

Comparative study of archaeological contexts of silver hoards c. 800-1050 in Northern and Central Europe



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A thesis submitted for the degree of
Doctor of Philosophy
Trinity 2016

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Abstract

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The dissertation deals with the archaeological context of Baltic-zone silver hoards deposited in the Viking Age. Its main objective is to investigate the hoards and the context of their deposition to determine how hundreds of thousands of silver artefacts, mainly Oriental dirhams, arrived in Northern Europe, why they were put in the ground and never retrieved.

The review of the published sources on hoards was undertaken in three case studies: Gotland, Pomerania and Svealand. The data on hoards, archaeological sites, geology and topography was collected in geodatabases, and analysed in detail by applying descriptive and advanced statistical methods: regression modelling and GIS-based spatial analysis. The results were presented in the historical context depicted in contemporary literary sources.

Hoard deposition was most pronounced near sites which afforded conditions suitable for mercantile exchange and facilitated the flow of silver: the network of emporia, regional trade hubs, local power centres, and harbours, generally situated near major communication routes and within populated areas. However, exchange networks needn't have been strictly hierarchical, and emporium-scale sites were not indispensable for a fair share of silver influx, and trade, to occur. Chronological changes in hoard distributions, their composition and fragmentation of objects indicate how these networks operated and meshed with economic and political conditions in c. 900 and c. 980.

A method, which uses the information about the presence/absence of a container, cross-referenced with the weight of silver, was devised to provide an indication as to whether particular hoards were deposited with the aim of retrieval – as savings accessed periodically, or for protection in the face of danger – or whether they were meant to be permanent ritual or symbolic offerings. Ritual behaviour took a variety of forms, but the most widespread were the depositions in recently occupied land in marginal soils, where they were aimed at forging a personal bond between the land and the owner.

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1 Introduction

1.1 Objectives and thesis structure

The following DPhil thesis was written within the remit of the AHRC-funded 'Dirhams for Slaves' project, based at the Khalili Research Centre, University of Oxford. The project aimed to explore the implications of a neglected trade system that connected Northern Europe and the Islamic world in the Viking Age. In this dissertation the Viking Age is understood as a period between c. 800-1050, i.e. between the first piratical raids on Western Europe recorded in the written sources, and the end of the Scandinavian influence overseas combined with the emergence of Christian kingdoms in Norway, Denmark and Sweden (Sawyer 1999b:2-3; Williams 2014:17, 27). In the archaeological material the Viking Age in the Baltic zone is characterised by the influx of Oriental coinage which begun between c. 800 and gradually died out in the final years of the 10th century, with the youngest coins dated to 390 AH (999/1000 AD). The abundance of Oriental silver¹ stimulated the development of long-distance, regional and local trade and exchange networks in the 200 years of its flow, but it was imperative to determine their fate after the importation of silver from the East stopped by c. 1000. As we will also see, the number of hoards deposited after 1050 drops significantly in the investigated regions. The analysis of Baltic-zone silver hoards between c. 800 and 1050 provides, therefore, within the constraints of a DPhil dissertation, a historically justified chronological frame for an adequate investigation of silver flow and its deposition.

New archaeological evidence and the increased availability of Central and Eastern European data strongly suggest an intensification of exchange, presumably commercial, in the Baltic region in this period. As yet, beyond occasional national- or regional-level research, there have

¹ The weight of Islamic coins and their fragments in hoards analysed in this dissertation alone comprised approximately 47% of all deposited silver.

been no attempts at historically guided comparative archaeological surveys of the Baltic zone as a whole. This situation is not helped by the fact that the lively long-range contacts discernible in the archaeological material rarely register in contemporary literary sources, in contrast with the well-attested evidence for long-distance trade in Atlantic Europe, the Rus, Bulgar and Khazar lands.

The archaeological evidence for long-distance contacts and inter-regional exchange in the Baltic zone takes mainly the form of silver coins: predominantly Oriental dirhams, both whole and fragmentary, as well as a variety of ornaments and other silver objects, usually in fragments described collectively as hacksilver. The overwhelming majority of these silver artefacts were found in hoards strewn across Northern Europe, from Ireland through Scandinavia to Russia. As an archaeologist within the team it was my task to investigate this category of finds with the emphasis on the context of their deposition, to help my colleagues answer the question of how exactly did the long-distance trade system linking these areas operate, and why this vast amount of silver was accumulated, then put in the ground, and never retrieved.

I do not have the skills to reassess the numismatic importance of these finds, but work has been undertaken by others and I rely on the determinations published to-date, supplemented by an unpublished database of Oriental coins of G. Rispling. Instead, a comparative study of the archaeological, and where possible, historical, context of their deposition is the focus of this dissertation. Thanks to modern methods in archaeological investigations as well as an increased use of metal detectors in recent years, a large number of silver coins and other objects have also been discovered as stray finds. Given the constraints on a doctoral thesis, I do not attempt to deal with this category of finds, important as it is.

For the same reason I have not been able to discuss all areas where silver hoarding occurred in the Viking Age. Instead, I focus on a number of case-studies comprising geographic and historical regions in the Baltic zone. These include some of the main hoarding 'hot-spots' identified by

macro-scale analysis of the distribution of published deposits (Figure 1): Gotland, Pomerania, and Central Sweden, which received individual chapters. For convenience, in the following paragraphs the term 'Baltic zone' is used to refer particularly to these regions, unless stated otherwise. Within each case study chapter the archaeological and historical background is outlined and the archaeological context of hoards, both 'primary' (derived from the descriptions of discovery) and 'inferred' (from the wider archaeological context) investigated. A spatial analysis of hoard deposition employing Geographic Information Systems (GIS) is used to identify the spatial patterns of thesaurisation. Additionally, a statistical regression analysis is used with the aim of identifying statistically significant archaeological factors responsible for the observed hoarding patterns. Statistical methods applied in this dissertation, primarily the regression analysis, were developed and verified with the invaluable help of Dr Dan Lunn (Department of Statistics, University of Oxford).

The first strand of my research is aimed at investigating general trends and patterns of hoard deposition within each case study. I determine factors responsible for the observed concentrations of silver deposits and investigate the association of hoards with sites and regions which could have facilitated the influx of silver and provided conditions suitable for exchange, mercantile or involving less peaceful means – certainly silver had to be available first before it could be deposited. These include, but are not limited to, harbours (or rather landing sites), central places and emporia.

In the second strand of my research I endeavour to explain why silver was put in the ground and, more importantly, why it was never reclaimed. The discussion is based on a method in which the information about the presence or absence of a container is analysed, cross-referenced with the weight of silver, supplemented by the archaeological and geoarchaeological data, and by written sources.

The initial analysis of Chapters 2-4 is based on the cumulative hoard record throughout the Viking Age. In Chapter 5 I investigate changes in geographical distribution of hoards over time throughout the Baltic zone by comparing data from the case-studies. I also analyse changes in the internal structure of the deposits and discuss them in the wider archaeological and historical context.

In the synthetic Chapter 6 I offer answers to the main questions of the thesis: the variety of functions performed by hoards; the differences in function within regions examined, with particular reference to the significance of containers and size of deposits as indicators of intention of retrieval; the hoards' relationship with trade and the light they may shed on the sheer amount of silver in circulation; the nature and function of emporia and the fact that they may not have been indispensable for a fair degree of trading to occur; the extent to which the findings mesh with literary evidence, e.g. Thietmar, Rimbert, Adam of Bremen, *Guta Lag*, *Upplandslagen* and the sagas. Finally, I summarise what my findings suggest about the nature of the different societies benefiting from the influx of silver in the Viking Age, with emphasis on the differences between them, and their use of it.

The datasets and methodology used for analyses are described in detail in Appendix A, and a concise catalogue of hoards analysed in this work is presented in Appendix B. All analysed hoards mentioned in the text are referenced to by their catalogue number (abbreviated to CatNo).

1.2 Chronology and types of hoards analysed in the dissertation

The catalogue of hoards analysed in this dissertation is based on the published record of hoards comprising coins, particularly dirhams, which allow a reasonably narrow and accurate dating within the Viking Age, i.e. c. 800-1050. I also included two coin hoards from Hasselby (Gotland) and Penzlin (Pomerania) dated to the last decade of the 8th century, and a small find from Sallmunds (Gotland) dated to 710/11 - potentially part of a larger, unknown deposit.

I exclude hoards comprised exclusively of ornaments and silver bullion, as they are notoriously difficult to date due to the long chronology of most ornament types. This problem is particularly prominent in Gotland where the end of the Viking Age is dated to c. 1140 (Östergren 1989:17) when the minting of local coin types began. The late Viking-Age ornament types can, therefore, be dated here to 1000-1100 or 1150, which makes it exceedingly difficult to establish whether they still fall within the chronological framework of the dissertation or not. Similar problems are encountered with early types, some of which can be present in contexts belonging to the late Vendel as well as early Viking periods. Furthermore, Gotland is only one of my case study areas, and each of them brings their own chronological problems associated with prevailing ornament styles, such as the Slavic types in Pomerania. In order to maintain chronological consistency throughout the geographical scope of the dissertation the problematic and relatively rare hoards completely devoid of coins (e.g. 10% of all Gotlandic deposits, cf. Table 2.1.) are not included in the following analyses.

