500 BC-1100 AD). Currently there is a project to register these analyses in a database and evaluate the results. We can for the first time get an overall picture of the various handicraft traditions that have existed at different periods in Northern Europe and in particular Scandinavia. The study presented here aims primarily to identify regional diversity during the Iron Age. The focus will be on analyses performed on pottery from Eastern Denmark, Scania, Gotland and Mälardalen with some examples from other parts of Northern Europe. A further aim of this survey, which is based on a large statistical material, will also investigate how cultural choices were reflected in material culture.

Interactions between different geological conditions and various cultural choices played a decisive role in how the pottery craft developed in different regions. The different geological conditions, with different types of clays and temper, can partly explain the differences in ceramic handicrafts. These factors may also have affected e.g. regional differences in firing methods. Various vessel types, styles, and ultimately table manners have also influenced the craft. Regional differences in usage of various types of vessels also affected how the pottery was manufactured. The method of studying thin-sections can reveal hidden differences in the handicraft and modify or even overturn groupings based on style and decoration. This study will set focus on that.

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## Introduction

Pottery is one of the most frequent and at the same time, in our view, one of the most neglected categories of artefacts from archaeological sites. The reasons behind this are as many as the potentials and difficulties in interpreting the material. This is a quantitative study with starting point in an evaluation of all thin-section analysis made at the Laboratory for Ceramic Research at Lund University. The material consists of more than 1650 ana-

lyses performed on sherds from the period c. 500 BC to 1100 AD from what is today Denmark, Sweden, Norway, Finland, Russia and Germany (Fig. 1). In this study the material has been divided into three periods:

1. Early Iron Age, c. 500 BC-200 AD.
2. Middle Iron Age, c. 200-750 AD
3. Late Iron Age (Viking Period and Early Medieval time) c.750-1100/1200 AD

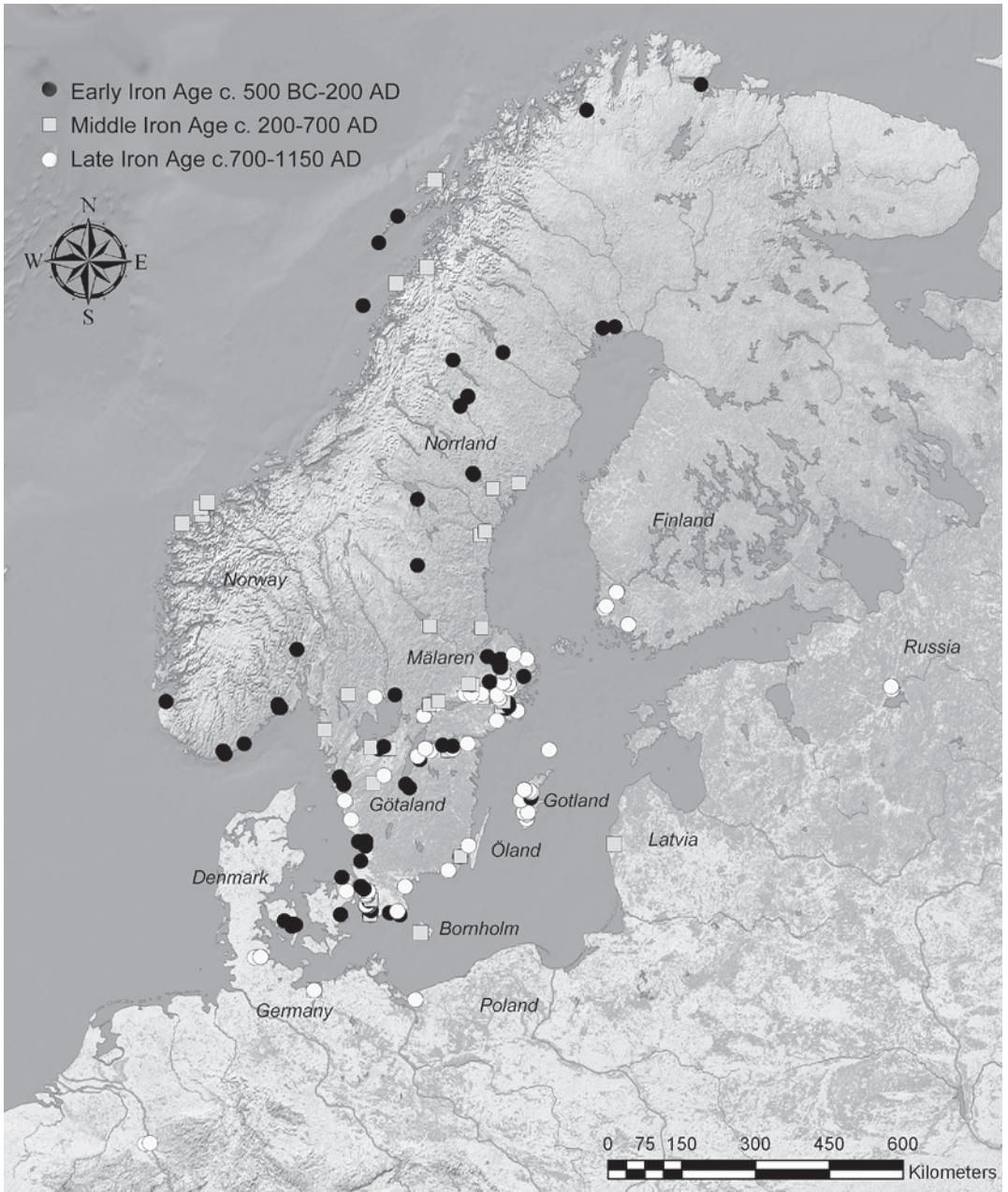


Fig. 1. Map of the sites with thin-section analyses. Map by T. Eriksson.

The reason behind the late end for the study, in a period that is normally seen as belonging to a medieval discourse, is the end of the indigenous Iron Age manufacture of pottery, the so-called AIV-ware (Selling 1955). This kind

of Viking Age and Early Medieval pottery is often impossible to distinguish from the earlier pottery from the Middle Iron Age. It was also manufactured at the same time as the AI-III-wares and found in the same contexts.

Pottery is a heterogeneous group consisting of a lot of various vessels with different functions, statuses, meanings and backgrounds (Braun 1983; Eriksson 2009, pp.155 ff.). It is probably also the only material that often is interpreted as a homogenous mass because it shares a common raw material, clay. This study aims to differentiate this approach in order to see ceramic as a raw material for different types of tools or vessels. The choice of clay and temper was not only an aspect of function, but regulated by cultural choices as well as of what properties the potter expected to achieve of the vessel. Those cultural choices were made in a framework given by the natural resources. The ceramic ware is therefore a result of reciprocal actions in a dialectic relation between nature and culture. The focus of this study has three components, the occurrence of calcium carbonate in the clay, the coarseness of the clay and finally the correlation between stylistic attributes and the composition of the ware in different regions.

