

Northern Worlds – landscapes, interactions and dynamics

Research at the National Museum of Denmark

Proceedings of the Northern Worlds Conference
Copenhagen 28-30 November 2012

Edited by
Hans Christian Gulløv

PNM
Publications from the National Museum
Studies in Archaeology & History Vol. 22

Copenhagen 2014

Publications from the National Museum
Northern Worlds – landscapes, interactions and dynamics
Research at the National Museum of Denmark
Proceedings of the Northern Worlds Conference
Copenhagen 28-30 November 2012

© The National Museum of Denmark and the authors, 2014

All rights reserved

Edited by Hans Christian Gulløv
Technical edition: Marie Lenander Petersen
Linguistic revision and translation: David Young
Cover design and layout by Donald Geisler Jensen
Set with Adobe Garamond Pro and Univers
Printed in Denmark by Narayana Press, Gylling
Published by University Press of Southern Denmark
Campusvej 55, DK-5230 Odense M
ISBN: 978 87 7674 824 1

Cover photo: Rock carvings, Hjemmeluft, Alta, Finnmark, North Norway, photographer Ditlev L. Mahler, 2010

The proceedings are funded by The Augustinus Foundation



CONTENTS

<i>Per Kristian Madsen</i> Preface	9
<i>Hans Christian Gulløv</i> Introduction	11
I. LANDSCAPES	
<i>Peter Emil Kaland</i> Heathlands – land-use, ecology and vegetation history as a source for archaeological interpretations	19
Use and traces	
<i>Ditlev Mahler</i> Shetland – the Border of Farming 4000-3000 BC	49
<i>Alison Sheridan</i> Shetland, from the appearance of a ‘Neolithic’ way of life to c. 1500 BC: a view from the ‘mainland’	67
<i>Christian Koch Madsen</i> Norse Pastoral Farming and Settlement in the Vatnahverfi Peninsula, South Greenland	95
Cosmos and perception	
<i>Flemming Kaul</i> The northernmost rock carvings belonging to the Scandinavian Bronze Age tradition	115
<i>Lars Jørgensen</i> Norse religion and ritual sites in Scandinavia in the 6th-11th century	129

<i>Ulla Odgaard</i>		
Clash of Concepts – Hunting rights and ethics in Greenlandic caribou hunting		151
Environment and changes		
<i>Morten Fischer Mortensen, Peter Steen Henriksen, Charlie Christensen, Peter Vang Petersen and Jesper Olsen</i>		
Late glacial and early Holocene vegetation development in southeast Denmark – palaeoenvironmental studies from a small lake basin close to the Palaeolithic site of Hasselø		169
<i>Kevin Edwards</i>		
Early farming, pollen and landscape impacts from northern Europe to the North Atlantic: conundrums		189
<i>Richard Oram</i>		
From ‘Golden Age’ to Depression: land use and environmental change in the medieval Earldom of Orkney		203
<i>Noémie Boulanger-Lapointe and Claudia Baittinger</i>		
Studies of the growth of arctic willow (<i>Salix arctica</i>) and arctic bell-heather (<i>Cassiope tetragona</i>) in the High Arctic		215
II. INTERACTIONS		
<i>Charlotte Damm</i>		
Interaction: When people meet		227
Networks and communication		
<i>Christina Folke Ax</i>		
Good connections – Networks in the whaling and sealing community on Rømø in the 18 th century		241
<i>Einar Østmo</i>		
Shipbuilding and aristocratic splendour in the North, 2400 BC-1000 AD		257
<i>Anne Lisbeth Schmidt</i>		
Skin Clothing from the North – new insights into the collections of the National Museum		273
<i>Peter Andreas Toft</i>		
Small things forgotten – Inuit reception of European commodities in the Historic Thule Culture		293
Objects and exchange		
<i>Anne Pedersen</i>		
Skagerrak and Kattegat in the Viking Age – borders and connecting links		307
<i>Helle Winge Horsnæs</i>		
Appropriation and imitation – A Barbarian view on coins and imitations		319

<i>Gitte Tarnow Ingvardson</i>	
Trade and Power – Bornholm in the Late Viking Age	325
<i>Lisbeth M. Imer</i>	
The tradition of writing in Norse Greenland – writing in an agrarian community	339
<i>Maria Panum Baastrup</i>	
Continental and insular imports in Viking Age Denmark – On transcultural competences, actor networks and high-cultural differentiation	353
Preservation and decay	
<i>Martin Nordvig Mortensen, Inger Bojesen-Koefoed, David Gregory, Poul Jensen, Jan Bruun Jensen, Anne le Boëdec Moesgaard, Nanna Bjerregaard Pedersen, Nataša Pokupčić, Kristiane Stratkvern and Michelle Taube</i>	
Conservation and drying methods for archaeological materials modified for use in northern areas	369
<i>Henning Matthiesen, Bo Elberling, Jørgen Hollesen, Jan Bruun Jensen and Jens Fog Jensen</i>	
Preservation of the permafrozen kitchen midden at Qajaa in West Greenland under changing climate conditions	383
III. DYNAMICS	
<i>Christian Wichmann Matthiessen and Richard D. Knowles</i>	
Scandinavian Links: Mega Bridges/Tunnels Linking the Scandinavian Peninsula to the European Continent	395
Continuity and discontinuity	
<i>Bjarne Grønnow, Martin Appelt and Ulla Odgaard</i>	
In the Light of Blubber: The Earliest Stone Lamps in Greenland and Beyond	403
<i>Peter Steen Henriksen</i>	
Norse agriculture in Greenland – farming at the northern frontier	423
Mobility and organization	
<i>Einar Lund Jensen</i>	
Settlement policy in a colonial context – discussions on changing the settlements structure in Greenland 1900-1950	433
<i>Christopher Prescott</i>	
A synthesis of the history of third millennium north-western Scandinavia	449
<i>Lasse Sørensen</i>	
Farmers on the move – The expansion of agrarian societies during the Neolithic and Bronze Ages in Scandinavia	463

Techniques and environment

Jens Fog Jensen and Tilo Krause

Second World War histories and archaeology in Northeast Greenland 491

Niels Bonde, Claudia Baittinger, Thomas Bartholin, Helge Paulsen and Frans-Arne Stylegar

Old Houses in Greenland – Standard Houses for Greenland. Dendrochronological studies
in timber houses 511

CONTRIBUTORS 521

INDEX 525

TRADE AND POWER – BORNHOLM IN THE LATE VIKING AGE

Gitte Tarnow Ingvardson

The Danish island of Bornholm is situated in the middle of the Baltic Sea between the shores of Northern Poland and Southern Sweden. Thanks to systematic detector surveys and archaeological excavation campaigns, the number of known hoards on Bornholm has doubled within a few years and the island has by far the largest concentration of Viking Age and Early Medieval treasures in Denmark. The hoards are composed of objects produced in many different areas and are an important source for our understanding of the economic and political network in the Baltic Sea region. New research on the largest Viking Age silver hoard on the island, the Nørremølle hoard, calls into question whether Bornholm was part of the Danish kingdom in the late Viking Age and whether large scale trade was carried out on the island (Ingvardson 2012, 2013a). In this paper, the archaeological evidence of the silver hoards is compared with the evidence of weights and Baltic Sea ware on the island.