The dating of hoards discussed in this work is based on the *terminus post quem* (*tpq*) of coins, which determines the earliest possible date of a hoard deposition. Although this method is the most widespread and useful tool for hoard dating, it has limitations one has to be aware of, chiefly the possibility of a gap between the *tpq* and the actual date of deposition (Graham-Campbell 2011:34-35). This problem is particularly pronounced in hoards where the *tpq*-giving coins were minted in long chronological brackets, e.g. the notorious Otto-Adelheid pennies (OAP) produced from 991 until c. 1040.² Similar ramifications has the question of how long coins remained in circulation before they were deposited, e.g. M. Stenberger (1947-1958) usually assumes c. 10-20 year gap between the *tpq* and the suggested date of deposition. However, the recent discovery within the Viking winter camp of 872/3 at Torksey of a fragmentary dirham

² Recent research indicates that certain variants of these coins could be dated to after 983 (Ilisch 2005:41). However, without the detailed specialist numismatic determinations, which for nearly all material analysed here are unavailable, I have no skills and expertise to question the traditional dating to after 991. Therefore, throughout the dissertation I assume the year 991 as the *tpq* of all Otto-Adelheid pennies.

struck in 866/7 (Woods 2015) shows that coins could travel all the way from the Caliphate to Lincolnshire in as little as five years. An even smaller gap can be observed in the hoard from Westerklijf in Frisia, where a dirham minted in 871/2 were deposited alongside Carolingian deniers dated to 875-7 (Kilger 2007a:233). The journey to the Baltic zone would conceivably take even less time. Unfortunately, apart from such rare examples it is usually impossible to determine with any precision the 'delay' between the coins' *tpq* and the actual date of a hoard deposition, therefore the *terminus post quem* still remains the best and most consistent method for investigating the chronological aspects of hoarding.

From the Viking-Age hoards comprising coins I exclude those entirely lacking in chronological data and those with unknown or poor localisation, i.e. which could not be narrowed down to at least an administrative area of an individual village, in practice typically a radius of c. 1.5km. Finally, from the discussion I also exclude deposits of silver discovered in the contemporary burials as grave goods. Exclusion of these deposits, rare as they are, may require a word of justification. Silver objects deposited in contemporary graves, which otherwise could be interpreted as hoards, are intimately linked to the funerary rites and beliefs of a given society. These are expressed for example through grave goods, which comprise a variety of personal possessions of the deceased and/or the mourners (Bradley 1990:94, 135, 142). A reliable analysis of silver objects deposited in this context, in my mind, cannot be made without first conducting a detailed analysis of the composition and structure of other artefacts accompanying the deceased, which is beyond the scope of this dissertation.

The reliability of all aspects of hoards, i.e. location accuracy, level of archaeological information, detail of contents descriptions including fragmentation and availability of numismatic analysis is scored and normalised in a scale of 0-1 to facilitate the comparison of the overall reliability of available information on each deposit (cf. Appendix B).

The following discussion and analyses are therefore based on 548 hoards: 347 from Gotland, 136 from Pomerania and 65 from Svealand. The sample is clearly not evenly distributed, but it reflects well the hoarding patterns and intensity in each case study, and provides a valid statistical base for the following discussion.

Naturally, silver hoarding is not a phenomenon confined only to the Viking Age. All three regions witnessed the influx of silver in the form of 2nd- century Roman denarii known from single finds and hoards, found in Late Roman and Early Migration Period contexts, i.e. between the 3rd and the 5th century (Bursche 2002:2). However, after the collapse of the Western Roman Empire the influx of silver and its hoarding all but ceased until the 790s. Conversely, the deposition of silver continued after 1050, however the number of known deposits falls dramatically in the second half of the 11th century and disappears in the 12th. Unfortunately given the constraints of the dissertation I was unable to investigate the problem of the Early Iron Age hoarding and continuity of silver deposition in the late 11th-12th centuries in the same detail as the core Viking-Age deposits, but an overview of these aspects in comparison with the Viking-Age hoarding is discussed in Chapter 5.4.

1.3 The Viking-Age Baltic zone as depicted in literary sources

The wider historical context, often marginalised in the predominantly numismatic-oriented discussion on Viking-Age hoards is an important factor in determining mechanisms and reasons of hoard deposition, and – as we will see – certain historical junctures are crucial to understanding the dynamics of hoarding in the Viking-Age Baltic zone. The more detailed context and accounts from the contemporary and near-contemporary sources will be presented in more detail in individual case study chapters, but I will briefly set out what the written sources tell us about the area in question in the period c. 800-1050.

The earliest contact with the Vikings recorded in the Western sources took place c. 789, when the Anglo-Saxon Chronicle recorded that three ships of 'Northmen' arrived at Portland and were met by the local reeve and his men, who believed the visitors to be merchants (Whitelock 1996:185; Keynes 1999:50). We also learn from the Chronicle that only four years later 'the ravages of heathen men miserably destroyed God's church of Lindisfarne, with plunder and slaughter' (Whitelock 1996:186). Two years after the sack of Lindisfarne the same fate befell Skye, Iona and Rathlin (Ó Corráin 1999:83-84), and in the final months of the 8th century the Frankish monastery on Noirmoutier was attacked (Sawyer 1999b:3). For the next 200 years English, Irish and Frankish written sources provide abundant evidence for the events of the Viking Age.

Unfortunately, for the Baltic zone in general and the three chosen case-studies in particular, the contemporary or near-contemporary written sources are few and far between. The earliest description of lands around the Baltic as a whole and the only one depicting it from the sea is the account of a journey undertaken by an Anglo-Saxon named Wulfstan, preserved in an Old English translation of Orosius' *Historiarum adversum Paganos Libri Septem* dated to the 890s (Bately 2007:21):

Wulfstan said that he travelled from the Heaths [Hedeby], that he was in Truso in seven days and nights, that the boat was all the way running under sail. Wendland was on his starboard side, and on his port side were Langeland and Lolland and Falster and Skåne, and these lands were all subject [or belong] to Denmark. And then the land of Burgendas was on our port side and they have their own king. Then after the land of the Burgendas there were on our port side these lands, which are called first island of the people of Blekinge and Möre and Øland and Gotland, and these lands are subject to the Svear. And Wendland was on our starboard side all the way to the mouth of the Vistula. This Vistula is a very large river and it separates Witland and Wendland, and the above-mentioned Witland belongs [or is subject] to the Ests (...) (Bately 2009:15).

Wulfstan's account is the earliest mention of Gotland in the Viking-Age written sources and remains a solitary example until the compilation of medieval sagas, including the semi-legendary history of the island described in the 13th-century *Guta Saga* (Peel 1999). A wealth of information

on customs and legal structure of the Gotlandic society can be found in the 13th-century *Guta Lag*, as many of the legal provisions it contains may have their origin in the late Viking Age (Peel 2009). These few sources allow some insight into the social and legal structure of the island, but do not provide any reliable details of historical events.

The land of the Wends, i.e. Slavs, described by Wulfstan as stretching along the southern coast of the Baltic between Denmark and the mouth of Vistula, was the object of Frankish attention already at the end of the 8th century, when Einhard's *Vita Caroli Magni* describes Charlemagne subjugating the Slavic Veleti during his conquest of Saxony (Nelson 1999:21-22; Piskorski 2002:48). This was by no means a uniform organism: an anonymous document drafted in the first half of the 9th century in Regensburg, called the *Bavarian Geographer* (Zakrzewski 1917), lists in the region a number of tribes, next to which the author added a number of constituent strongholds (*civitates*) and regions (*regiones*) (Piskorski 2002:44). Some authors believe that the document reflects a careful estimate of the strength of those Slavic tribes, which the Frankish empire supposedly wished to control (Urbańczyk 2000:144).

The interest of the Ottonian state in the Slavic lands translated clearly into the 10th-century work of a contemporary of Otto the Great, Widukind of Corvey. His *Res gestae saxonicae*³ provides crucial information on the political and armed conflicts between the German monarchy of Henry the Fowler and Otto I, and their Polabian Slav neighbours. Although the events described by Widukind focus on lands lying to the south and west of the Pomeranian case study, the description of the first great Slav uprising in 955, and particularly the Piast expansion along the Oder, are the earliest sources for the history of Pomerania.

One of the most crucial written sources is Thietmar of Merseburg's *Chronicon*⁴ compiled in eight volumes between 1013 and the author's death in 1018, covering the period between 908 and

³ *WoC*, quotes after Walkowski 2013 in my translation from Polish

⁴ *ToM*, quotes after Warner 2001

1018. Although Thietmar borrows heavily from earlier sources (including Widukind), ‘paints brutal portraits of the Ottonians’ enemies and indulges in a particularly virulent brand of ethnic stereotyping’ (Warner 2001:4), amongst his somewhat biased chronicle of the reigns of the Ottonian emperors he provides crucial details about the second Slav uprising of 983 and the political struggle between the Holy Roman Empire, the emerging Piast state and the involvement of the Polabian tribes. Thietmar’s *Chronicon* is also a valuable source of descriptions of Slavic religion, temples and customs.

Of note for the discussion of the southern Baltic coast is Helmold of Bosau’s *Chronica Slavorum*⁵ written in the late 12th century, and devoted to the a history of the conquest and conversion of the Polabian Slavs from the time of Charlemagne to 1171. Although *Chronica* often borrows from the works of Rimbert and Adam of Bremen, its purpose of demonstrating how German Christianity took hold among the heathen inhabitants of the Baltic zone resulted in abundant unique details of and insights into Slavic beliefs and customs.

The number of contemporary sources about Viking-Age Sweden and particularly Svealand is even more limited. The earliest source is Rimbert’s *Vita Anskarii*,⁶ a biography and an account of the missionary work of Saint Anskar in Scandinavia, written in the last quarter of the 9th century. Rimbert’s work is an important source describing the contemporary political structure in Svealand and everyday lives of its people, and provides the most detailed account of the emporium of Birka.

Another crucial source describing Viking-Age Sweden is Adam of Bremen’s *Gesta Hammaburgensis ecclesiae pontificum*⁷ written between 1073 and 1076, with *scholia* added until his death, possibly in 1081 (Tschan 1959:xvi). The treatise is of particular importance as it covers the entire Viking Age in Northern Europe from the foundation of the Bremen (later

⁵ *HoB*, quotes after Popłoński 1862 in my translation from Polish

⁶ *VA*, quotes after Robinson 1921

⁷ *AoB*, quotes after Tschan 1959

Hamburg-Bremen) bishopric in 804/805 after Charlemagne's conquest of Saxony. Adam provides useful information not only about the missionary activities in the North, but also unique accounts of Viking-Age religion and customs of both Slavs and Scandinavians (including the famous description of the Uppsala temple), and political events in the Baltic zone in the late 10th-11th centuries, although some of his politically-charged accounts can be questioned (e.g. Lund 1999:165-7; Duczko 2000:30).