The study is based on a large statistical sample in form of databases of the results of thin-section analysis. The aim is to show the broad tendencies in a supra-regional perspective rather than to set the spot-light on unique divergences (Fig. 1).

Furthermore, the aim is to combine the statistical data with cultural choices in handicraft traditions versus the natural resources. The focus in archaeology during the last decades has often been on the unlimited selection of choices for humans. But the natural resources and practised techniques set a limit for what is possible in a region. The culture is a combination of cultural traditions within a natural framework set by nature and technology. The latter may also affect the symbolic values of the products. A rare material or a material difficult to master often achieves a greater value than a common and easy material to handle. The differences in distribution of a raw material group as different types of clays

may therefore have affected the production as well as the attitudes towards the products.

## The occurrence of Calcium in Iron Age Pottery

Calcium in different chemical forms is most often seen as an undesired pollution in the clay used for ceramic vessels. It is especially during the firing of pots where the calcium reacts with oxygen and forms carbon oxides that tends to spall the ware. Under an oxidizing atmosphere, the carbonate begins to decompose at 700 or 800°C into calcium oxide (CaO) and carbon dioxide (CO<sub>2</sub>). The gas rapidly hydrates to form calcium hydroxide (Ca(OH)<sub>2</sub>). The hydration is accompanied by expansion, and it is this expansion that causes pottery containing CaO to spall and crack. One way to avoid this is to fire the vessels in a reducing atmosphere, to choke the oxygen in an oven or a pit or add organic matter to the clay. In a reducing atmosphere the hydration to Ca(OH)<sub>2</sub> is delayed to 900°C. (Feathers 1989; Lindahl *et al* 2006, p. 95; Rice 2005, p. 97 f.) The calcium can also add useful qualities to the vessel if the risks with the cracking are mastered. It makes the vessels stronger and made it possible to make thinner walls more resistant to thermal shocks.

The dominant bedrock in most parts of Sweden consists of different types of granite and gneiss, both low in calcium (Fig. 3). Three Swedish counties differ from this: Scania in the south and the islands of Öland and Gotland in the Baltic (Fig. 3). The two latter are entirely covered with different sedimentary bedrocks, mainly limestone. Limestone also appears in a lesser extent in Dalarna, Väster- and Östergötland. Furthermore a large occurrence of lime is situated in the Gulf of Bothnia, east of the towns Gävle in the south up to Sundsvall in the north. This has affected the sedimentary composition in

### Content of calcium in clay

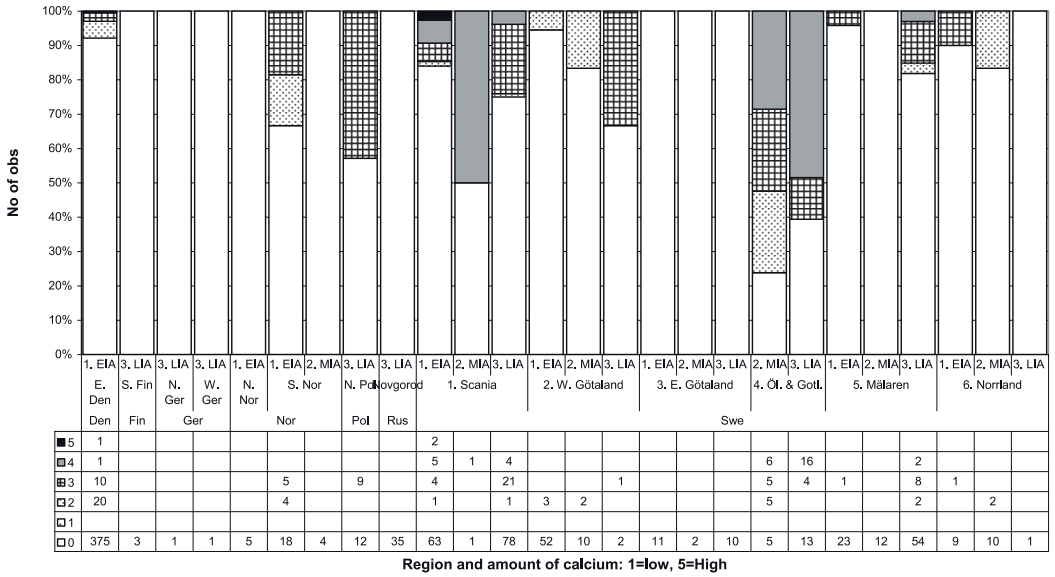


Fig. 2. Diagram with average content of calcium. The scale is subjective from 0 (total lack) to 5 (very rich). It is clear that the great islands of Gotland and Öland in the Baltic (Östersjöarna) have a highest amount of calcium followed by Scania and Pomerania.

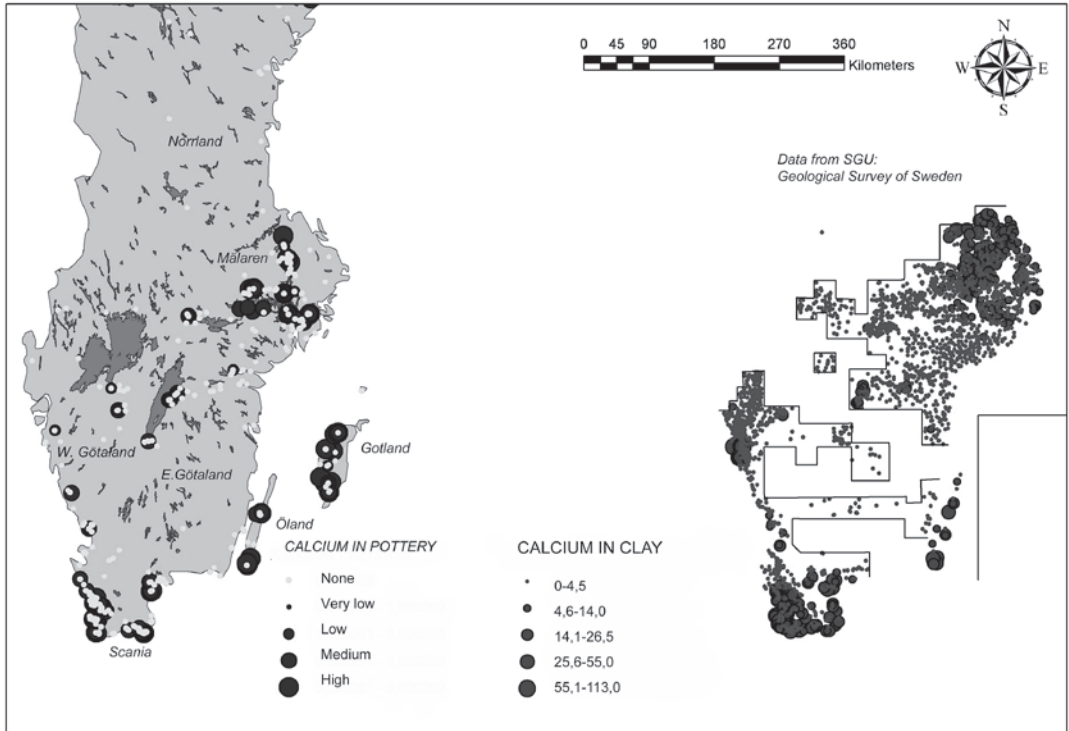


Fig. 3. Map with calcium in vessels and in the soils. The data from the soil comes from a survey made by SGU Sveriges Geologiska Undersökningar. Map by T. Eriksson.