The Nørremølle Hoard

A hoard of almost two kilograms of silver was deposited at a settlement on the east coast of the island of Bornholm, probably in the years 1024-1040. The hoard is composed of a heterogeneous group of minted and unminted silver objects. The majority



Fig. 1. The Nørremølle hoard is the largest Viking Age hoard on Bornholm. It was located by the amateur archaeologist Finn Jensen in August 2006. Photo J. Lee, the National Museum of Denmark.

of the 1194 coins are German, but there is also a large number of English coins and smaller groups of Kufic, Scandinavian, and Bohemian coins. The *hacksilber* consists of 87 objects such as ingots, rods and melts/lumps, and 170 pieces of jewellery mainly produced in the Slavic territory (fig. 1). Archaeological investigations show that the hoard was situated only a few metres from the remains of a burnt-down house dated to the late Viking Age (Ingvarðson 2013).

Western Contacts

With regard to both number and weight, the German coins, with 846 coins (951.54 g), constitute by far the largest group of objects in the Nørremølle hoard. 711 German coins can be attributed to one of the 25 German mints represented in the hoard. Coins minted in Northern Germany dominate. More than 40% (301 coins) of the German group which are attributed to a mint are the so-called Otto-Adelheid pennies (983/991-1040), probably minted in Goslar. The presence of many German coins can be explained by the discovery of large silver mines in Harzen in the second half of the 10th century. The plentiful supply of silver resulted in large scale coin production in the following decades. Throughout the late Viking Age, the dominating role of Otto-Adelheid pennies is a common feature in hoards deposited in present day Denmark and Scania, whereas the Otto-Adelheid pennies were succeeded by the younger Saxon pennies (*Randpfennig*) as the dominant coin type around 1020 in present day eastern Germany and Poland (Kilger 2000: 127; Kluge 2001: 419, 424). This suggests a very intense trade between northern Germany and southern Scandinavia (Ingvarðson 2013: 292-293).

The second largest coin group originates from England. 144 English coins can be attributed to 27 mints. Even though coins from the London mint represent a large percentage of the coins, the distribution among the English mints is more varied than the German issues. Contrary to Germany, the English coinage was a unified national coinage, and coins from various mints mingled freely in circulation within the country. In the light of other hoards, especially Tyskegård but also Store Frigård, both from Bornholm, the presence of some of the

English coins in the Danish Viking Age deposits has been interpreted as the result of Danegeld (Moesgaard 2006: 405-419). The Tyskegård hoard is composed of 81 coins all of the same type, Ethelred II's long cross minted c. 997-1003, and none of the coins bear test marks. This is not the case in the Nørremølle hoard, which is composed of many different English coin types (Ingvarðson 2013: fig. 24). Furthermore 98 % of the English coins in the Nørremølle hoard have been tested either by test marks and/or by bending, which indicates that the coins have been in circulation for some time outside the British Isles. It is unknown how they left England, but in the last instance the English coins in the Nørremølle hoard are therefore probably the result of trade rather than raid (Ingvarðson 2013: 293-294).

Eastern Contacts

The Kufic dirhems constitute a heterogeneous group of 72 coins produced in many different places, such as present day Iran, Russia, Syria and Iraq.¹ The Kufic coins are without doubt the oldest group of coins in the hoard. It is very interesting that they show two waves of influx, one at the turn of the 9th century and one from the end of the 9th century to the middle of the 10th century. Very few Kufic coins in the Nørremølle hoard are struck later than 970. These waves correspond to the general influx of Kufic coins in the Baltic Sea area (Leimus 2009: 8-10). The chronological frame for most of the English and German coins and all of the Scandinavian coins is 990-1025, which is close to the deposition time (fig. 2). The Kufic coins must therefore have been in circulation for some time before they were hoarded in the Nørremølle treasure (Ingvarðson 2013: 287-289).

The hack silver shows a strong contact with the Slavic territory. 126 objects such as beads, pendants, and temple rings have been produced in the Slavic territory (fig. 3). The presence of many melts/lumps of silver is also a common feature in the Polish Viking Age hoards (Ingvarðson 2013: 288-294).

1 I am grateful to René Laursen for the identification of the Kufic coins.

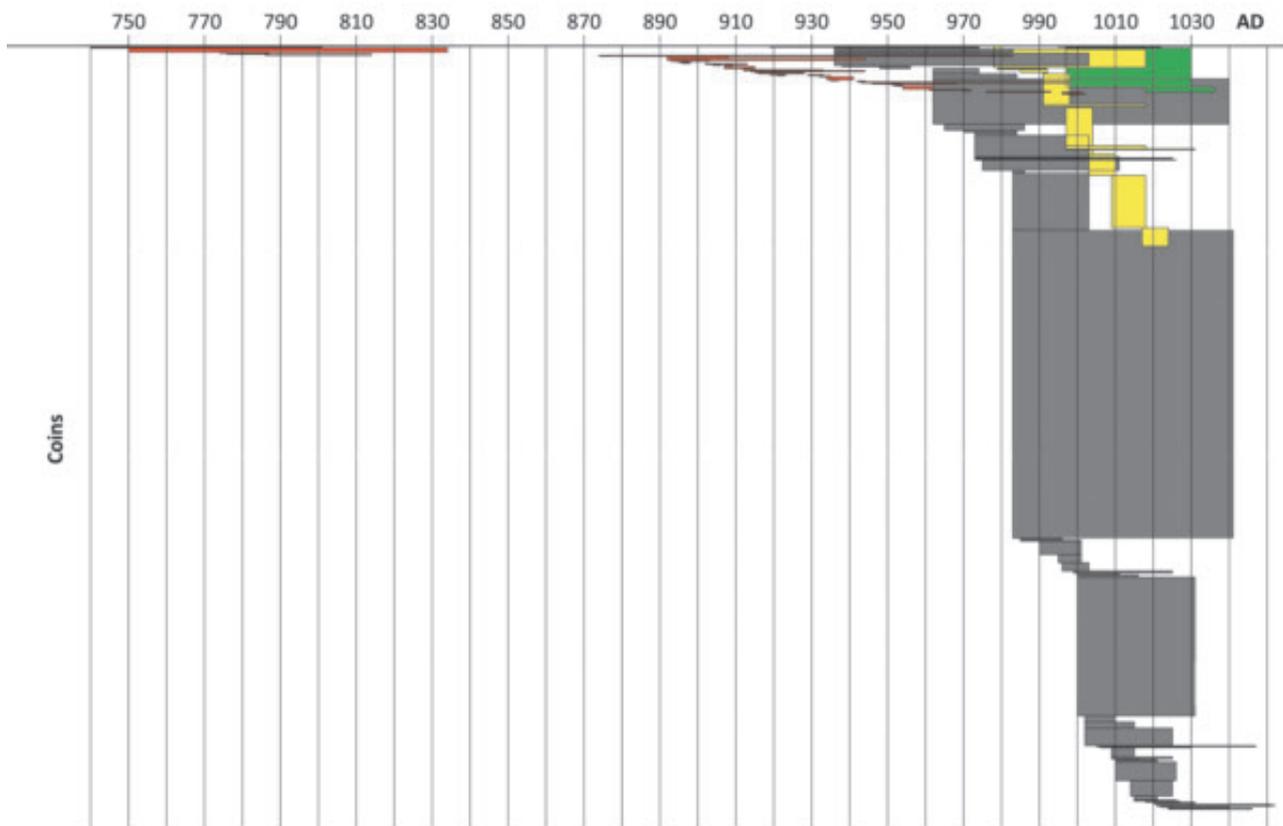


Fig. 2. The chronological distribution of coins in the Nørremølle hoard. One line represents the chronological frame of one coin. Red lines represent Kufic coins, grey lines represent German coins, yellow lines represent English coins and green lines represent Scandinavian coins. Only coins with a relatively precise identification are included in the graph.