1.4 Viking-Age silver economies – basic concepts

1.4.1 Why silver?

'One of the major drivers for the start of the Viking movement outside Scandinavia (...) was the desire to generate wealth' (Kleingärtner and Williams 2014:49). The archaeological and historical sources show that this wealth was obtained in multiple ways including tribute- and mercenary-payments, booty, gift-exchange, and trade, and in multiple forms such as furs, silks, wine, slaves, domestic animals, but above all as silver. Silver certainly has much better chances of being preserved in the archaeological record than goods made of organic materials: it does not perish and is susceptible to corrosion only in very extreme environments. But clearly this is not the sole reason for its abundance in the Viking-Age Baltic zone. Its appeal lies in its relative rarity and durability; it is possible to quantify, divide and remelt into larger units or objects of desired value when needed (Hårdh 1996:14); it formed the basis of the developed monetary economies in Western Europe and the Caliphate with which the Baltic-zone societies came into contact; and its relatively high value per weight unit meant it was easy to transport. All these factors resulted in an increased preference for silver as a medium for expressing and storing wealth, and as a universally accepted means of exchange (Skre 2011:81).

In the following two sections I will briefly discuss with the help of a sample of written sources the ways in which silver was likely to arrive in the Baltic zone in the Viking Age and how it may have been used in the contemporary economies.

1.4.2 Influx of silver – raiding, payments, trade and gift-exchange

First contacts with the Vikings recorded in the written sources were certainly not amicable. Although we don't know if the Northmen at Portland c. 789 engaged in any other activities beyond killing the reeve's men, by 793 they did not miss out on an opportunity to acquire goods through pillage at Lindisfarne. In the following year 'the heathens ravaged in Northumbria, and plundered Ecgfrith's monastery at Donemuthan' (Whitelock 1996:187). A letter written by Alcuin of York, Charlemagne's advisor, suggests that the attackers carried off hostages, with the view of acquiring ransom (Nelson 1999:21).

From this point the intensity and scale of Viking attacks on Western Europe gradually increased with particularly devastating consequences for the divided Frankish realms in 845, when Hamburg was pillaged and burnt so thoroughly that the saint bishop Anskar barely escaped 'without even a cloak to cover his body' (VA CH16). In the same year Paris was sacked by Ragnar's force of 120 ships who retreated only after receiving a ransom of 7,000 French pounds of gold and silver from Charles the Bald (Nelson 1999:30-37). By the end of the 9th century West Frankia had been subjected to a tribute of 12,000 pounds of silver and gold (Nelson 1999:37). King Æthelred's treaty of 991/994 following the defeat of the English army at Maldon obliged the English to pay a tribute of 22,000 pounds in silver and gold (Whitelock 1996:443). In the following years of Æthelred's reign tributes paid to the Viking raiders rose dramatically: the army of Thorkell the Tall in 1012 exacted tribute in the sum of 48,000 pounds (Whitelock 1996:245-246) and in 1018 Knut the Great after being recognised as king by the English received a tribute of 82,500 pounds (Whitelock 1996:251).

The early *ad hoc* pillaging and later organised tribute-taking were subsidised by taking captives for ransoms. For example, in 858 the kidnappers of the abbot of St-Denis received ransom in the astonishing sum of 686 pounds of gold and 3,250 pounds of silver (Nelson 1999: 26-28). There are also numerous instances quoted by Adam of Bremen of churchmen redeeming Christian captives (*AoB* B1CH33(35),39(41),41(43)) with a particularly evocative description of bishop Rimbert selling vessels from the cathedral's altar as 'he had to see the miseries of the many that still were detained by the pagans.' Rimbert himself describes his mentor Anskar, who 'began also to buy Danish and Slav boys to redeem some from captivity so that he might train them for the God's service', a crucial tool in the conversion of the North (Knibbs 2016:126).

Mercenary payments attested in the historic sources were undoubtedly an additional source of silver for the Vikings. The *Annales Bertiniani* tell a story of Weland, who in return for 3,000 pounds of silver agreed to attack another Viking force on behalf of Charles the Bald in 860 (Nelson 1999:36). The payment was also taken as room and board: following the treaty and tribute paid to Thorkell in 1012, 45 ships of his army 'promised [king Æthelred] to defend this country, and [the king] was to feed and clothe them' (Whitelock 1996:246).

If one reads between the lines of anti-heathen rhetoric it seems that one of the main preoccupations of the Northmen was in fact trade. After a Viking force besieged in Angers by the forces of Breton ruler Salomon in 873 agreed to leave and never return, the Viking leaders requested permission to hold a market on an island in the Loire where they were to winter before leaving (Nelson 1999:33). A tentative indication of trade agreements built in the immediate aftermath of conflict could be seen in the treaty between Alfred and Guthrum (886-890), which allowed traffic of cattle and goods between England and the Danelaw (Whitelock 1996:418). Much fuller attention was paid to matters of commerce in Æthelred's treaty of 991 or 994 (Whitelock 1996:442), noticeable in paragraphs which stipulate the procedures for protection and safety of merchant ships and their crews, even if they were driven ashore in lands

covered by the truce. On the other side of the Viking world the Rus-Byzantine treaties of 911 and 944/945 (both following Rus attacks on Constantinople) preserved in the *Povest' vremennykh let* focus on trading conditions of the Rus at Constantinople, procedures and prices regarding stolen or escapee slaves, and conditions surrounding the silk trade (Cross and Sherbowitz-Wetzor 1953:64-65, 73-77). Even the Arab historian Miskawayh's description of the Rus raid on Bardha in modern Azerbaijan in 943 (Lunde and Stone 2012:148) may be read as a prelude to establishing beneficial trading agreements.⁸ The situation was summed up by S. Sindbæk's statement that 'raids [were] a continuation of trade by other means' (Sindbæk 2012:150), although the sequence of events in England, Constantinople and Bardha raises a possibility of an opposite conclusion: that trade was a continuation of raids by other means. Whichever reasoning one chooses to follow, it is clear that Vikings were preoccupied with trade, a situation well illustrated in Eirik the Red's Saga describing Karlsefni's voyage to Vinland (Smiley and Kellog 2001:670). The text indicates that even when venturing into uncharted and by all appearances uninhabited territories, the Vikings nevertheless loaded their ships with trading goods (red cloth in this case), which they eventually exchanged for valuable furs at the first opportunity when approached by Native Americans.

The importance of trade as the primary source of silver is even more pronounced in the Baltic zone, given the lack of prime targets such as monasteries or urban centres. Here 'the Scandinavians had to organize local systems to collect the natural wealth, and then establish trade centres and trading routes to market these goods' (Noonan 1999:135). This is not to say that raids did not take place here, but examples in the written sources are rare. One of these is a passage from *Vita Anskarii* (CH30) describing a Swedish attack on the town of Seeburg (Grobina in Latvia) and a siege of Aputra (possibly Pilten on Windawa). The beleaguered inhabitants

⁸ The geographical location of Bardha'a on the River Kura and en route between the Caspian and the Black Seas would offer the Rus not only a foothold in the Arab world but also a strategic advantage in a long-distance trade, should it have succeeded.

agreed to offer the Swedes all the gold and silver taken from the Danes whom they had defeated the previous year, and additionally pay a half-pound of silver for each inhabitant, offer 30 hostages, and restore a yearly tribute which they had ceased to pay some time before. Ibn Rusta's work dating to 903-913 suggests that Rus raided and enslaved *Saqaliba* (Slavs) to sell them to Khazars and Bulgars. He also writes that Rus 'earn their living by trading in sable, grey squirrel and other furs. They sell them for silver coins (...)' (Lunde and Stone 2012:126). An earlier source, *Kitab al-masalik wa'l-mamalik* (Book of Roads and Kingdoms) by Ibn Khurradadhbih, the director of the Abbasid postal and intelligence service (*barid*), also describes Rus merchants trading beaver and black fox pelts as well as swords to the Byzantines, and sometimes venturing with their merchandise from the Caspian Sea to Baghdad on camelback (Lunde and Stone 2012:111-112). The importance of furs exchanged for silver in trade with Arabs may suggest that tributes taken from Slavs were likely to be taken in the form of natural produce and raw resources similar to *gafol* imposed by Ohthere on the neighbouring *Finnas* (Bately 2007:27, 46). A fragment from *Povest' vremennyh let* under the year 859 could imply that the tribute imposed by 'the Varangians from beyond the sea' on a mixture of Baltic, Slavic and Finnish tribes of the Lake Ladoga and the upper Dnieper area, was taken in a similar form as the tribute of one 'white-squirrel skin from each hearth' paid by middle Dnieper Slavs to the Khazars (Cross and Sherbowitz-Wetzor 1953:59). Probably the most evocative description of the eastern trade comes from Ibn Fadlan's *Risala* – an account of a diplomatic mission sent by the caliph al-Muqtadir to the recently converted ruler of the Volga Bulgars, Almish – in which he gives a brief description of their wares including sable skins and slave girls sold for dinars and dirhams. Another passage shows just how lucrative the trade in furs and slaves was:

Round their necks, they [the Rus women] wear torques of gold and silver, for every man, as soon as he accumulates 10,000 dirhams, has a torque made for his wife. When he has 20,000, he has two torques made and so on (Lunde and Stone 2012:46-48).

The eastern trade brought vast quantities of silver primarily in the form of dirhams, which dominate the Baltic-zone hoards until the last quarter of the 10th century when they are replaced by European coinage mainly from Germany but also from England, undoubtedly as the result of trade but conceivably also derived from the vast tributes paid in the late 10th-early 11th century.