the county of e.g. Uppland, since the inland ice during the Ice Age transported material southwards. Thus Scania, Öland, Gotland and Uppland often have clays, rich in calcium. But the amount of calcium in the clay shows large fluctuations locally, especially in layers which have different stratigraphic age and formation.

The amounts of calcium in the clay also depend on the formation process e.g. if the clays are deposited in lakes or maritime milieus. Parts of Sweden, for instance Scania and the Highland in Southern Sweden, have not been covered by the sea and lack therefore postglacial clays that are very typical for the Lake Mälaren Basin. On the large islands in the Baltic, Öland and Gotland, clay have been washed away or consists mainly of moraine clays rich in calcium (Eriksson 2009, p. 92 f.; Stilborg 2009).

All those natural prerequisites have formed different potentials for the handicraft of pottery (Fig. 2 & 3). The results from the analyses show that the occurrence of calcium in clay is highest, not surprisingly, on Gotland and Öland followed by Scania and Pomerania (Hulthén 1984). It has been difficult to avoid calcareous clays on Gotland and they have managed the difficulties by firing the pots in reducing atmosphere. We can also see that the use of different clays at Gotland was very variable, as seen in the standard deviation. There are four possible explanations to this phenomenon:

1. Vessels were imported to the island. This does not seem to be plausible during the two older periods, then the ceramic handicraft was very strong and distinctive with a very high artistic standard on the island.
2. Clay was imported. This does not seem plausible at all since the production was too large to be based on imported clay.
3. A large-scale scouting was performed in order to identify non-calcareous clays. This seems to be the most plausible ex-

planation.

4. The disadvantage with the calcium was overcome by using more advanced techniques: adding salt or organic material to the clay and/or maintain reducing atmosphere during the firing.

It is probably a combination of the last two explanations that are most plausible (Fig. 4). It is perhaps through these relatively high claims on the technological skill that made pottery on the island to have a higher standard and more artistic character than on the eastern part of the Swedish Mainland, there suitable clays are very common. The most part of the production in eastern Sweden did not have such artistic values as on Gotland.

Even though it was possible to avoid calcareous clays in regions as Scania and the lake Mälaren valley, calcareous clays were used anyway in Scania during the Middle Iron Age and during the Late Iron Age in Mälaren valley. The reason for this behaviour was probably twofold. The disadvantages with the calcium has been mastered by using reducing atmosphere and the vessels have not been used for cooking and therefore not been exposed for thermal shocks after firing (Fig. 4).

## Coarseness of clay versus fineness of handicraft

The choice of clay has played an extremely import role in the *chaîne opératoire* of making pottery. There are many ethnographical examples that potters search for the right clay and walked several kilometres in order do to this (Arnold 1985; Lindahl & Matenga 1995). The choices were based on a tactile knowledge of the hand, mouth, nose and eye – feel, taste, smell and colour – as well as oral tradition.

The definition of clay is based on the fineness of the particles in the soil. Clay particles

### Content of calcium versus firing atmosphere

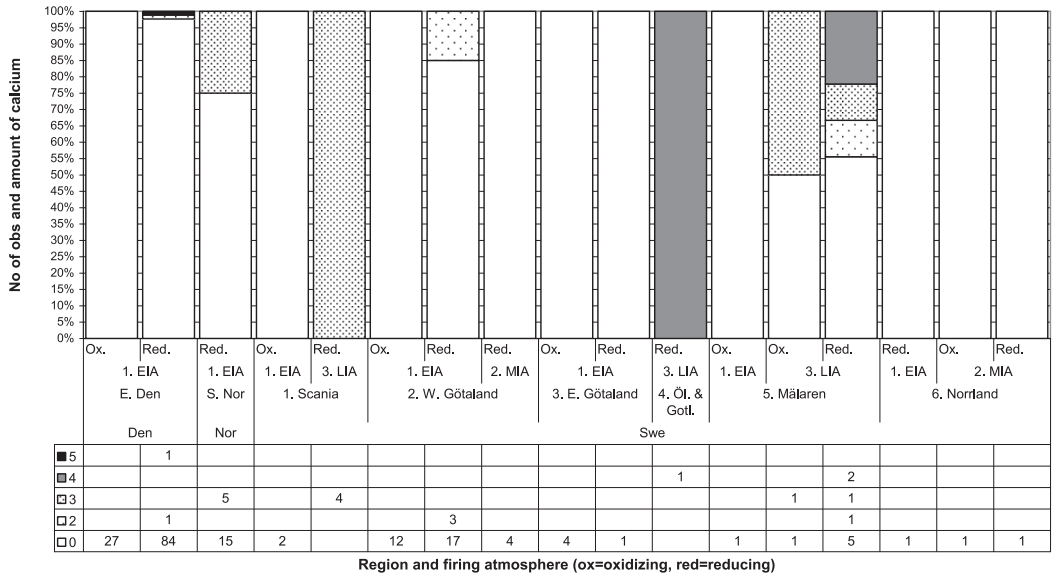


Fig. 4. Calcium in the clay versus the firing atmosphere. The disadvantages with calcareous clay have been master by using a reducing atmosphere.