Trade in the Viking Age

In the Viking age, silver was traded by weight and not by number. Pure silver is soft and the Vikings tested the objects for their silver value, by bending, stabbing and/or scratching the surface of the object with a knife, for example. 97% of all the objects in the Nørremølle hoard have been tested for their silver content. This supports the theory that the objects have been gathered by trade (fig. 4). Three

kinds of test marks have been recorded on the silver objects of the Nørremølle hoard: nicks, notches and pecks. Nicks are defined as small scratches made with a knife on the surface towards the edge of the object (Malmer & Lagerqvist 1987: XVIII). Notches are defined as small cuts made with a knife in the edge of the object (Rispling 2004: 4f type C). Pecks are defined as small impacts of a knife in the surface of the coin (Malmer & Lagerqvist 1987: XVIII;

Fig. 3. These two temple rings are the only complete jewellery in the Nørremølle. The one on the right is produced in the Slavic area and the one on the left is produced somewhere in the area covering present day Hungary, Serbia and Romania. The beads next to them have most likely been part of identical temple rings. Photo J. Lee, the National Museum of Denmark

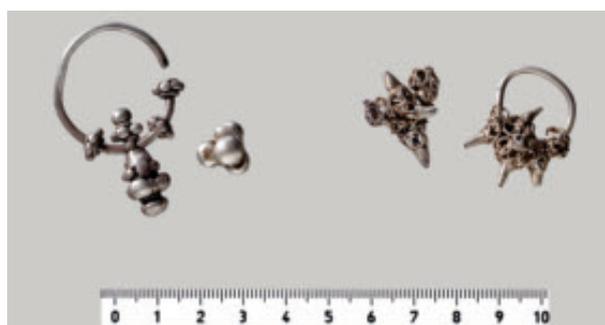




Fig. 4. Examples of objects with pecks and notches. Top left: Clear peck marks in the centre of a coin. Top right: A bent planchette with test marks along the rim. Bottom: Fragment of arm/neck ring and an ingot with notches along the edges. Photo J. Lee, the National Museum of Denmark.

Kilger 2003: 3-12, 2006: 449-465). Around 90% of the Western objects, which are almost exclusively coins, are tested with pecks and around 20% are tested with notches (fig. 5). The very uniform picture implies that the coins have probably been in circulation in the same areas. The Kufic coins, on the other hand, show a different pattern, as 43% of them have been tested with pecks and 69% with notches. As mentioned, the Kufic coins probably reached Bornholm in two waves, the first one at the turn of the 9th century and the second one from the end of the 9th century to the middle of the 10th century. It is therefore possible that the Kufic coins have been in circulation for a long time on Bornholm. As there are very distinct differences between the West European coins and the Kufic ones, it seems likely that the main part of the test marks on the German, English and Scandinavian coins were made before they reached Bornholm, otherwise the dirhems would have had a similar pattern of test marks. Another possible interpretation is that the Kufic coins were a more trusted currency on Bornholm and therefore not pecked to the same degree as the West European coins. We must however bear in mind that the Kufic coins were tested with notches, in the Eastern territories, prior to their arrival in Bornholm, which probably indicates mistrust. Therefore, an explanation of these different patterns of testing can be that the coins were rarely tested

on Bornholm, perhaps indicating a low degree of circulation of coins on Bornholm and that many of the coins were hoarded soon after their arrival on the island (Ingvardson 2013: 294-296, 300-302).

Weight analysis of the hack silver hoards in Scandinavia and in the Baltic region demonstrates that weight standards must have functioned in various regions (Hårdh 1996: 94-130). The results of the weight analysis of the Nørremølle hoard correspond to the survey made by Hårdh, which shows that Scania, Blekinge, Bornholm and the Slavic area constitute a homogeneous economic area where the fragmentation in hoards culminates in the decades around 1000, whereas the size of fragments in hoards deposited after 1020 increases slightly, corresponding to the fragmentation in the Nørremølle hoard (Hårdh 1996: 104-111; Ingvardson 2013: 296-299).

The Unique Treasures of Bornholm

The analysis of the Nørremølle hoard shows a unique combination of objects. The composition of the coins resembles silver hoards of south Scandinavia. In this area, hoards are dominated by Otto-Adelheid pennies and there is a relatively high proportion of English and Scandinavian coins. In the Slavic area, the Otto-Adelheid penny is succeeded by the Saxon penny (*Randpfennig*) as the dominant coin type around 1020 and there are very few English and Scandinavian coins in the Polish hoards (von Heijne 2004: 23; Kilger 2000: 127; Kluge 1981: 257-327). On the contrary, the hack silver shows a strong contact with the Slavic territory, where the majority of the jewellery is produced. The many melts/lumps of silver are also a characteristic for the hoards from Poland, Bornholm and Eastern Sweden (Hårdh 2011: 289). In Scandinavia and the Baltic countries, so-called mixed hoards with both minted and unminted silver were a common

	Fragmented	Peck	Nick	Notch	Bend	Test marks/ Bend
Slavic area (127 p.)	90%	1%	0%	9%	82%	83%
South Scand. (45 p.)	16%	91%	0%	23%	98%	98%
Germany (846 p.)	15%	93%	1%	23%	99%	100%
England (204 p.)	33%	90%	0%	18%	94%	98%
"Kufic" (72 p.)	75%	43%	3%	68%	92%	99%
All objects (1451 p.)	34%	75%	1%	29%	92%	97%

Fig. 5. The secondary treatment of the objects in the Nørremølle hoard.

feature throughout the Viking Age. Mixed hoards testify that a bullion economy prevailed and that silver was traded by weight. 28% of the weight in the Nørremølle hoard consists of unminted silver. During the Late Viking Age and the Early Middle Ages, the mixed hoards were succeeded by pure coin hoards. This change took place at different times in different regions. In Southern Sweden, the amount of unminted silver in the hoards diminished from around 1025, whereas the hoards in Gotland consist of both minted and unminted silver throughout the 11th century (Hårdh 1976: 130). In both present day Denmark (except Bornholm) and in Poland, the change in the composition of the hoards happened during the second half of the 11th century (Bogucki 2011: 137; Ingvarsson 2010, 34), whereas on Bornholm, mixed hoards are deposited well into the 12th century. Along with Blekinge and Estonia, the two islands in the Baltic Sea, Gotland and Bornholm, apparently retained a bullion economy longer than their neighbours in the Baltic Sea.

Bornholm and Gotland are often compared, but both the weight analysis and the examination of test marks of the Nørremølle hoard suggest that there are different patterns on the two islands. Furthermore, the Gotlandic hoards contain an element of locally produced jewellery and bronze objects, which are not found in the hoards on Bornholm. It is only with regard to the content of unminted silver in the hoards that the two islands have a comparable development.

Finally, the weight analysis shows that Bornholm, Southern Sweden and the Slavic area constituted an economic unit, as the fragmentation of the hoards in these areas fall into similar weight categories.

The unique structure of the Nørremølle hoard indicates that the economic system on Bornholm

differed greatly from the development in the rest of the Danish Kingdom. The central power had a very strong influence on the monetary development in the Late Viking Age in Denmark and the unique composition of the hoards of Bornholm suggests that the island was not a part of the Danish kingdom in the late Viking Age, but constituted an independent economic and therefore also political unit (Ingvarsson 2012, 2013a).