In the context of the Viking-Age silver one should not forget the gift-exchange which is considered, particularly by the economic anthropologists, of great importance for the question of movement of wealth and objects (Mikkelsen 2012:545). The literary evidence indicates that poignant political decisions were initiated or accompanied by exchange of gifts, which might have helped to establish or adjust trading networks, facilitated forging of links between donors and recipients which in turn defined the social standing of leaders and secured the loyalty of their followers (Sheehan 2013:811). The nature of the gift is such that it needs to be reciprocated and the returning of the accepted gifts with excess places the original giver under an obligation to the 'major donor' (Mauss 1973:277). The literary sources which enumerate or describe gifts suggest that they were most often individual objects of outstanding craftsmanship or pedigree. For example gifts of gold, palls, robes, furs, slaves and wax bestowed upon the embassies of Rus and Byzantine envoys accompanied the signing of Byzantine-Rus peace treaties and trade agreements in 911 and 944 (Cross and Sherbowitz-Wetzor 1953:68, 77). However, when the Andalusian Arab al-Ghazal visited a Viking king in 845, he brought coffers filled with garments and vessels (Allen 1960:21). Adam of Bremen (B1CH38) writes that the co-rulers of Denmark, brothers Halfdan and Sigefrid, asked the western emperor Louis II for peace in 873 by sending him gifts, which included a sword with a golden hilt. More examples can be given to illustrate gift-giving in the Viking Age, but they clearly show that despite having an indisputable political and social importance when relations were to be forged or maintained (Skre 2011:68), gift exchange could not be responsible for the scale of the silver influx evidenced by the numerous hoards which predominantly comprise masses of coins and unaesthetic hacksilver, which cannot seriously be interpreted as items of gift-exchange.

1.4.3 Silver economies – basic concepts

There is a lively debate regarding the nature of the economy, or more correctly, economies in the Viking Age. In this period the access to silver appears to be far greater than previously, but it was generally associated with long-distance trade routes and a network of emporia and central places (cf. Sindbæk 2012), although they may have not been indispensable (for example in Gotland, Chapter 2.4.7). In fact, at least until the second half of the 8th century in the Baltic zone there were no large international emporia (cf. Bogucki 2006:140-145, fig. 132), there was little precious metal available, perhaps except what was left from the contacts with the Roman Empire, therefore there were effectively no mechanisms to allow for a unification of the Baltic zone. This situation resulted in the effectively disunited area that we come to see at the beginning of the Viking Age, and – as will be shown below – in an uneven distribution of silver, which arrived in different Baltic regions gradually and at a different pace (cf. Skre 2011:83). This could indicate that a form of an old system of barter exchange might have been used laterally, particularly at the beginning of the Viking Age and conceivably longer in areas where access to silver was restricted.

In this primitive exchange system the value of regularly exchanged items was expressed in stable exchange rates with other goods, which over time attained functions ascribed to money (Skre 2011:69). This system of ‘commodity-money’, was probably widespread within the local markets of the Baltic zone throughout the Viking Age (Skre 2011:73-80), however with the emergence of the long distance-trade it had become inadequate. Where trading partners were often temporary visitors, the local market populations were disadvantaged to anticipate preferences for payment in a commodity-money exchange. This problem had been solved by the adoption of a medium of payment that everyone accepted (Skre 2011:77-82): silver, principally in the form of dirhams, replaced by European coins from the late 10th century, and supplemented throughout the Viking Age by other whole and fragmentary silver artefacts, mainly ornaments.

The Arabic written sources indicate that besides silver the function of such commodity money may have been also fulfilled by glass beads and marten skins (Kleingärtner and Williams 2014:54), which finds some confirmation in the archaeological record (e.g. in Truso, Chapter 3.3.12).

The qualities of silver discussed in Chapter 1.4.1 made it the most widely-accepted form of 'commodity money' and preferred means of exchange within the 'bullion' or metal-weight economy in the Baltic zone. One of the main characteristics of a bullion economy is that silver was exchanged by weight and fineness regardless of its form (Kershaw 2014:155). Coins, ornaments, bars and ingots were often deliberately cut or broken into smaller fragments in order to provide the desired weight for a transaction. Silver weight was determined with the use of hand-held balances and a variety of weights, including cubo-octahedral and oblate spheroid forms, some imported from the Islamic world and some produced locally (Kleingärtner and Williams 2014:57-58). H. Steuer's (1987:479-490) analysis of Viking-Age scales and weights led him to a conclusion that the standardized weight system in the East was closely related to the Oriental weight system, although the exact standard varied across time and regions (Kleingärtner and Williams 2014:60). Nevertheless the Oriental silver appears to have 'set the agenda' in regions previously poor in precious metals. The purity of metal was tested most likely during a commercial transaction and employed a variety of methods, the simplest of which were simple resistance tests with the help of a knife: small crescent-shaped knife cuts known as 'nicks' and sharp, angled 'pecks', made with a knife tip (Kershaw 2014:155). If the silver was felt to be too soft, there was a chance it had been adulterated with lead, when it was too hard it was likely to be mixed with copper. Far more accurate results were achieved by the use of fire assaying or cupellation (Gustafsson 2013:53) although traces of this process are difficult to trace archaeologically. Cupellation was carried out by melting together a weighed amount of silver with lead on a shallow clay plate in an oxidising environment so that the oxidised lead drew base metals from the melt. The weight of the remaining silver was then compared to the original to

assess the level of debasement – the smaller the difference in weight the purer the silver. One contemporary artefact may provide direct evidence that the value of silver was commonly known in the Viking Age and that it served as a means of payment. The so-called Forsa ring (Hälsingland, Sweden) bears a runic inscription of a law code, which stipulates fines in oxen and *aura* for breaking the peace at a thing assembly. K. Jonsson (2011:254) believes that the term *aura* (öre) can only refer to the weight of silver equal to 1/8th of a mark (c. 25g).

In addition to being a convenient means of payment, silver was undoubtedly a symbol of status which could be exchanged as a gift to help forge political and social alliances or worn in overt displays of wealth within the 'display' economy (Graham-Campbell 2008:29; Hårdh 1996:18; Kershaw 2014:154). The use of silver was certainly flexible (Kershaw 2014:156) – complete, particularly large ornaments intended for display could also serve as convenient storage of bullion which could be cut to size when needed; alternatively fragmented silver could be melted together to create jewellery which could be then displayed. A number of coins found in the Baltic-zone hoards can serve as an illustration of this cycle: certain dirhams obtained in economic transactions were pierced or looped to be worn as ornaments and subsequently fragmented and turned back to hacksilver used in bullion economy (Figure 1.2).

The work of B. Hårdh (1996) on silver fragmentation in a sample of Baltic-zone hoards propagated the view that precious metals at the beginning of the Viking Age were almost exclusively confined to social rather than economic functions (Kleingärtner and Williams 2014:54), and only gradually from the mid-10th century it became used increasingly as means of payment (Hårdh 1996:86). This linear development has recently been questioned in Anglo-Saxon England by J. Kershaw (2014:157) and the results of the present work indicate that the transition from display to bullion economy is not clear-cut in the Baltic zone either (Chapter 5).

In the context of bullion and display economies one must not forget gold, coveted equally - if not more - by the early medieval societies. Gold does at times appear in predominantly silver

hoards, but only relatively rarely (only 3% of hoards studied here, cf. Appendix B). When gold is found, it is more often discovered as stray objects or in exclusively gold hoards, composed mainly of complete ornaments or sets of ornaments which generally do not bear hallmarks of the silver bullion economy, i.e. test marks and fragmentation. B. Hårdh (1996:161) suggested that gold and silver were used in the contemporary societies in different ways, a problem analysed in more detail by T. Zachrisson. She concluded that gold in Norse literature, mainly Snorri's prose Edda, is associated with kennings referring to gods and mythical entities, whereas silver is absent in kennings and is also treated much more marginally (Zachrisson 1998:30). Thus, whereas gold had the connection to heroes and gods, silver had a more prosaic appearance and was used frequently in mundane transactions. This suggestion is also borne out in the archaeological material as gold hoards and ornaments are, compared to silver equivalents, found more often in connection with watery environment and 'district' boundaries, highlighting their symbolic function (Zachrisson 1998:117-118). In more mundane terms the rarity and the purchasing power of gold, valued at 8 times that of silver (Skre 2008:81), made it a less practical medium for frequent, small-scale transactions, thus a less appealing and accessible means of exchange.

Viking-Age societies handling coins as a medium for the bullion value of precious metal, were certainly aware of the use of coins in areas where they originated and circulated within 'monetary' economies where they were passed by tale rather than weight. When political structures in Scandinavia reached the necessary level by the end of the 10th century, uniform royal coinages were issued in the name of reigning kings in Norway, Denmark and Sweden (Gullbekk 2008:162) and the Baltic-zone societies made the first faltering steps towards coin economy. However, within the chronological scale of the three case-studies analysed here, the concept of a monetary economy is hardly applicable. Gotland did not develop its minting until the 1140s (Gullbekk 2008:62), Pomerania until the 1170s (Horoszko 2015:9), whilst the production of the Svealandic coinage minted in Sigtuna from c. 995 collapsed already in the

1030s, and its output did little to change the structure and composition of Svealandic hoards (Chapters 4 and 5). Nevertheless, the abundance of Oriental coins in the Baltic zone may imply a level of familiarity with the relatively consistent form, weight and quality of dirhams, at least among people who handled them regularly. This allowed some scholars to suggest that at certain times and places coins may have been counted rather than weighed (Jonsson 2011:254), although such practice was most likely very limited and on a very small scale.

1.5 Definitions of and main themes in the research of hoards

1.5.1 Definitions

The Oxford English Dictionary defines a hoard as ‘an accumulation or collection of anything valuable hidden away or laid by for preservation or future use; a stock, store, esp. of money; a treasure’. Under Roman law, a hoard (*thesaurus*) was a collection of valuables hidden for reasons of protection and security, but then forgotten in its hiding place by its original owner, who for whatever reason failed to retrieve his or her belongings (Curta and Gandila 2013:45). Related to this definition is the 12th-century English law of Treasure Trove which was intended to ensure that the Crown acquired newly discovered valuables without traceable legal ownership (Millett 1994:102).