### Coarseness of clay versus sherd thickness

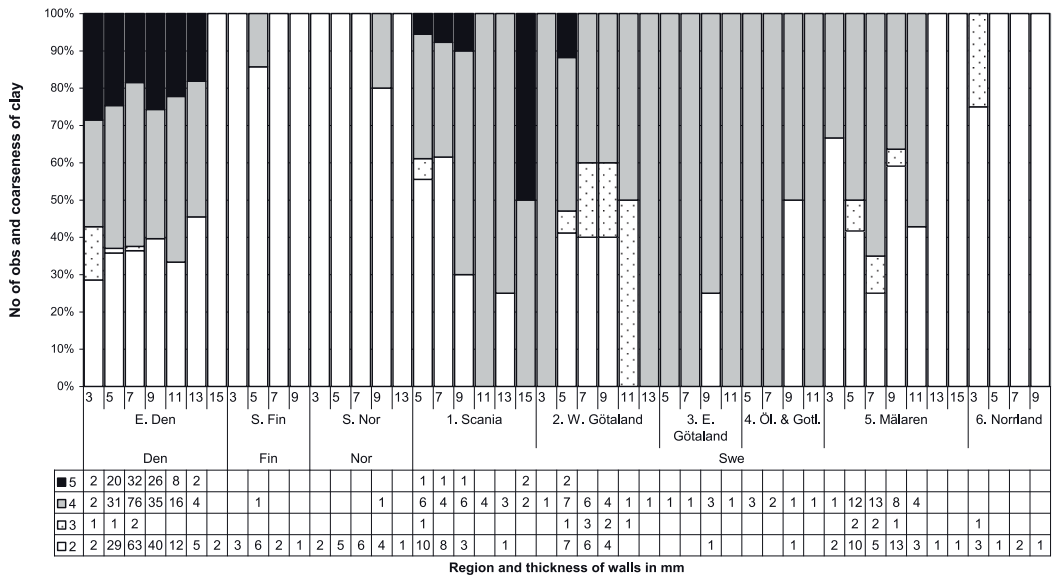


Fig. 5 The coarseness of the clay versus wall thickness of the sherd. The coarseness is gradual from 1 (fine clay) to 5 (very coarse clay) and 3 is normal. The use at Funen in Denmark is very homogenous. The use in Sweden is more differentiated and fine clay was used for thick-walled vessels.

### Coarseness of clay versus amount of temper

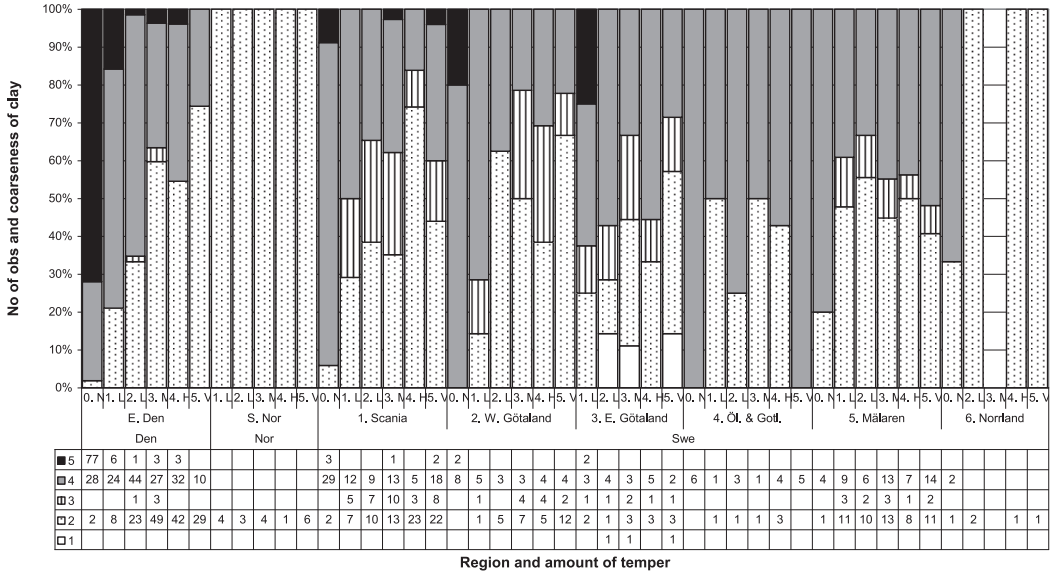


Fig. 6. The ware composition seen as a relation between the coarseness of the clay and the amount of temper. The different nuances of gray stands for the coarseness versus the standing bars, which are divided on the percentage of the amount of temper (0=none, 5=>20%). It is striking that coarse clay in Denmark and Scania was used instead of temper.

### Sortation of clay versus region

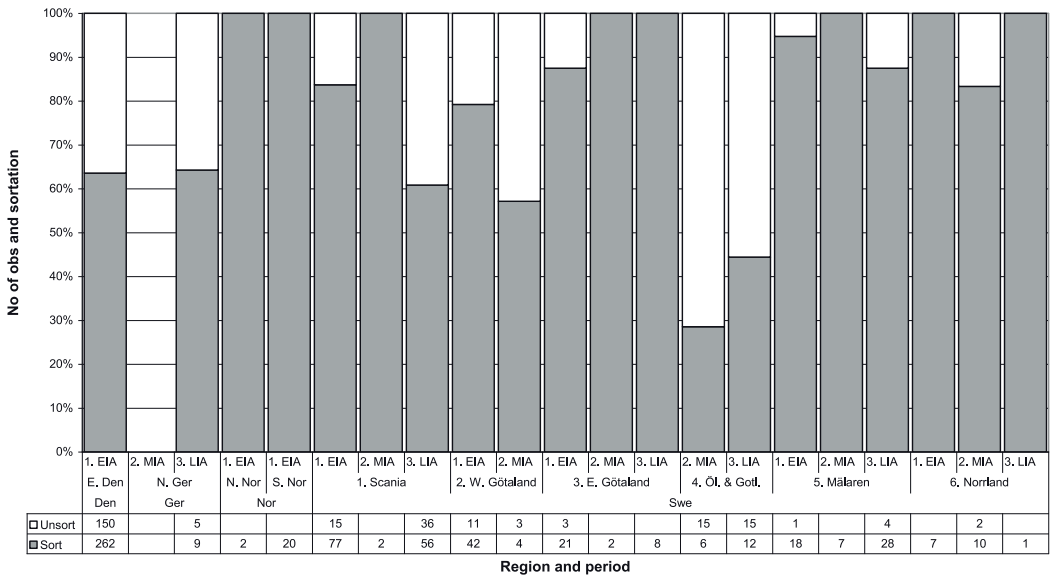


Fig. 7. Sorted or unsorted clay versus region. The regions above the highest coastal line have a higher degree of unsorted clay in the vessels compared to regions with a lot of marine and lacustrine sedimentation clays.

are fine-grained with grain diameter less than 0,002 mm. In nature, clay rarely appears in a pure state, but mixed with other grain-sizes (silt and sand). A sorted clay, which most often is formed by sedimentation in water, usually have less of the coarser fractions and is therefore often more homogenous. Unsorted clay often appears in areas above the highest shore-line i.e. parts that have never been covered by the sea after the latest glacial period. The unsorted clay usually contains a mixture of different grain sizes.