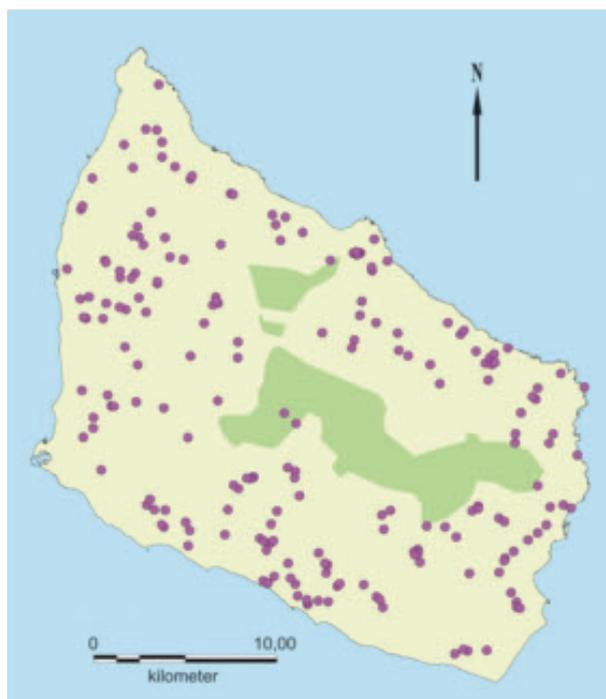
System of Trade and Power

The organization of trade on Bornholm in the late Viking Age is an open question. The Sorte Muld complex functioned as an important power and trading centre during the Iron Age but gradually declined during the Viking Age. In the late 10th and the early 11th century, Sorte Muld was reduced to a few individual farmsteads (Aarsleff 2009: 119; Watt 2008: 26-27). Furthermore, the elite burials that have been found on the extensive cemeteries at Nørre Sandegård Vest, Lousgård, Bækkegård, Glasergård and Kobbeå diminish during the 9th and 10th century (Jørgensen 1990; Jørgensen & Jørgensen 1997; Nørgård Jørgensen 1991). No new trading centre from the late Viking Age has yet been located in the archaeological record. However, this does not mean that trade related finds are absent in the late Viking Age on Bornholm.

From the end of the 10th century, a new settlement structure of individual farmsteads appears. The farmsteads are primarily recorded through reconnaissance and metal detector surveys and are characterized by finds of Baltic Sea ware, fragments of imported millstones from Central Europe, whetstone from South Norway, weights and coins (Aarsleff 2008: 21-22; Nielsen 1994: 125-129).

Fig. 6. The distribution of sites with Baltic Sea ware. The dots represent very different find histories and can for example represent a few sherds found during reconnaissance or more extensive settlement remains recorded during excavation.

Map J. S. Andersen.



The presence of imports, weights and coins can be seen as strong markers for trade and it is therefore likely that these new settlements played an important role in the organisation of trade on Bornholm in the late Viking Age.

In the following, I will give an overview of these sites, focussing on sites with finds of Baltic Sea ware and weights. My survey is based on finds recorded by the Museum of Bornholm in the National databases *Fund og Fortidsminder* and *Regin*. The results must therefore be regarded as preliminary guidelines and focus is laid on tendencies rather than detailed site studies.

Settlements with Baltic Sea Ware

The Museum of Bornholm has recorded approximately 200 sites with Baltic Sea ware² (fig. 6). A further classification of the Baltic Sea ware into early, middle and late types is unfortunately not possible within the scope of the present paper, but earlier surveys have connected the many finds of Baltic Sea ware with the new settlement structure appearing towards the end of the 10th century. In the future, it would be interesting with a more detailed study of finds of Baltic Sea ware on Bornholm, but at present I will rely on earlier studies and conclude that the main part of sites with Baltic Sea ware are probably from the late Viking Age. The map shows that late Viking Age sites are widely distributed throughout the island. The central part of Bornholm is forested and the lack of finds in this area is probably caused by the lack of detector surveys.

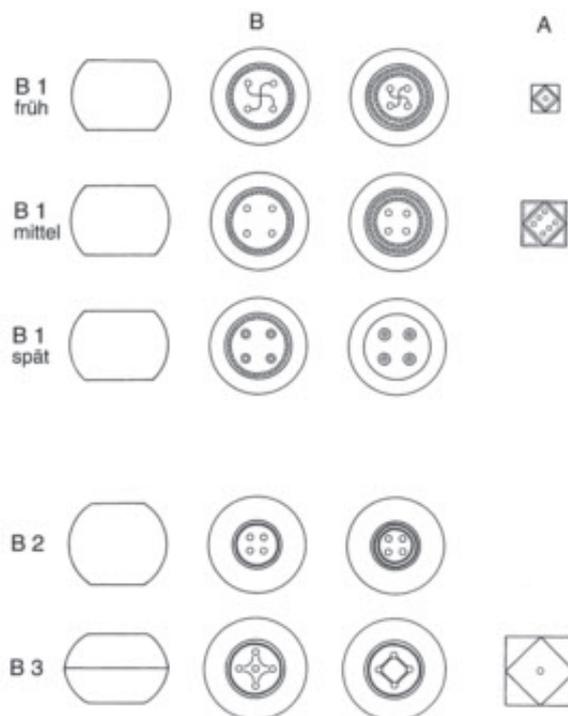
2 I am grateful to the Museum of Bornholm which has willingly let me use their archaeological data and especially to Finn Ole Nielsen and René Laursen, who was a great help when I visited the museum.

Weights

H. Steuer's analysis of the finds of weights in comparison with the monetary development is of great interest to this analysis. Steuer concludes that a system of very accurate and fine weights is found in societies with a weight economy, whereas weights have a more unsystematic character when they are found in coin-using societies and in societies where different currencies were in circulation and weights were used in comparison between different coin types (Steuer 1987: 407-409).

During the late 9th century, a very accurate folding balance (Steuer's type 3) was introduced to the Baltic Sea region. The balance appears together with two standardised weight types, the spherical weights with flattened poles and the polyhedral weights. Both the spherical weights and the balance probably originate from the Islamic area and were introduced in the Baltic region at the same time as the second wave of Kufic dirhems (Steuer 1987: 462; Gustin 2004: 99). The spherical weights with flattened poles and the polyhedral weights functioned in a system where the polyhedral weights followed the light standards, whereas the spherical weights with flattened poles followed the heavier standards. Steuer has made a chronological division of the types of these weights on the basis of shape and

Fig. 7. Steuer's typological division of polyhedral weights and spherical weights with flattened poles (Steuer et al. 2002, 138 Abb. 3).



decoration (fig. 7). As mentioned above, the identification of weights is made on the basis of pictures and/or descriptions in *Regin*; the limitation in this identification method unfortunately does not allow me to include Steuer's chronological sequence in this paper. I. Gustin has pointed out that not all of the Viking Age weights should be seen in connection with a weight economy. At the *Posthuset* (ASR 9) excavation in Ribe, there is a clear connection between lead weights and fragments of moulds, which shows that the lead weights were used in the process of metal working (Feveile 2006: 143-144; Gustin 2004: 108-109). Gustin has compared the frequency of polyhedral, spherical with flattened poles and other weight types in four craft and trading sites: Paviken and Bandlunde on the island of Gotland in the Baltic Sea, Uppåkra 5 km south of Lund in Scania and Birka on the east coast of Sweden. There is a very distinct difference in the distribution of weight types between the sites and in some cases also within different areas of the sites. In areas with many finds of coins and *hacksilber*, the dominating weight types are polyhedral and spherical whereas other weight types dominate in areas with craft activity (Gustin 2004: 89-108).