These definitions outline the most common perception of Viking-Age hoards as collections of valuables deposited deliberately in a place believed to offer protection, with an intention of later retrieval. This approach should probably not come as a surprise and would explain why the Viking-Age hoards predominantly comprise precious metals and numerous coins. The latter are the prime focus of numismatists whose research greatly influenced the discussion. Modern numismatists often see hoards as the conscious process of selecting and storing away objects of value against the dangers of repeated depreciation of the currency (Curta and Gandila 2013:45). This position could be contrasted with the view of scholars who prefer to stress the role of

irrational behaviours in every part of human life (Urbańczyk 2002:209), and who perceive hoarding as an expression of symbolic or ritual behaviour. Such interpretation is usually made on the basis of an unusual composition and/or deposition in an environment which would make retrieval impossible, although there is no consensus among the researchers in the selection of criteria (Mogielnicka-Urban 1997:18). One must note, however, that such a unilateral approach to the interpretation of hoards is rare in modern research and the majority of scholars appreciate that reasons behind the deposition of hoards were complex (Bogucki 2004:50).

There is also a difference of opinions with regards to what constitutes a hoard. Some scholars, primarily those with a numismatic background, consider hoards as assemblages of at least five, sometimes ten, or more coins (e.g. Noonan 1994:221; Kovalev 2012; Kilger 2007a; Zachrisson 1998), although the number is not always directly specified. On the other end of the scale are scholars who consider as hoards stray finds of large ornaments such as bangles, arm- and neckrings (e.g. Östergren 1989). However, one fails to find a clear description as to what the degree of completeness or the minimum size and/or weight of a 'large' artefact must be to consider it a hoard. As such, this kind of hoard definition is very much open to interpretation and therefore unsuitable for the purpose of the following analyses, which consider hoards from different metalworking traditions and ornament styles: Gotland, Central Sweden, northern Poland and north-eastern Germany.

Probably the most widely accepted definition of a hoard, which reduces the possibility of confusing intentionally hidden and accidentally lost object, is that a hoard must consist of more than a single item (Oras 2012:65). Throughout this dissertation, therefore, as a hoard I will understand finds of at least two objects discovered at a single place and time as a form of material wealth which was disposed of deliberately for reasons known and important to the hoarder (after von Brunn 1968:236). Importantly, in this approach the intention that the deposit should be retrievable is not a prerequisite.

1.5.2 Main research themes

The research on hoards has a long and rich history, beginning in the late 19th century, since when an array of views pertaining to the motives and interpretations of hoarding behaviour has emerged (Mogielnicka-Urban 1997:17-20; Bogucki 2004:49-51; Oras 2012:65-68). In general, three major themes in interpretation of hoards (partially dictated by the geo-political background of the researchers) can be distinguished, after R. Bradley (1987:352):

- **Political**, where the deposition of hoards is seen as a direct result of social and political unrest and instability. The discussion of the political aspects of hoarding was most fully presented by S. Bolin in 1926 where he stated that the number of hoards in a region reflects historical events that may lead to the deposition of hoards (Bolin 1926:197-203) and that the deposition is indicative of unrest/warfare rather than political and economic power and wealth (Bolin 1926:204-207). This approach may be summarised by a statement by P. Grierson (1975:132): ‘the most frequent cause of such permanent loss is warfare, since while in times of peace a prudent man may keep his money hidden, he will also be able to recover it at need.’ Such hoards, called **emergency hoards**, are deposits of precious objects and coins buried for protection in the face of impending disaster of whatever nature, and not retrieved as a direct result of the crisis. The composition of emergency assemblages is expected to contain a random selection of coins, perhaps with an admixture of ornaments or precious metals, which the owner had to hand at a particular moment. It is believed that such hoards would ‘represent a snapshot of the coins in circulation at the time of the burial’ (Curta and Gandila 2013:47). In the archaeological context one would expect that emergency hoards would be buried within or near settlements, ideally associated with destruction horizons, however they do not necessarily have to be buried on the spot, but can be found where the owner has taken refuge (‘refugee hoard’, Grierson 1975:133). Some scholars who

favour the emergency hoard explanation see a direct correlation between hoards and military events known from written sources or even reconstruct unknown military events, although this rather extreme approach is strongly criticised (for references see Curta and Gandila 2013:46). An interesting point raised by J. Casey (1986:56) is that emergency hoards do not necessarily have to be deposited by the legitimate owners. Some of them could comprise plundered or stolen goods temporarily hidden by looters or thieves waiting for the hue and cry to stop.

- **Economic**, associated with trade and accumulation of wealth. This line of interpretation, outlined most fully in the works of V. Jammer (1952:39-43) and W. Hävernicks (1956), grew in opposition to S. Bolin's views, and related the deposition of hoards to the economy: an increase in deposition was to represent the times of prosperity; the decrease or absence of hoards meant times of hardship (Bogucki 2004:51). One such interpretation perceives hoards as **savings hoards**, accumulated over a long period of time and added to at intervals (Curta and Gandila 2012:47). This means that they must have remained accessible to the saver so that withdrawals and additions could be made periodically (Casey 1986:55). B. Malmer (1968:7) even refers to them as 'safe-deposit boxes' (*bankfack*). A numismatic characteristic of savings hoards is that they should tend to be selective, containing high-value and better coin specimens in preference to low-value ones, with little or no circulation wear (Curta and Gandila 2013:47; Grierson 1975:55). K. Odebäck (2009) interprets such hoards as family savings, transferred as inheritance with occasional additions. The character of savings hoards is well summarised by J. Casey (1986:53) who sees them as 'temporary immobilisations of coin put together with the intention of returning them to the currency pool sooner or later. The object of this exercise is not to create a hoard but to create future spending power.' Casey's 'spending power' doesn't, however, need to be understood in strict economic terms. The saved and stored wealth might have been used in trade but it was equally

likely to act 'as a portable but standardised medium for the payment of social obligations' such as compensation payments, dowries and ransoms (Bradley 1987:358). Indeed, M. Burström (1993) and S. Sindbæk (2011:54-57) see savings hoards as associated with marriage and bridewealth. M. Burström (1993:36) also suggests that hoards associated with bridewealth alongside their economic function may have been used in a prestige sphere: once the transaction involving bridewealth-bride had been completed the silver could be deposited on the farm belonging to the bride's parents, where it served as a confirmation of the status of the kin group. Alternatively, such hoards could be seen as wives' dowry or savings, particularly given that their labour and production would belong to the family into which they married (Sindbæk 2011:60). One thing these interpretations have in common is that in the archaeological context, one would expect savings hoards to be characterized by depositions in durable containers within or near domestic sites, or even within houses themselves to facilitate reasonably easy and safe access when withdrawals or additions had to be made. The fact that they were never recovered was likely to be only in exceptional circumstances due to dramatic events rather than an intention of non-retrieval.

- **Ritual/symbolic;** it is generally accepted that ritual motives for hoard deposition comprise in essence votive offerings seen as a fulfilment of a sort of a contract made between the worshipper and the gods or ancestors in line with the Roman religious formula *do ut des* (Bradley 1987:361). Interestingly, R. Bradley suggested that 'it is only logical for religious transactions to resemble the workings of the contemporary economy' (Bradley 1987:361), which offers a tantalising possibility that the composition of hoards deposited in the ritual or symbolic context did not have to be dramatically different from that of savings or emergency hoards. The generally accepted criterion for interpreting hoards as ritual is their deposition in places which would make retrieval of the deposited items impossible. Therefore, marshes, bogs, springs, rivers – collectively

described as the watery environment – are most often mentioned in the literature. One needs to be also aware that some of the ritual deposits could have been deposited in places which made them technically reversible, but which could have been made intentionally irreversible, e.g. being protected by oaths or spells (Mogielnicka-Urban 1997:19). Examples of magical protection of hoards are known from Eastern European folklore and ethnography up to the early 20th century (Макаров 1981:262). Another criterion for ritual interpretation of hoards includes places which occupy prominent locations in the landscape, such as characteristic rocks, hilltops, glacial boulders etc., or hoards deposited in structures and burials of earlier cultures, particularly in barrows (Bradley 2000:22-23, 156; Mogielnicka-Urban 1997:18-19 with references). Such behaviour might have been associated with the cult of ancestors (Zachrisson 1998:264; Svedjemo 2014:115), or symbolic aspects of creating and maintaining boundaries (Zachrisson 1998:93-94, 226; Kowalewski 2001:68-69, 71-73, 76). However, one should be mindful that the prominence and visibility of such features in the surrounding landscape would also make them convenient markers if the owners intended to retrieve their silver. Another ritual and symbolic interpretation of hoards perceives them as cenotaphs - votive offerings placed in lieu of a burial, comprising deposition of items required by the deceased in the afterlife, if the deceased was missing, could not be buried in a proper way (Blajer 2001:21) or died from specific reasons (e.g. child birth, Myrberg 2009a:139). Finally, many archaeologists consider silver hoards an expression of the so-called Odin's law in *Heimskringla* (e.g. Carlsson 2010:10; Myrberg 2009a:140; Widerström 2009:61-62): 'He [Odin] said that every man should come to Valhall with such riches as he had with him on the firebale and that each should use what he himself had buried in the earth' (Monsen and Smith 1990:6). It suggests that Viking-Age people found additional spiritual assurance for burying their wealth, which on the one hand may have lessened their trepidation at not being able to retrieve it in their lifetime, on

the other by burying their personal wealth they ensured that it would reach them in the afterlife, in case their kin were unable (or unwilling) to furnish the pyre accordingly.

The above outline of the main interpretative conventions also highlights some problems with the terminology. The term 'hoard' commonly used for the description of silver deposits, particularly in the English language, is interpretationally loaded (Oras 2012:65) and carries the implication of deposition associated with safe-keeping of valuables for economic reasons. This concept is acceptable as a generic term for silver deposits, which after all were a quantum of somebody's wealth deposited for a variety of reasons, and it works particularly well with the terms 'emergency hoard' and 'savings hoard'. It may, however, be somewhat confusing to refer to silver deposits associated with ritual and symbolic behaviour as 'hoards' as well. To avoid any misunderstandings and the danger of creating a potential oxymoron, in the following chapters I will refer to silver deposits associated and likely to be associated with ritual and symbolism as 'placed deposits'. As the name indicates, placed deposits contain any material that appears to have been deliberately 'placed' in the ground in order to achieve certain "non-functional purpose or intention' (Sofield 2015:111). One should remember, however, that practices considered 'irrational within a modern scientific paradigm could have been perfectly rational within the worldview of those carrying it out' (Sofield 2015:111). Importantly, the term satisfies the condition of purposefulness in my definition of a 'hoard', and furthermore, placed deposits, sometimes described as 'special' or 'votive', are commonly attributed to religious practices (Sofield 2015:111), which should not be understood in the modern sense of an organised religion, but can entail behaviour we would today describe as symbolic.