A coarse clay does not mean that the handicraft was crude. The truth is rather the opposite: a coarse clay is more suitable for thin-walled and fine vessels. If the clay contains coarse grains (silt and sand) to a sufficient amount it may not be necessary to add temper (Fig. 5-7). The natural coarse grains are normally smaller than for instance crushed rock like e.g. granite and more suitable for thinner walls. This can be seen especially in the tradition of pottery making on Funen in Denmark (Stilborg 1997). The correlation between the use of coarse clay without temper or small grained crushed rock (gneiss) as added temper in small amounts is striking (Fig. 5). The same phenomenon is also clear in the southern most part of Sweden. This has pro-

bably at least partially natural explanations since Denmark and Scania to large extent are situated above the highest coastline and the sediments are dominated by moraine clays. Those clays are normally coarser and not sorted. They are easy to find and good to use in fine wares. In some of the southern regions, Eastern Denmark, Gotland and Öland, the potters sometimes have used coarse clay to make thick-walled vessels. On the Danish island Funen this is even more accentuated, almost all pottery is made of the same types of clay, with no adaption to function (Fig. 8).

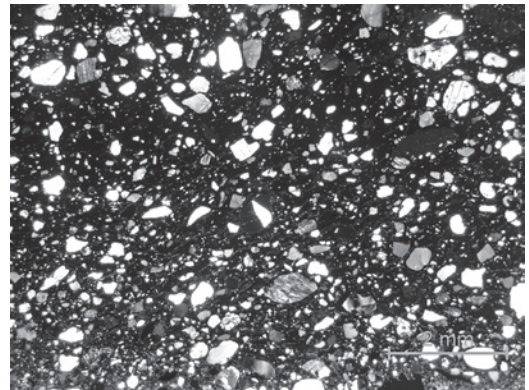


Fig. 8. Natural coarse grains (no added temper) in a clay used for an Iron Age pot found at Lundeborg, Funen in Denmark. Photo by A. Lindahl.

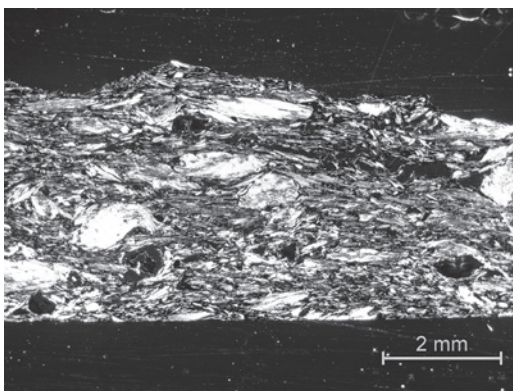


Fig. 9. Asbestos temper in a Bucket-shaped vessel from barrow 2 in Högom, Medelpad, Sweden. Photo by A. Lindahl.

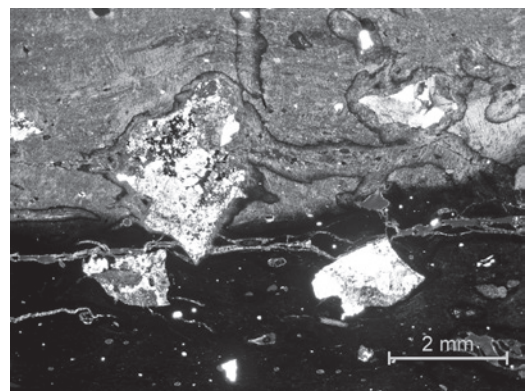


Fig. 10. Fine clay tempered with crushed granitic rock, used for a Early Iron Age vessel found in Gödåker, Tensta parish in Uppland, Sweden. Photo by A. Lindahl.



One possible explanation is that the pottery production was on a proportionally larger scale. Most of the material comes from central places around the Gudme complex (Stilborg 1997; Henriksen & Kjer Michaelsen 1995; Thrane 1998).

Mälardalen and Norrland display a different tradition, here fine clays with an added temper are used. This is also partly contingent by natural causes. The prehistoric settlements in those regions are situated in valleys covered by thick glacial or post-glacial clay sediments.

The access to natural resources especially in Mälardalen has therefore been very good (Fig. 7). In Norrland clay is not found in abundance as is the case in Mälardalen. The fact that clay is not so commonly found in Norrland might have given pottery a higher status.

The southern part of the coast of Norrland is in many aspects very influenced by West Scandinavian material culture and can be seen as a more or less Norwegian region (Ramqvist 1995; Ramqvist 2007). This can also be seen in the production of pottery. The analysed material from the Roman Iron Age and Migration Period is dominated by fine ware and small, often exclusively decorated Bucket-shaped vessels (Engevik 2008; Kristoffersen 2010; Hulthén 1995; Stout 1986). These bucket-shaped vessels are made of a clay temper with soapstone, talc, asbestos or steatite. The majority of the Norwegian Bucket-shaped vessels are tempered with asbestos (Engevik 2008). One Swedish example comes from the well-known chamber-grave at Högom in Medelpad (Fig.9; Hulthén 1995; Ramqvist 1992, p.129 f.). The other examples from Norrland are also tempered with asbestos but some of examples from Bohuslän are tempered with the related minerals soapstone and talc. The possible connections between the earlier Northern Scandinavian traditions of Asbestos ware and Asbestos pottery and the younger tradition with Bucket-

shaped vessels are not thoroughly investigated (Hulthén 1991; Engevik 2008).

In Mälardalen on the other hand, where fine clay is found in abundance (Fig. 6, 7 & 10), the finer vessels are very rare as compared to Southern Scandinavia and Gotland. The production seems to have had a domestic character with jars tempered with crushed granite (Eriksson 2009).

## Style, origin and thin-section analyses of Viking Age pottery

The only more widely accepted attribution and terminology of pottery in Viking Age Scandinavia is the one made by Dagmar Selling in the 1950's (Selling 1955). It is mostly based on technique, form and decoration and she combined those factors with possible origins. The system is easy to work with and have been well accepted, even though there have been some efforts to make other nomenclatures and the connection with style and origin has been challenged (Fig. 11).

The presumably wheel-thrown pottery from Western Europe is called AI and consists among others of finer jugs, for instance of Tatinger type. AII is the name of pottery with decoration of horizontal and/or wavy lines often made on a slow turn-table. They are often jar-formed vessels supposed to have been made by the Slavic Wends in Poland and northern Germany. The AIII ware mainly bowls with decoration on the parts near the rim. They were associated to the Finns in south-western part of Finland. Finally, the AIV-ware was the often quite coarse and undecorated jars that were supposed to be of a local domestic production. Instinctively, the thin-section analyzes should show that the similarities in clays and tempering materials in the various wares ought to be more similar within the group than between groups of stylistically determined ware types.