As discussed above, the distribution pattern of weights can be influenced both by chronological and functional aspects. I have recorded 970 Iron Age and Viking Age weights from Bornholm in the following categories: spherical with flattened poles, polyhedral, spherical, cylindrical, segment shaped, quadrilateral and conical/biconical weights (for further discussion on classification of weights, see Gustin 2004: 89).³ With reference to the works of Steuer and Gustin, the following analysis will concentrate on the distribution of spherical weights with flattened poles and polyhedral weights (hereafter *spherical/polyhedral weights*) in comparison

to the group of other types of weights including spherical, cylindrical, segment shaped, quadrilateral and conical/biconical (hereafter *other weights*). There are, however, chronological problems. *Spherical/polyhedral weights* can clearly be dated to the later part of the Viking Age, whereas *other weights* were in use throughout both the Iron Age and the Viking Age. This should be held in mind when drawing conclusions from the recorded data. The survey is primarily based on finds from the topsoil and the chronological sequences of the sites are therefore based on the combination of finds. In this paper, only finds of Baltic Sea ware, coin hoards and weights are included. It would be relevant to include finds of fibulae types and single coin finds, but this is unfortunately beyond the scope of the present study.

There is a widespread distribution of weights throughout the island of Bornholm, though finds in the northern part of the island are less common (fig. 8). If we compare it with the distribution of Baltic Sea ware, (fig. 6) it is clear that the distribution pattern is not influenced by lack of Viking Age activity on North Bornholm. Even though *spherical/polyhedral weights* and *other weights* are found in all areas of the island, there is a clear difference in the

3 Another 121 weights could not be identified on the basis of pictures and/or descriptions in *Regin*, and are therefore excluded from the analysis.

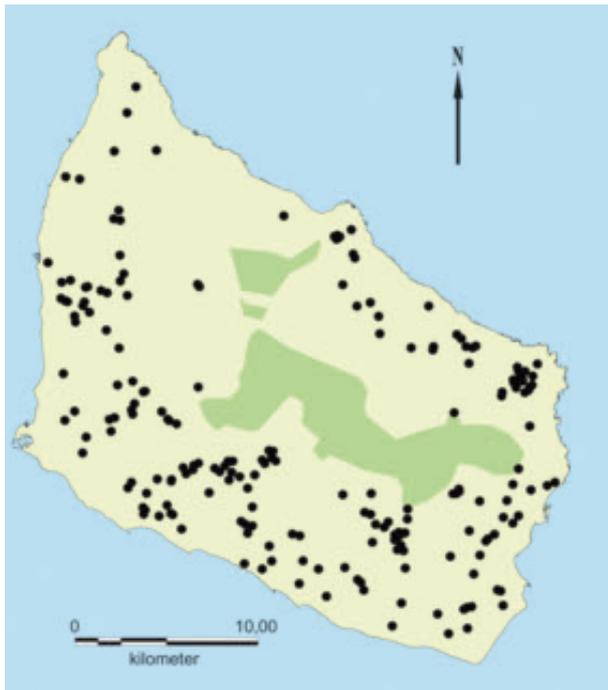


Fig. 8. Sites with one or more identified Iron Age and/or Viking Age weights. Map J. S. Andersen.

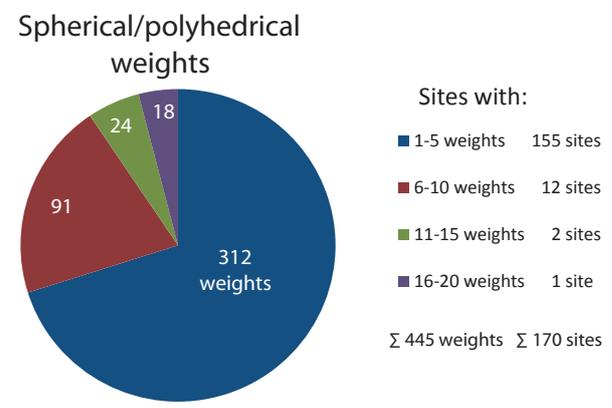
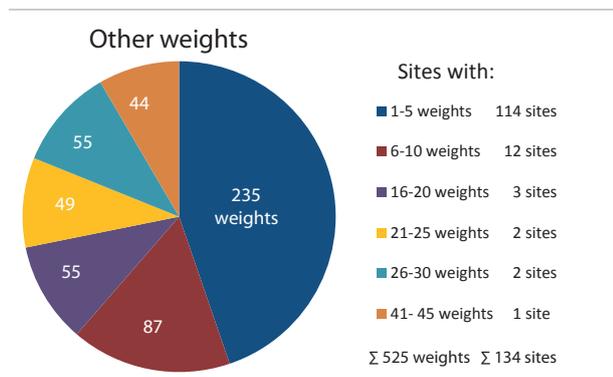
distribution pattern of the two groups. The overall picture is that *spherical/polyhedral weights* are distributed on many sites with a few weights per site. A large proportion of *other weights* are also scattered on many sites with a few weights, but a large percentage of them are found on a few sites with many weights per site (figs. 9a and 9b). There are 16 sites with more than ten weights (fig. 10). Among these sites, there is a clear dominance of the so-called Iron Age productive sites, which includes the Sorte Muld complex on the Eastern side of Bornholm.

Ten of the sites are included in M. Watt's extensive sampling programme from 1997 and 1999 (Watt 2006: 140). One could therefore argue that the high density of weights on these sites is due to these extensive surveys. On the other hand, most of the weights (79%) have been found with metal detectors and the multiplication of coin finds within the last decades testifies to an extensive survey on sites with Baltic Sea ware as well. With some caution, I will conclude that sites with many weights are an Iron Age phenomenon on Bornholm, whereas Viking Age sites have produced only a few weights per site. Analysis made by Gustin and Steuer mainly connects the *spherical/polyhedral weights* to trading activity. The very scattered distribution without clear clustering does not therefore point towards the presence of a new trading centre on Bornholm in the Viking Age.

Silver Hoards

Today we know 37 sites with one or more Viking Age and Early Middle Age silver hoards on Bornholm. Extensive metal detector surveys by the skilled amateur archaeologist on the island constantly bring forth new finds. On 35 sites, the amount of coins and *hacksilber* makes it likely that

Fig. 9. a. The distribution of other weights per site. b. The distribution of spherical/polyhedral weights per site. Map J. S. Andersen.



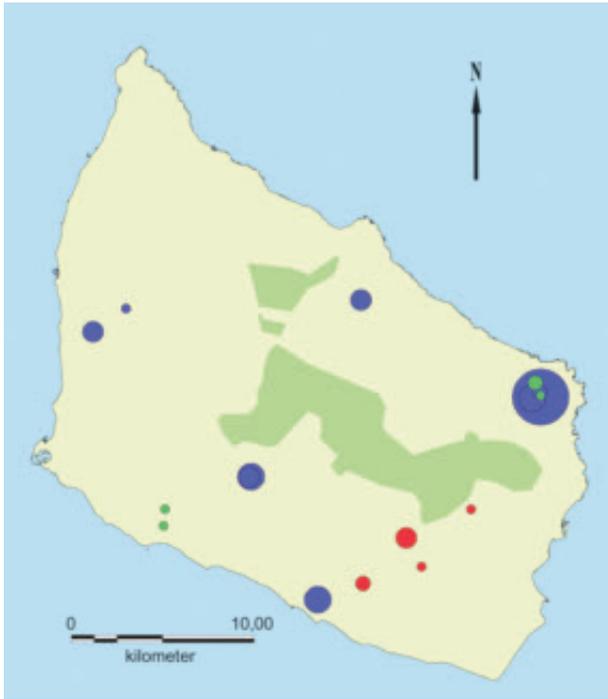


Fig. 10. Sites with more than ten weights. Red: Sites with primarily *spherical/polyhedral weights*. Blue: Sites with primarily *other weights*. (Primarily is defined as at least twice as many). Green: Sites with a mix of *spherical/polyhedral weights* and *other weights*. Map J. S. Andersen.