As can be seen from this review of research themes of hoards, a single interpretation method applied to all silver deposits cannot explore the complexity and variety of the possible motives for their deposition. It is important to stress here, that in many cases hoarding was probably a complex affair, which transcended our perception of functional and non-functional behaviours.

One should not forget that Viking-Age societies' distinction between material and immaterial was not as sharp as it is for us today. To paraphrase N. Price (2014:166): the Vikings did not believe in the supernatural any more than they believed in a mountain – both were just there, equally relevant and real. Nevertheless, the proposed interpretative division offers a convenient platform from which the discussion of the reasons for hoarding and non-retrieval of objects in the Viking-Age Baltic zone can be initiated.

R. Bradley (1987:351) wrote that 'careful documentation of [hoards'] contexts is an essential preliminary to a more ambitious analysis' – only detailed analysis of a hoard's composition, location of the findspot, circumstances of discovery, and relationship with other archaeological contexts and sites may allow for a reliable interpretation to be made. With this advice in mind I will now proceed to the analysis of silver deposits in the three chosen case-studies.

2 Gotland

2.1 Introduction

2.1.1 Case study

Gotland was chosen as a case study not only because of the highest concentration of known silver hoards, but also because it is a clearly defined geographical unit, and uniform in terms of archaeological, social and historical development. As such it provided a perfect 'testing ground' for development of analytical methods required to investigate hoarding of Baltic-zone Viking-Age silver, which subsequently were applied in other, less homogeneous areas.

Gotland occupies a central position between the coasts of Sweden and Latvia, and Polish Pomerania and the Finnish Åland islands, and is the largest of the Baltic islands. There are no major rivers on the island and only a few relatively small lakes concentrated in the northern part. Cadastral maps from the turn of the 18th century (Appendix A, A1.1.4) indicate that prior to the agricultural revolution which triggered extensive drainage of wetlands, at least c. 10% of Gotland's area was covered by bogs.

2.1.2 Written sources and historical background

Gotland appears to have all but escaped the attention of contemporary Viking-Age writers. The earliest mention of the island in the description of Wulfstan's voyage dated to the 890s remains a solitary example until the compilation of medieval sagas, where Gotland is only mentioned occasionally. These include *Hversu Noregr byggðist* or *How Norway was inhabited* (Dasent 1894:Appendix A; Rowe 2003:445) and Snorri Sturlusson's *Heimskringla* in descriptions of the deeds of Norwegian kings Olaf Tryggvason and St. Olaf (Monsen and Smith 1990:132, 183, 221,

264, 281, 424, 432). More information on Gotland is provided by *Guta Saga*⁹ written between 1220 and 1275 (Peel 1999:liii) describing the (often legendary) history of the island prior to Christianisation. However, one has to be mindful that the application of these literary sources to research could be problematic as they ‘may be coloured by religious and political agendas or simply by imperfect knowledge, as well as by deliberate borrowings from earlier literature’ (Williams et al. 2014:26). Clearly standing out in this context is *Guta Lag*,¹⁰ a Gotlandic law book which remained in official use until 1595, but in practice until 1645. Although written in the 13th century,¹¹ it contains many alliterative phrases and some residual rhythmic passages indicating that an earlier form of oral law underlies the known manuscripts (Peel 2009:xxiv-xxv), and it is likely that many of legal provisions it contains may have their origin in the late Viking Age.

The paucity of contemporary sources makes it difficult to discuss the political and social structure of Viking-Age Gotland, and the little information available is often problematic. The anonymous author of *Guta Saga* suggests that ‘the Gotlanders submitted to the king of Sweden, of their own free will so that in exchange for a yearly tribute of sixty marks of silver, they might travel everywhere in Sweden free and unhindered, exempt from toll and all other charges’ (Peel 1999:7). We don’t know if the submission to the Swedish crown was truly voluntary and one cannot reject the possibility that the Swedish ‘protection’ was imposed on the Gotlanders, since some authors suggest that *Guta Saga* was written in order to argue for Gotland’s autonomy (Sjöholm 1976:108; Peel 1999:xxxv). Assuming that the treaty was really initiated by Gotlanders it would make for a bold economically-motivated political move, but it is unclear whether it was made already in the Viking Age. Wulfstan’s account suggests that Gotland was in some way dependent on the Svear by the end of the 9th century. However, this statement has to be taken cautiously since he states that at the same time Blekinge was also subject to the Svear, even

⁹ GS, quotes after Peel 1999

¹⁰ GL, quotes after Peel 2009

¹¹ Between 1220 and 1275, although the date of c. 1220 is likely (Peel 2009:xxxix)

though it was part of Denmark until the 11th century (Peel 1999:xxxiii). Snorri Sturluson suggests that after Olaf Trygvasson seized power in Norway in 995, jarl Eric Haakonsson fled to Sweden and after having been well received by King Olaf Skötkonung, he began harrying about the coast of Gotland, preying on merchant shipping (Monsen and Smith 1990:182-183). This would be hardly possible if Gotland was under Swedish protection. Probably the best indication of when the treaty was negotiated is provided by one of only seven existing runestones, which mention Gotland by name. An inscription on the stone from Torsätra in Uppland reads:

Skúli and Folki have raised this stone in memory of their brother Húsbjörn/Ásbjörn. He was sick abroad when they took payment on Gotland (Rundata, U 614; cf. Appendix A, A1.1.2).

The text indicates that some form of tribute was taken from the island in the second half of the 11th century, since the stone is attributed to group Pr3 in A.-S. Gräslund's typology, dated to c.1050-1080. Despite this, Gotland must have retained a high level of autonomy at least into the 13th century because *Guta Lag* does not mention any fines payable to the king; in fact it doesn't mention the Swedish king at all (Peel 2009:xxiv).

The written sources provide a rather fragmentary and inconclusive picture of the political and judicial organisation on Gotland. Much of what is known about those structures has been pieced together with the help of later sources (Gustafsson 2013:37-39; Peel 2009:xxiv-xxx). Gotland appears to have been divided into a number of hierarchical units. The highest was the general assembly (*gutnalþing*) usually referred to as *athing* modelled on the Icelandic equivalent. The next level is commonly believed to be formed by three *pripiungr* (*tredingar*) or thirds, subdivided into two *siettungar* (*settningar*) or sixths each (six in total). These were divided into two or in some cases three things (*þing*) each (twenty in total), which in turn were subdivided into fourths or *fjærdningar*, and parishes. In judicial terms the third level of assembly mentioned specifically in *Guta Lag* divided sixths into twelve hundreds or *hunderi*. There is, unfortunately, no solid evidence that this complex organisation, whose elements are not accounted for before the 15th

century, was already present in the Viking Age. A passage in *Guta Saga* describing heathen practices of the Gotlanders (Peel 1999:5) suggests that only the thirds, local things and the general assembly were units with roots in pre-Christian society. However, Å. Hyenstrand (1989:108, 136) argues that hundreds, each divided into eight, were the oldest, original administrative division of the island, which later gave rise to sixths and thirds.

Guta Saga provides some, but rather meagre, information on the beliefs of the Gotlanders who reportedly 'believed in groves and grave howes, holy places and ancient sites, and in heathen idols. They sacrificed their sons and daughters, and cattle, together with food and ale (...) The whole island held the highest sacrifice on its own account, with human victims, otherwise each third held its own. But smaller assemblies held a lesser sacrifice with cattle, food, and drink' (*GS* CH1). The heathen practices survived after Christianity arrived on the island, certainly to a degree which required a dedicated chapter in the *Guta Lag* explicitly forbidding under the pain of a fine all customs 'that belong to paganism' (*GL* CH4). The arrival of Christianity is itself a problematic issue in the light of written sources. Certainly it does not appear that the conversion was undertaken by the bishops of Hamburg-Bremen, as both Rimbert and Adam of Bremen are silent on the subject. The indigenous source, *Guta Saga*, provides two somewhat contradictory accounts of the conversion. The first can be linked to the visit of St. Olaf during his flight from Norway to Prince Jaroslav in Novgorod in 1007/1008 (Peel 1999:xxxvi-xl, 9). The future saintly king reportedly baptised Ormika of Hejnum, who build an oratory at the site of his conversion in Aker garn, now Sankt Olofsholm in Hellvi parish. In the alternative version, Gotlandic merchants came into contact with Christianity during their journeys, and some allowed themselves to be baptised, brought with them priests and built churches, or more likely personal devotional chapels, since *Guta Saga* does not mention bishops who could have consecrated them (Peel 1999:xl, 9-11). Interweaved in the descriptions of the church building activity *Guta Saga* provides a short statement concerning the acceptance of Christianity by the whole population 'of their own free will, without duress' (Peel 1999:xl, 11). It is not clear when this general

conversion took place and how thorough it was, assuming that the account can be trusted.¹² The earliest known remains of wooden churches from Gotland were preserved as reused wood in later stone churches from Eke and Hemse. These earliest structures date to 1087-1092 and 1098-1103 respectively (Bråthen 2015).

The dearth of contemporary written sources about Gotland would suggest *ex silentio* that the island was of little importance to the early-medieval political and economic dynamics of the Baltic zone. This situation is in a stark contrast with the unparalleled record of nearly 500 hoards¹³ of Viking-Age precious metal, by far the highest concentration of early medieval silver in Europe. This fact alone makes Gotland central to discussions on Viking-Age hoarding, economies and long-distance connections.

2.2 Hoards in Gotland

Scholarly interest in the Viking-Age finds of precious metal on Gotland has a long tradition, starting with the works of C.J. Tornberg in the mid and late 19th century, but probably the most important work on the subject was the 1947 *Die Schatzfunde Gotlands der Wikingerzeit* by M. Stenberger. In his extensive catalogue he identified 687 finds of gold and silver artefacts. As of 2009 apart from occasional stray coins (included by Stenberger in his list) over 700 finds of Viking-Age precious metal have been reported in Gotland, and more discoveries are made every year (e.g. Östergren 2009:11).