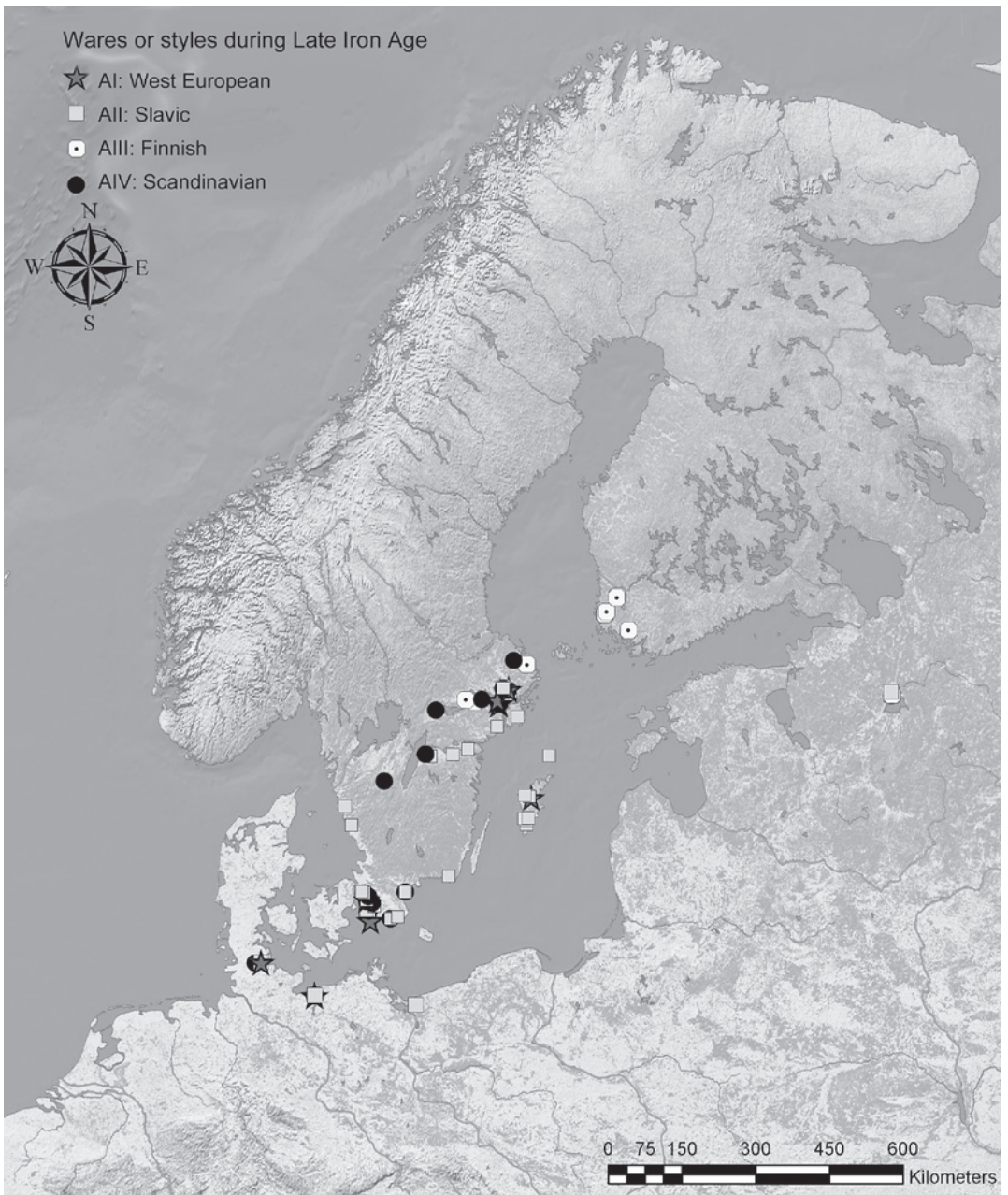


Fig. 11. Map with the distribution of the different A-types or styles. Map by T. Eriksson.

AI is definitely outstanding as a ware compared to all other groups: it has the smallest grain-sizes in temper, lowest amount of crushed granite and is often tempered with grog or no added temper at all (Fig. 13-14). The analysed material comes from just a few

sites, Reric in Germany, Löddeköpinge and Trelleborg in Scania and Mangsarve in Eke parish on Gotland (Hulthén 1984; Svanberg et al 2000) and Birka in Sweden. What is remarkable is that the results from the different sites show a very disparate picture. The

### Calcium in AII-ware versus region

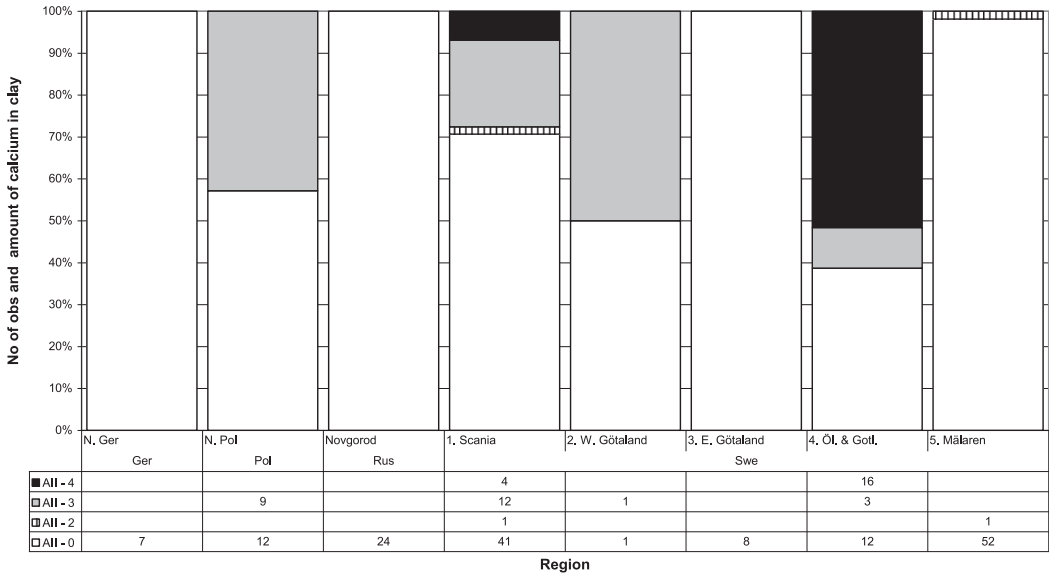


Fig. 12. The occurrence of calcium in the clay in AII-ware/style (the so-called Slavic pottery). Gotland has a notable high amount of calcareous clay, which must reflect a domestic production on the island.