- 11-15 weights
- 16-20 weights
- 21-25 weights
- 26-30 weights
- 53 weights

further surveys on these sites will produce one or more hoards (fig. 11).

The composition of coins in the known hoards fall into three general phases (fig. 12). In the first phase, the hoards are dominated by Kufic coins. The second phase begins towards the turn of the

11th century. The hoards in the second phase are generally large, are dominated by especially German and to some degree English coins and there is often a small influx of Scandinavian and Kufic coins. In the third phase from the middle of the 11th century, the hoards are generally small. They are dominated by German and English coins and some Scandinavian coins. The Kufic coins have vanished almost completely.

There is no clear connection between *other weights* and sites with hoards. In contrast, the *spherical/polyhedral weights* are often found on sites with one or more hoards (figs. 13a and 13b). Even though Gustin and Steuer connect the *spherical/polyhedral weights* with the second wave of Kufic coins, there is at present no clear connection between the two find groups on Bornholm. On the contrary, *spherical/polyhedral weights* can be connected to sites with hoards from the 11th and the beginning of the 12th century (phase two and three). This indicates that the widespread distribution of *spherical/polyhedral*

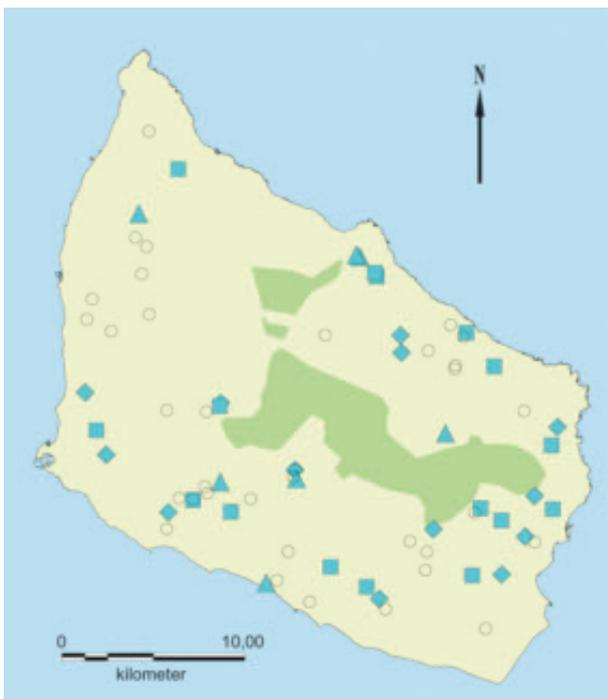


Fig. 11. Sites with one or more Viking Age hoards. As most of the coins have been found with a metal detector in ploughed soil, it can be very difficult to determine whether a site contains a series of single finds, one large hoard or several small hoards. I have therefore chosen just to mark the site and not the amount of hoards on each site. Map J. S. Andersen.

- ◆ phase one hoards
- phase two hoards
- ▲ phase three hoards
- potential hoards

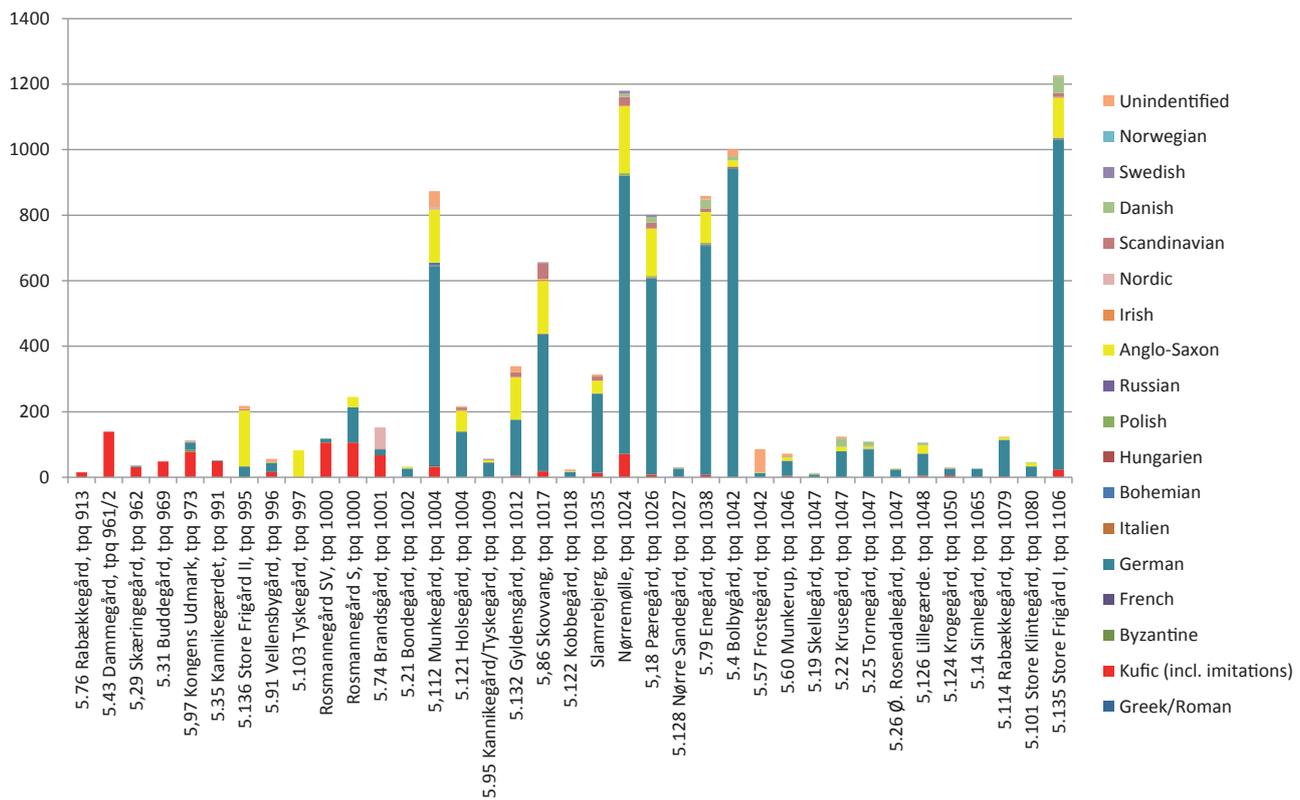


Fig. 12. The composition of coin provenance in Viking Age hoards on Bornholm. Data is based on von Heijne 2004 and updated with new finds recovered before 2011 by H. Horsnæs, who has generously allowed me to use the data. The numbers refer to the catalogue of von Heijne 2004.

weights on Bornholm is a later phenomenon, which should be seen in connection with the distribution of the many silver hoards from the 11th century on the island. This corresponds to Gustin's analysis that shows a connection between *spherical/polyhedral weights* and finds of *hacksilver* and coins.