My research in the published material including works by M. Stenberger (1947), G. Hatz (1974), *Corpus nummorum saeculorum IX-XI qui in Suecia reperti sunt* (henceforth CNS, Malmer and Rasmusson 1975; Malmer 1977; 1982a; 1982b), I. Hammarberg, B. Malmer and T. Zachrisson

¹² The form and a style different from the surrounding narrative may indicate that it was based on an earlier oral model (Peel 1999:xlvi).

¹³ Many publications give figures between 700 and 800. This apparent discrepancy is due to the differences in the definition of what constitutes a hoard (Chapter 1.5.1).

(1989), S. Brather (1996), L. Thunmark-Nylén (2000), an unpublished database of Oriental coins by G. Rispling who kindly made it available to me, entries in the Swedish National Archaeological Sites Information System (FMIS) and 106 grey-literature reports by ArkeoDok, Arendus and Länsmuseet på Gotland¹⁴ has so far identified 866 finds of precious metal on Gotland, of which 505 are hoards in the definition set out in Chapter 1.5.1. The following discussion is based on 347 hoards fulfilling the criteria set out in Chapter 1.2, which comprise c. 95% of deposits that could be dated to the period in question and c. 78% of all coin hoards known from Gotland which were deposited well into the 12th century (Table 2.1).

All hoards in case study	505
Coin hoards in case study	447
All hoards with good localisation	417
Coin hoards with good localisation	405
All hoards with dating within period	366
Coin hoards within period	362
Hoards suitable for analysis in case study	347

Table 2.1 Suitability of Gotlandic hoards for analysis

With regards to Gotland no other piece of archaeological work has had as great and long-lasting impact as the pioneering doctoral dissertation of M. Östergren. Based on excavations at 14 findspots of Viking-Age hoards, she established that 13 contained finds and features indicating a contemporary settlement¹⁵, which is 93% of cases (Östergren 1989:51). Östergren's own metal-detector surveys of 82 sites including 74 hoard findspots revealed that a similarly high percentage (94%) can be classified as Viking-Age settlements according to criteria developed by her from the observations made during a small number of excavations. This led her to identify

¹⁴ The overwhelming majority of these reports I obtained only thanks to the invaluable help of P. Widerström of Gotland Museum.

¹⁵ In fig. 40 on page 54 Östergren lists 16 excavations on the analysed hoard sites, however two of these (Tummelbos and Burge II) produced no finds and seemingly were removed from this statistic (13 of 16 is 81%), which surprisingly was not applied to conclusions on page 64.

silver hoards as direct indicators of settlements and even individual buildings, a view which is still very strong in Swedish and particularly Gotlandic archaeology:

The connection of silver hoards to contemporary settlements, probably to the dwelling house itself, (hoards were evidently concealed under something, for example floor-board) emphasises the incorrectness of the view that the precious metal hoards were 'buried' in the ground. Instead we should talk of 'hiding' and 'concealing' when we speak of Viking precious metal finds, at least those from Gotland (Östergren 1989:248).

Closer analysis of Östergren's work reveals a problem with the practical application of her definition of a 'settlement' used to denote 'Gotlandic farms, which are represented by a collection of farm buildings on each individual farm' (Östergren 1989:15-16). The meaning is somewhat cryptic and not very well suited for the Viking Age since settlement remains are all but invisible on the surface and, above all, excavated in very few instances: after all, Östergren's list of 17 excavated sites is only a fraction (1.1%) of the estimated 1500 settlements in the Viking Age (Chapter 2.4.1). Nevertheless, one has the impression that 'settlement' for Östergren would refer to a farm toft, a homestead (Swedish *tomt*), the place where the farm buildings were located. To avoid any ambiguity I will henceforth by the term 'settlement' understand the farm toft only, and any associated field systems will be treated as separate interpretative units, although functionally related to farm tofts.

Another weakness noted and discussed by some researchers (e.g. Svedjemo 2014:113-114; Zachrisson 1998:119) lies in Östergren's definition of what archaeological elements present in the landscape constitute a settlement site. The main set of criteria Östergren refers to are presented in fig. 40 of her thesis (p. 55-65), where all 83 places she analysed (of which 74 are hoard findspots) are listed along with twelve different criteria which are considered to be indicative of settlement sites. At least two of these criteria, besides the hoard itself, have to be met in order to classify a site as a settlement. Additionally, she states that there are further criteria not listed in fig. 40, such as the depth at which the hoard was found, high phosphate content etc. She also refers to a third list of eight criteria, partially duplicating those in fig. 40, of

features that should be visible on the surface of a settlement site (p. 64). Unfortunately the latter two sets of criteria are not itemised for the sites analysed, which makes following her reasoning difficult. Finally, however, on p. 64 Östergren states that the criteria presented in fig. 40 show that 94% of sites fulfil at least two of the criteria needed to be classified as a settlement site.

G. Svedjemo's scrutiny of the data (2014:114) revealed that there are 18 findspots in the list that meet only one criterion and three meeting none (all these are hoard sites). When applied to the 74 hoard findspots, this means that 21 sites do not meet the criteria specified by Östergren and therefore only 72% of hoard sites can be considered Viking-Age settlements. Similar criticism was launched earlier by T. Zachrisson, but she only questioned some 11% of Östergren's findspots (Zachrisson 1998:119-120).

However, a closer analysis of artefacts (excluding those identified as belonging to hoards) found on the posited settlement sites, published by Östergren herself as well as by Thunmark-Nylén (2000) and supplemented by the data held by FMIS, places Östergren's determinations under more pressure. From the available descriptions it becomes clear that 4 hoards discussed by Östergren were clearly deposited in contexts other than settlements, such as earlier burials or Early Iron-Age¹⁶ field boundary walls (known locally as *stenvasts*),¹⁷ 8 hoard sites did not produce any objects other than those belonging to hoards themselves¹⁸ and 9 contained beside the hoard

¹⁶ The Iron Age in Sweden comprises the Pre-Roman Iron Age (c. 500-1BC), Roman Iron Age (c. 1-400AD), Migration Period (c. 400-600AD), Vendel Period (c. 600-800AD) and Viking Age (c.800-1050AD, until c.1140 on Gotland). The Swedish Iron Age is usually divided into the Early Iron Age and Late Iron Age, although there is a difference of opinions whether the division should be drawn at the beginning or the end of the Migration Period (cf. Chapter 4.4.1). In the Gotlandic chapter I am following the terminology of Svedjemo (2014:55), who by the 'Early Iron Age' understands the period to include the Migration Period. In the context of his work and throughout Chapter 2 of this study the term is used to refer particularly to the late Roman Iron Age-Migration Period.

¹⁷ Parish name and catalogue number, if applicable, given in parentheses: Sigsarve (Hejde), Lillängen (Vamlingbo, CatNo318) in Early Iron Age field boundaries; Ammunde (Burs, CatNo37) in an Early Iron Age clearance cairn or burial; Pavalds (Lärbro, CatNo181) is believed by L. Thunmark-Nylen to be ritual (see below)

¹⁸ Vanges (Burs, CatNo47), Sälle (Fröjel, CatNo90), Rings (Hejnum, CatNo146), Rangsarve (Näs, CatNo229), Halor (Rone), Martille (Stenkumla, CatNo282), Liknatte (Stenkyrka, CatNo291), Bosarve (Stånga, CatNo272)

only artefacts datable to Vendel or medieval periods.¹⁹ In the case of hoards from Hemängen (Etelhem, CatNo70) and Niome (Stenkyrka, CatNo288) the metal-detected finds were dated to the Vendel/early Viking-Age period, but the hoards have *tpqs* of 1030 and 1024 respectively, therefore it is not likely that they were contemporary with the putative settlements.

It could, therefore, be said that with regards to correlation of hoards with contemporary settlements there is a decisive lack of positive evidence for the above 23 hoards (31%).

Less clear-cut evidence against the correlation of hoards with contemporary settlements exists for a further 12 hoards (16%). At the findspot of a hoard from Gustavs *tpq* 959 (Fröjel, CatNo89), the only other dated artefact was a weight from the late Viking Age/early medieval period, i.e. mid-12th century in the Gotlandic chronology. The hoard from Nygårds (Västerhejde, CatNo332) was found alongside objects dated from the Roman Iron Age to the post-medieval period including only a single Viking-Age artefact: a bronze bead divider which most likely formed a part of a necklace set belonging to the hoard. The remaining ten²⁰ sites produced settlement-related material besides the hoards themselves, but none of it can be dated. As such, these findspots do not entail positive evidence for linking them with contemporary Viking-Age settlements, but at the same time the possibility that at least some of these artefacts were deposited in the Viking Age cannot be easily and completely dismissed. Some solution to the problem of these chronologically challenging hoards is provided in Östergren's table, which indicates that 4

¹⁹ Pilgårds (När, CatNo226), Lingsarve (Näs, CatNo228), Änggårde (Rone), Sigfride (Öja, CatNo223), Sandgarde (Sanda), Uddvide (Grötlingbo, CatNo113), Myrungs (Linde, CatNo200), Lingvide (Havdhem, CatNo133), Alskute (Levide, CatNo184)

²⁰ Bölske (Eke, CatNo56), Tummelbos (Levide, CatNo195), Burge II (Lumellunda, CatNo211), Stale (Rone, CatNo255), Tune (Stenkyrka, CatNo294), Stora Tune (Väte, CatNo339), Bölske (Grötlingbo, CatNo102), Prostarve (Högran, CatNo163), Gullarve (Väte, CatNo336), Grausne (Stenkyrka, CatNo286)

findspots²¹ meet none or only one of her criteria and therefore should not be considered as settlements.