### Coarseness of clay versus region and ware/style

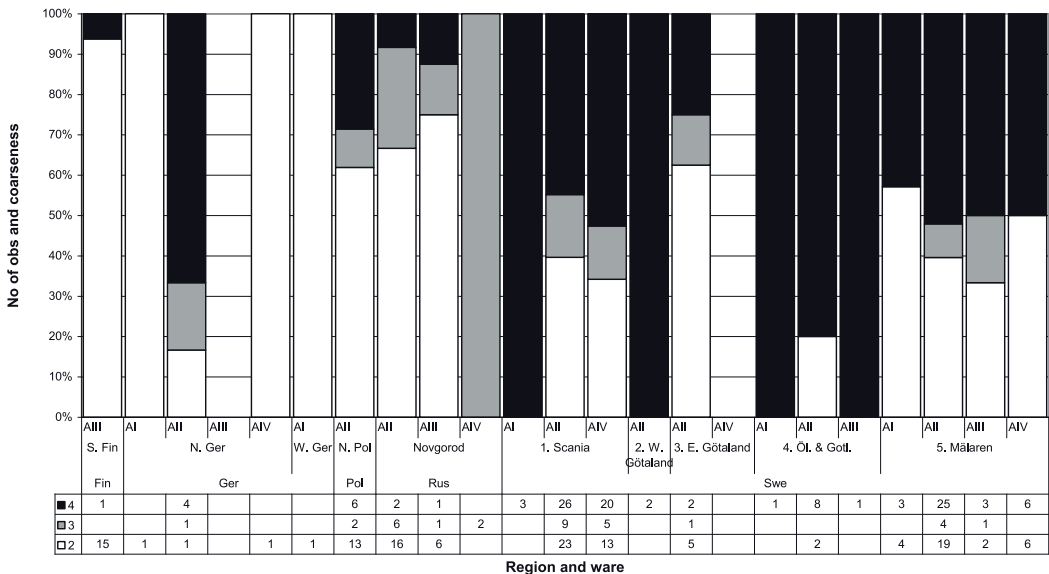


Fig. 13. Pottery grouped by Selling's system versus the coarseness of the clay in different regions. Gotland is very deviant with the very coarse clays in all types of A-wares/styles. This is probably reflecting a domestic production of different types of the ware-types according to Selling.

Sortation of clay versus region and ware/style

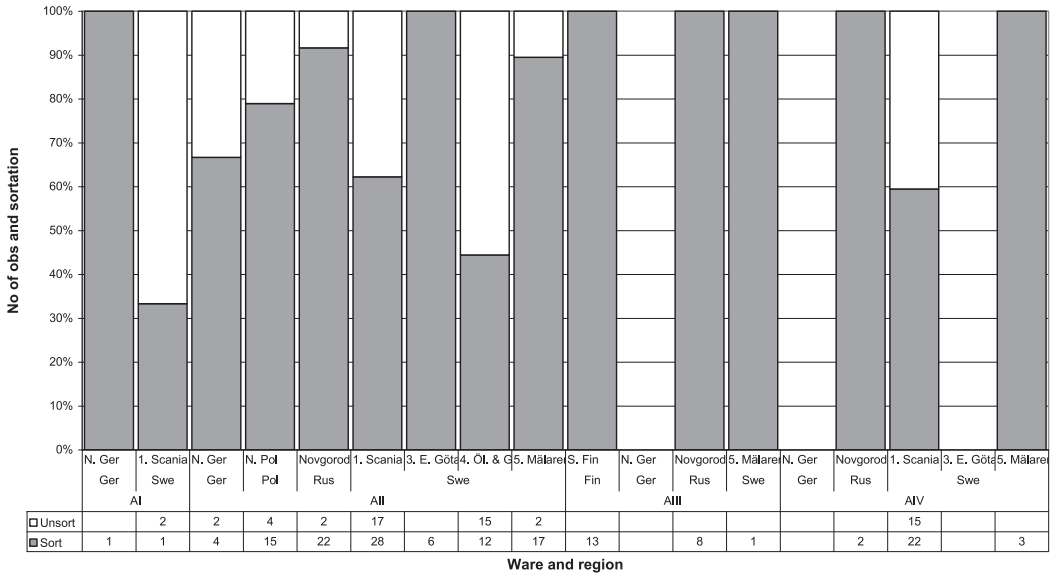


Fig. 14. Unsorted and sorted clay grouped on Selling's types and regions. It is clear that all types or styles must have different origins either locally produced or imported from a lot of sources.

All: Calcium in clay versus region and parish

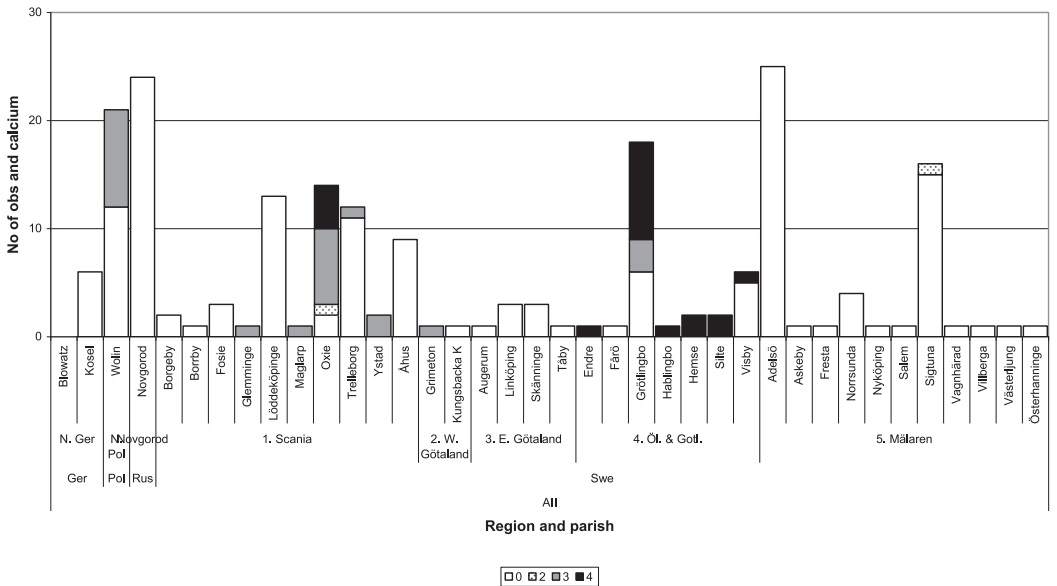


Fig. 15. The occurrence of calcium in different parishes in the regions. It is noticeable that Visby at Gotland have lower amount of calcareous clay than the other parts of the island. This might reflect a higher amount of imported vessels in the port.

coarseness of clay, amount of calcium and the amount of natural coarser particles differs a lot from each site and also within the sites. Granite as temper occurs only in Uppland, sand only in Reric and the coarsest grains are to be found in Uppland. (Brorsson 2010) The results clearly show that a ware with a presumption to be homogenous in reality is very heterogeneous, but the number of analysed items is low. It may also be assumed that the pots of this ware group may have different origins. The Upplandic examples with crushed granite as temper may indicate an older hand-craft tradition or even a local domestic production in the region.