At present, the Museum of Bornholm has undertaken small archaeological excavation campaigns on the find spots of 29 Viking Age hoards. Among these sites, Store Gadegård is the only site that can be categorised as a high status settlement (Ingvardson 2013: 305-309, Wagnkilde 1978). Here the excavation revealed a house of 33 metres and the find material contained Baltic Sea ware, iron knives, arrows and needles, animal bones from domesticated animals and fish, glass fragments and a coin imitation pendant of gilded bronze with a king's portrait, probably produced in the second half of the 11th century. The hoard itself consists of 68 complete coins, 44 fragmented coins, 33 pieces of unminted silver and a piece of hack gold, which

is rare in the Viking Age hoards on Bornholm. Due to the find history, it is unclear whether these items come from one or two hoards. The large house, the gilded pendant, the glass and the gold piece in the hoard indicate that the Store Gadegård site should be interpreted as a high status settlement, but the main part of the Viking Age hoards found on Bornholm is apparently found in ordinary settlements lacking other high status features. It must however be underlined that the excavated areas are limited and it is difficult to give an exact interpretation of the sites (Ingvardson 2013: 304-309).

The Organization of Trade and Power

The analysis of weights, hoards and Baltic Sea ware demonstrate a clear change in the organisation of settlement and trade on Bornholm at the turn of the 11th century. The widespread distribution of Baltic Sea ware shows that the new settlement structure with individual farmsteads is present throughout

the island. Simultaneously, we see a sharp rise in the amount of deposited hoards and a marked structural change in the hoards, as the dominant role of the Kufic coins is replaced by West European coins. The distribution pattern of weights shows that no new trading centre was established in the late Viking Age after the fall of the Sorte Muld complex, and the connection between 11th century hoards and *spherical/polyhedral weights* indicates that the widespread distribution of *spherical/polyhedral weights* should be

seen as an important element in the organisation of trade on the island.

The structure of the Nørremølle hoard as regard to the objects, production place, chronology and secondary treatment implies that the hoard was gathered by trade and not by tribute or raid, and that the coins were hoarded soon after their arrival to the island, thus indicating a low degree of circulation in the 11th century on Bornholm. The analysis of the fragmentation shows that Bornholm constituted an economic unit with Scania and the Slavic area. The composition of the coins and jewellery and the relation between minted and unminted silver in the hoards of Bornholm is unique in comparison with the countries surrounding the Baltic Sea, and this suggests that Bornholm was not under the strict control of a powerful external ruler. It was an economically independent unit.

The absence of a new powerful trading centre implies that trade on Bornholm was not controlled by one strong ruler who organized and guaranteed safe trading conditions in one dominating trading centre. On the contrary, many of the 11th century hoards are deposited on what appear to be more or less ordinary settlement sites. Together with the distribution pattern of the *spherical/polyhedral weights* found on sites with late Viking Age hoards, this implies that trade was instead carried out on a smaller scale, perhaps on several manor sites distributed throughout the island. The analysis of test marks on the coins in the Nørremølle hoard implies a low

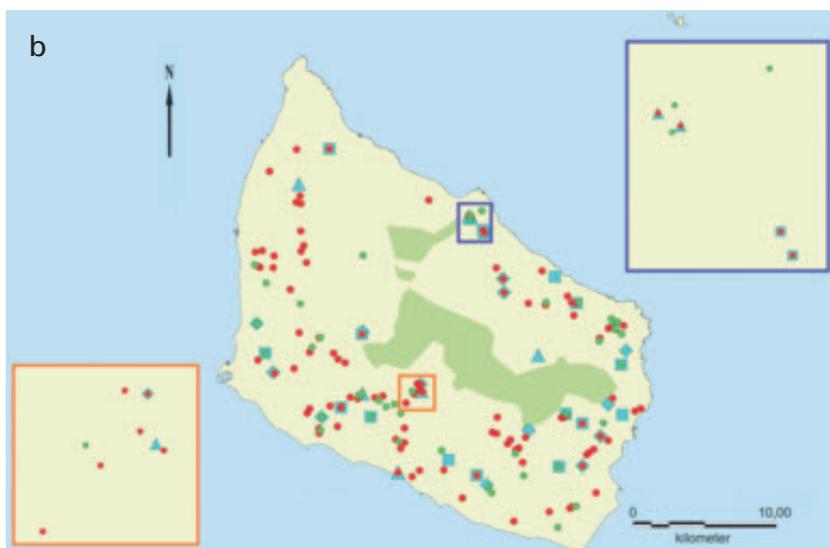
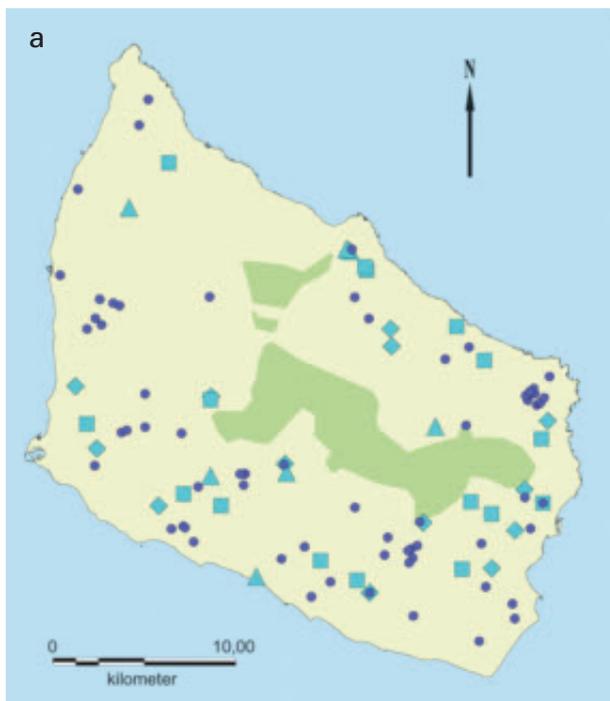


Fig. 13 a. The distribution of hoards and sites with primarily *other weights*. b. The distribution of hoards and (red dots) sites with primarily *polyhedral/spherical weights*, and (green dots) sites with a mix of *spherical/polyhedral weights* and *other weights*. (Primarily is defined as at least twice as many). Map J. S. Andersen.

degree of circulation which confirms this interpretation. No doubt the inhabitants of Bornholm used the central geographical position of the island to gather these significant fortunes that are represented in the silver hoards, but the find picture gives evidence that the silver was mainly gathered through trade outside the island. With reference to S. Bolin's classic thesis (1962: 45-64), the non-recovery of the many 11th century hoards can be seen as the result of war and unrest. This supports the idea that Bornholm was not under the protection of a strong ruler, but functioned as an independent economic and political unit in the late Viking Age.

References

- Aarsleff, E. 2008. Velstandens Ø. *Skalk* no. 4, Højbjerg, 2008, 18-25.
- Aarsleff, E. 2008. Viking Age Finds. In Adamsen, C., Hansen, U. L., Nielsen, F. O. & Watt, M. (eds.), *Sorte Muld, Wealth, Power and Religion at an Iron Age Central Settlement on Bornholm*, pp. 118-122. Bornholms Museum, Wormianum & Kulturarvstyrelsen, Rønne.
- Bogucki, M. 2011. The Use of Money in the Slavic Lands from the Ninth to the Eleventh Century: the Archaeological/Numismatic Evidence. In Graham-Campbell, J., Sindbæk, S. M. & Williams, G. (eds.), *Silver Economies, Monetisation and Society in Scandinavia AD 800-1100*, pp. 133-151. Aarhus University Press, Aarhus.
- Bolin, S. 1962. *Ur Penningens Historia*. Aldus/Bonnier, Stockholm.
- Feveile, C. (ed.) 2006. *Ribe Studier. Det ældste Ribe. Udgravninger på nordsiden af Ribe Å 1984-2000*, Bind 1(2). Jysk Arkæologisk Selskab. Den antikvariske Samling, Århus.
- Gustin, I. 2004. *Mellan gåva och marknad. Handel, tillit och materiell kultur under vikingatid*. Lund Studies in Medieval Archaeology 34, Lund.
- von Heijne, C. 2004. Särpräglat. *Vikingatida och tidig medeltida myntfynd från Danmark, Skåne, Blekinge och Halland (ca 800-1130)*. Stockholm Studies in Archaeology 31. Elanders Gotab, Stockholm.
- Hårdh, B. 1976. *Wikingertidliche Depotfund aus Südschweden. Probleme und Analysen*. Acta Archaeologica Lundensia, Series in 8^o No.6. Stockholm.
- Hårdh, B. 1996. *Silver in the Viking Age. A Regional-Economic Study*. Acta Archaeologica Lundensia, Series in 8^o No. 25S. Stockholm.
- Hårdh, B. 2011. Viking-Age Silver from Hoards and Cultural Layers. In Graham-Campbell, J., Sindbæk, S. M. & Williams, G. (eds.), *Silver Economies, Monetisation and Society in Scandinavia AD 800-1100*, pp. 281-196. Aarhus University Press, Aarhus.
- Ingvardson, G. T. 2010. *Møntbrug. Fra Vikingetid til Venderogter*, Århus, 2010.
- Ingvardson, G. T. 2012. The Monetary History of Bornholm in the Early Middle-Ages – Regional Variation in Eastern Denmark. In Leimus, I. (ed.), *Monetary History of the Baltics in the Middle-Ages (12-16th C.) International symposium in Tallinn, 9-10 Dec. 2010*, pp. 208-214. Eesti Ajaloomuuseum, Tallinn.
- Ingvardson, G. T. 2013. The largest Viking Age silver hoard of Bornholm (Denmark). *Journal of Archaeological Numismatics* Vol. 2(2012), pp. 281-346.
- Ingvardson, G. T. 2013a. Helt alene i Østersøen? Bornholm i vikingetiden. In Lyngstrøm, H. & Thomsen, L. G. (eds.), *Vikingetid i Danmark. Arkæologi på Saxo-instituttet*, pp. 187-190. Det Humanistiske Fakultet, Københavns Universitet, Copenhagen.
- Jørgensen, L. 1990. *Bækkegård and Glasergård. Two Cemeteries from the Late Iron Age on Bornholm*. Arkæologiske Studier VIII, Copenhagen.
- Jørgensen, L. & Nørgård Jørgensen, A. 1997. *Nørre Sandegård Vest. A Cemetery from the 6th to the 8th Centuries on Bornholm*. Nordiske Fortidsminder, Serie B, Vol. 14, Copenhagen.
- Kilger, C. 2000. *Pfennigmärkte und Wärungslandschaften. Monetarisierungen im Sächsischen-Slawischen Grenzland Ca. 965-1120*. Commentationes De Nummis Saeculorum IX-XI. In Suecia Repertis Nova Series 15, Stockholm.
- Kilger, C. 2003. Vad säger egentligen pecks och böjningar? Tanker kring metodiska och teoretiska frågor angående sekundära individuella data och silver hanteringen under vikingatiden. *Nordisk Numismatisk Unions Medlemsblad* 1-2: 3-12.
- Kilger, C. 2006. Silver Handling Traditions during the Viking Age – Some observations and thought on the phenomenon of pecking and bending. In Cook, B. & Williams, G. (eds.), *Coinage and History in the North Sea World c. 500-1250. Essays in Honour of Marion Archibald*, pp. 449-465. The Northern World, Vol. 19. Brill, Leiden.
- Kluge, B. 1981. Das angelsächsische Element in den slawischen Münzfunden des 10. bis 12. Jahrhunderts. Aspekte einer Analyse. In Blackburn, M. & Metcalf, M. (eds.), *Viking-Age Coinage in the Northern Lands*, BAR int. 122, vol. 1, pp. 257-327. Oxford.
- Kluge, B. 2001. Sachsenpfennige und Otto-Adelheid-Pfennige. Anfänge und Dimensionen der Münzprägung in Magdeburg und Sachsen zur Zeit der Ottonen. In Puhle, M. (ed.), *Otto der Grosse. Magdeburg und Europa*, Band I, pp. 419-426. Philipp von Zabern Verlag, Mainz am Rhein.
- Leimus, I. 2009. Millennium Breakthrough. North goes West. *PAST. Special Issue on the History of Estonia*, pp. 7-34. National Archives, Tallinn.

- Malmer, B. & Lagerqvist, L. O. (eds.) 1987. *Corpus Nummorum Saeculorum IX-XI. Qui in Suecia Peperti Sunt* 3(4). Stockholm.
- Moesgaard, J. C. 2006. The import of English coins to the Northern Lands. In Cook, B. & Williams, G. (eds.), *Coinage and History in the North Sea World c. 500-1250. Essays in Honour of Marion Archibald*, pp. 389-434. Brill, Leiden.
- Nielsen, P. O. 1994. Middelaldergårde på Bornholm. *Hikuin* 21: 125-138.
- Nørgard Jørgensen, A. 1991. Kobbegravpladsen – en yngre germansk jernaldergravplads fra det nordbornholmske kystområde. Årbøger for Nordisk Oldkyndighed og Historie, pp. 123-183. Copenhagen.
- Rispling, G. 2004. Cirkulations spor på mynt från vikingatiden. *Mynstudier. Mynttidsskriften på Internet* 4: 1-8.
- Steuer, H. 1987. Gewichtsgeldwirtschaften im frühgeschichtlichen Europa. Feinwagen und Gewichte als Quellen zur Währungsgeschichte. In Düwel, K. (ed.), *Untersuchungen zu Handel und Verkehr der vor- und frühgeschichtlichen Zeit in Mittel- und Nordeuropa. Teil IV. Der Handel der Karolinger- und Wikingerzeit*, pp. 405-427. Bericht über die Kolloquien der Kommission für den Altertumskunde Mittel- und Nordeuropas in den Jahren 1980 bis 1983. Vandenhoeck & Ruprecht, Göttingen.
- Steuer, H., Stern, W. B. & Goldenberg, G. 2002. Der Wechsel von der Münzgeld- zur Gewichtsgeldwirtschaft in Haithabu um 900 und die Herkunft des Münzsilbers im 9. und 10. Jahrhundert. In Brandt, K., Müller-Wille, M. & Radtke, C. (eds.), *Haithabu und die frühe Stadtentwicklung im nördlichen Europa*, pp. 133-167. Schriften des Archäologischen Landesmuseums 8. Wachholtz, Neumünster.
- Wagnkilde, H. 1978: Excavation report, BMR 1978, St. Gadedgård. Pedersker sogn, Bornholms herred, Bornholms amt (06.02.03 SB 160).
- Watt, M. 2006. Detector sites and settlement archaeology on Bornholm. A survey of “productive sites” from the Iron Age and the Viking Age 1996-1999, *Journal of Danish Archaeology* 14: 139-167.
- Watt, M. 2008. Sorte Muld – Past and Present. In Adamsen, C., Hansen, U. L., Nielsen, F. O. & Watt, M. (eds.), *Sorte Muld, Wealth, Power and Religion at an Iron Age Central Settlement on Bornholm*, pp. 12-27. Bornholms Museum, Wormianum & Kulturarvstyrelsen, Rønne.