The AII-ware was first considered as imported pottery from the West-Slavs: Wends, Pommerians and Poles. It was therefore often called Wendish black ware. Today the understanding of the ware is more complex (Hulthén 1984; Roslund 2001; Brorsson 2005; Brorsson & Håkansson 2001). There is a difference between Slavic pottery made and used in the Slavic areas and local Scandinavian made pottery of the type Östersjökeramik (Baltic Pottery) i.e. pottery made in a style influenced by Slavic pottery. The thin-sections reveal that the ware is heterogeneous differentiated in amount of calcium and coarseness of the clay (Fig. 12-15). This must reflect a large variation not only in chosen raw-materials i.e. clays but also a more local production of the ware outside the first supposed homelands.

The discussion about the origin of the style in Scandinavia must be differentiated. There are at least four groups of pottery in this so called ware:

1. Imported pottery from West-Slavic areas.
2. Imported pottery from East-Slavic areas.
3. Slavic potters making pots in Scandinavia.
4. Scandinavian potters influenced by the style.

There are strong indications for the third group. Pottery craftsmanship shows clear regional differences on Gotland within the so called wares (Fig. 15). Here the analyses made on Baltic ware in Visby show a closer connection to the analyses made on material from South Scandinavia and the southern Baltic region while the ceramic ware on the Gotland hinterland exhibit more local specifics. One can interpret this as the town of Visby imported pottery vessels during the late Viking period and early Middle Ages, while in the rural areas there were imported potters who made local copies. There are artefacts that could be linked to Slavic influences in many contexts in Scandinavia, at Bornholm and Gotland, in Birka and in Scania (Hulthén 1984). Some of them, for instance temple rings and knife mountings indicate that both males and females, influenced by Slavic dresses were buried in Scandinavia (Lundström 1955; Serning 1982, pp. 83 f.; Roslund 1990, p. 58; Kelm 2000; Roslund 2007; Naum 2008, pp.155 ff.). The possible Slavic influences at Gotland are perhaps the most important feature according to the presumable domestic production of AII-ware on the island. There are finds of presumed Slavic Temple rings in late Viking Age graves at Stånga on southern Gotland (SHM 9905), the same part as some of the finds of Baltic ware/style with AII-vessels made of calcareous clays.

## Discussion and conclusions

Clay as raw material for pottery is by no means a homogenous material. On a regional scale there are large variations e.g. occurrence of calciferous matter in the clay, the variation of admixture of natural silt and sand in the clay etc. The examples above display how regional variations in the raw material can be used to explain cultural and functional adaptation to the challenges involved when mastering



these often complex variations. The use of a particular type of clay for the manufacture of specific types of vessels as is illustrated in the choice of coarse silty clay for the fine ware. This clearly shows that the potters were very aware of what type of raw material was best suited for the product. Clay tempered with crushed granitic rock with grain sizes up to 3–4mm, which was the most common paste used for household ware, was not practical when producing the often very thin and polished pots.

The definition of the forms of vessels, decorations and sizes into different types of ware according to Selling is still functional (Fig. 11). It is easy to use; the definitions are widely spread in literature but should be seen as a nominal definition rather than a definition that includes a preconceived origin of the pots. Style and potters can spread far beyond a supposed origin of a type and a great portion of deliberateness must be taken in consider before terms like Wendish, Lusatian, Baltic or Scandinavian are used.

It is interesting to note that in spite of strong similarities in shape and decoration the AI ware display a great variation in raw material. This indicates that the ware type was produced at several different localities.

The AIII-ware, which is supposed to have been manufactured by Finnish tribes in Finland and Russia, is more homogenous according to clay and temper as compared to the other ware types during this period (Fig. 13 & 14). It is often made by fine and sorted clays, low in calcium. The vessels from Mälardalen and Finland also show a more frequent use of firing in reducing atmosphere than the e.g. the local AIV-ware. The tradition of tempering the clay is similar in AIII- and AIV-wares. The amount of temper is almost the same in the two ware types, but the temper is of a smaller grain size in the AIII than in the AIV-ware. This and the fact that the AIII-ware was often fired in reducing atmosphere usually

decorated and had a bowl-like shape indicate a functional interpretation. The difference in temper size should therefore not be sought in the provenance of the vessels but rather in the function. The finer walls in the AIII-bowls claimed the use of finer crushed temper and the use of the vessels as low vessels for drinking and eating did not need to have as much temper as the domestic AIV-ware, which were dominated by vessels for storing and preparing food.

Another example where thin-sections analyses have revealed new information hidden in the ware is the so called Gotlandic or Ölandic (Insular) pottery during Roman Age and Migration period. There are several cases where vessels being found in Uppland are decorated in an insular style, but not made of typical insular clay, i.e. coarse and calcareous clay. Instead they seem to be of a domestic production. They are made in an imported style and perhaps by imported potters rather than imported vessels (Eriksson 2009).

## Summary

The thin-sections can reveal facts about pottery, technology and the choice of temper and clay that cannot be understood without laboratory analyses. Style can sometimes be just a thin layer that covers invisible differences in wares and technique.

The old nomenclature of Viking Age pottery by Selling is still operational and perhaps the best way of organizing a material but the underlying comprehension and cultural explanations about origin and influences are to be remodelled. But the term *ware* should be avoided and replaced by style; a term with a more adequate meaning and without connotations of *import* and *origin*. In many cases styles can travel further than the ceramic vessels. This is also true about the so called insular pottery during the Middle Iron Age.

We must also remember the often very complex exploitation of different types of clays and temper for different vessels and functions. The use of coarser clays for finer wares are one striking examples from Southern Scandinavia. The sophisticated use of natural tempered and coarse clays for elaborate bowls, jugs and mugs are elegant. Coarse clay covered by an often burnished surface makes it a remarkable contrast to the use of finer clays in Central Sweden for coarse, domestic jars. The heterogeneous occurrences of different clays on the southern half of Sweden make the choice of raw material important. Perhaps it is also possible to see a converse between abundant clay resources and a high appreciation of style and elaborate decoration, especially in Central Sweden. A fact that is even more visible by using thin-sections.

Finally this study clearly display the importance of making and analysing ceramic thin-sections from all types of archaeological features – graves, inside houses, garbage areas etc – as well as different time periods and regions. Even if 5 or 10 thin sections from one single excavation site does not help to explain all the questions put forward for that particular investigation it certainly will help to add information on a regional scale.

The work with the thin-section database also show the “white spots” i.e. in which areas – both on the time scale and geographically - where more analyses have to be done.

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