	Associated with settlement	Undetermined (inconclusive or undated other artefacts)	Unlikely settlement (undated other artefacts and site not meeting Östergren's criteria)	No traces of settlement
% of hoards analysed by Östergren	53%	11%	4%	31%
Number of hoards analysed by Östergren	39	8	4	23

Table 2.2 Scrutiny of hoard data in Östergren 1989

By combining the lines of evidence discussed above (Table 2.2) only for between 53% and 64% of hoard sites on Östergren's list, depending on how strictly we want to interpret the data, is there sufficient evidence to consider them as deposited on contemporary Viking-Age settlements. This is a very significant difference which makes the interpretation of all silver hoards as proxies for Viking-Age settlements uncertain and extrapolation of such conclusions on the remaining deposits would be methodologically hard to justify. The question of where and for what reasons the Gotlandic Viking-Age hoards were deposited by their owners, remains therefore largely unanswered. In the following paragraphs I will offer a range of alternative as well as complementary explanations, starting the discussion with the analysis of the spatial distribution of hoards themselves.

²¹ No settlement categories met: Grausne (Stenkyrka, CatNo286), 1 category met: Bölske (Grötlingbo, CatNo102), Prostarve (Högran, CatNo163), Gullarve (Väte, CatNo336)

2.3 Spatial analysis of hoard distribution

Figure 2.1 shows the distribution of hoards whose location is known and which could be dated to between c. 800 and 1050. I include in the discussion a hoard from Hesselby (Dalhem, CatNo52) dated to 792 and a find from Sallmunds (Levide, CatNo193), which comprised two dirhams dated to 710/11 - potentially part of a larger, unknown deposit.

It is clear even at a first glance that hoards are not distributed randomly, but form clusters. This observation is confirmed by the results of the Average Nearest Neighbor analysis (Figure 2.2), which shows that given the z-score of -9.051, there is less than 1% likelihood that this clustered pattern could be the result of random chance. It is, however, hard to quantify the intensity of concentrations based on the geographical distribution alone. A much clearer picture emerges with application of kernel density estimation, which calculates a magnitude of concentration per unit area within a radius in which the clustering processes are statistically significant. In the case of Gotland it was calculated to 4km (the method is detailed in Appendix A, A2.1).

The results of kernel density analysis are presented in Figure 2.3 as a heat map, in which the statistically significant concentrations of hoards are highlighted in red as 'hot spots' and areas lacking hoard finds are represented in blue. One could argue that this representation tells, however, only part of the story as it takes into account only the number of hoard finds and their distribution but does not consider the amount of deposited silver.

And here is one of the problems one faces when analysing Viking-Age hoards from Gotland, namely the scarcity of information on the weight of deposits. Only for 243 (70%) of the analysed hoards, could the overall weight of deposited silver be reconstructed from a variety of published sources, although many publications I consulted do not detail the weight of silver and only a fraction have the information on the weight of individual items. These deficiencies were to some degree rectified by the review of the original handwritten 18th- and 19th-century discovery

descriptions and redemption receipts held by the Swedish History Museum (*Statens historiska museum* or SHM) catalogue available online.

	Median weight (g)	95% bootstrap confidence interval	
		Lower	Upper
Oriental coins			
whole	2.99	2.96	3.03
fragment	1.42	1.34	1.52
Byzantine coins			
whole	2.55	2.46	2.65
fragment	1.17	0.95	1.45
German coins			
whole	1.26	1.20	1.33
fragment	0.58	0.47	0.76
English coins			
whole	1.30	1.07	1.35
fragment	0.66	0.51	0.77
Other European coins			
whole	1.48	1.19	1.61
fragment	0.67	0.42	0.90
Other objects			
whole	73.40	63.36	86.19
fragment	11.06	7.32	13.67

Table 2.3 Results of the average weight calculations for Gotlandic hoards

To mitigate this problem for the remaining 30% of Gotlandic hoards where the weight data is unavailable I calculated average weights of whole and fragmentary items for each of artefact categories (ornaments, Oriental coins, German coins etc.) using the method described in Appendix A, A2.3. Although the use of median average weight rather than mean average in calculations is a robust way of limiting the influence of outlying values from unusually composed hoards, the results presented in Table 2.3 highlight some deficiencies of this approach. The most obvious problem is the variance of weights of fragmentary and whole non-coin objects, particularly in the case of ornaments: the weight of such complete items, if published, can vary from c. 3g (finger-rings) to over 200g (spiral armrings) and the extent of fragmentation and fragments' weights are very rarely detailed. It has to be said, therefore, that although the calculated weights of non-minted silver items are statistically a good representation of their average weight in the global sense, they can cause some errors in calculations in the case of

unusually composed hoards, e.g. consisting almost exclusively of very small or very large items. The only solution to this problem would be to physically visit the collections and manually weigh all objects. Given the scope and time constraints of the project this was not a viable solution. Nevertheless, the results presented here prove to be accurate with an overall median average error of $\pm 7\%$. I believe them, therefore, to be accurate and suitable for calculating the overall weight of silver in the 30% of Gotlandic hoards where such data is otherwise unavailable.

Using the published and calculated weight data I undertook spatial autocorrelation analysis to determine to what degree the weight of silver could influence the clustered pattern of hoards observed before (cf. Appendix A, A2.1). The results showed that given the z-score of 2.92 in the global Moran's I test, there is a less than 1% likelihood that this clustered pattern could be the result of random chance (Figure 2.4). This would mean that the amount of silver at hoard findspots is not distributed among them at random, and that it influenced the clustering. However, when I visualised these results using kernel density approximation, this time taking into account not only the spatial distribution of hoards, but also the weight of silver deposited in each of them, the resulting density heat map was almost identical to the one produced in Figure 2.3. This suggests that it only reflected the underlying spatial distribution of hoard findspots – the influence of the weight of silver was negligible, if any. To get to the bottom of these contradictory results I analysed the spatial autocorrelation of silver weight by using the 'Cluster and Outlier Analysis (Anselin Local Moran's I)' function in ArcGIS, which identifies statistically significant clusters of features with high or low values with an accuracy impossible to obtain in the global Moran's I test. The results (Figure 2.5a) indicate that the weight of silver had a statistically significant influence on hoard clustering only in two localised exceptions (outliers), otherwise it had no statistically significant influence on the observed densities. This result provides, I believe, robust evidence that although hoard findspots are clearly clustered, the amount of silver is distributed among them at random, and therefore is of no consequence for hoard clustering on Gotland. In other words, there are no clearly defined areas where heavier

or lighter hoards concentrate (Figure 2.5b), a pattern which we will see repeated in Pomerania and Svealand. The observed clustering of hoards, therefore, appears to be dependent on factors other than the weight of silver. In the following paragraphs I will endeavour to show what they were.

2.3.1 Concentrations

Before I discuss the context of hoards and factors responsible for their clustering I would like to review the concentrations highlighted by the kernel density analysis presented in Figure 2.3. As we will see in other two case studies, it is possible to connect the majority of hoard concentrations to some form of a central place, be it emporium, stronghold or other high-status site. This task is next to impossible on Gotland, mainly due to the uniform, all but egalitarian form of the excavated settlements, which are few and far between, and little evidence for emporia-scale sites (cf. Chapter 2.4.7).²² Some tentative help can again be offered by *Guta Saga*. The text mentions the figure of Avair Strabain of Alva parish, whose skilful negotiations brought about the treaty with Sweden (Peel 1999:7). The historicity of Avair cannot be proven, but it is not impossible that the passage echoes oral tales or poetry concerning a much respected heathen (Peel 1999:xxxv). Importantly, Alva parish with which he is associated, is the location of a small but discrete hoard concentration (Figure 2.6). A much larger and denser cluster of hoards is in the north-eastern part of the island in the parish of Hellvi, where the aforementioned oratory built by Ormika at Sankt Olofsholm is located. The area is associated with the visit of the Norwegian king St. Olaf, who is said to have stayed there a long time (Peel 1999:9). If the story is true, it is plausible that the young king chose for his stay a fittingly comfortable and prosperous area with some prestige. Another intensive cluster is located in the north-western part of the island in the parish of Stenkyrka. Stenkyrka is associated in *Guta Saga* with Likkair Snielli, who was said to have carried most authority at the time, while the first church on Gotland was

²² The concepts and definitions of an emporium and a central place are discussed in Chapter 6.1.1.

reportedly built by his son-in-law, Botair of Akebäck (Peel 1999:9). Intriguingly, Akebäck is located in the western part of a hoard concentration centred at Roma (see below). Again both figures are mentioned only in *Guta Saga* and their historicity may be doubted. However, none of the hoards belonging to the latter two concentrations can be dated to the 9th century and their chronology generally falls into the late 10th-early 11th century, which may imply that Stenkyrka and Hellvi were of some importance in the past not so distant from the time when the saga was written. Naturally, all these associations are highly speculative. A little more solid indication of a connection of Gotlandic hoards with places of social and economic importance can be traced in the Stenkyrka concentration's proximity to the Viking-Age harbour at Lickershamn, which would have offered a crucial gateway for long-distance trade and elite contacts. A similar argument can be put forward for hoard concentrations in Othem, Burs and Grötlingbo parishes. However, out of these only the harbour at Bandlunde in Burs parish has been excavated in any detail. I will return to the question of association of hoards with harbours in Chapter 2.4.7.

One final concentration which requires a mention here is the hoard cluster in the western part of Roma parish (Figure 2.6), centred just several kilometres from Roma kloster, a 12th-century Cistercian monastery which is referred to as '*Sancta Maria de Guthnalia*' in contemporary sources. The name has been interpreted as deriving from a Latinised form of '*by the guþnalþing*', i.e. the althing of the Gotlanders (Gustafsson 2013:38) and is traditionally associated with the highest level of the assembly on the island (Östergren 2004). Although the exact location of the althing is arguable (Myrberg 2009b), the area north of the monastery (RAÄ Roma 85:1)²³ has yielded plentiful finds associated with trade and exchange, including weights, silver coins, fragments of copper-alloy bars, and ornaments. Unfortunately all finds were recovered with the use of a metal-detector and no excavations have yet been undertaken on the site, therefore the

²³ Riksantikvarieämbetet (Swedish National Heritage Board) site identification number.

exact chronology, nature and character of one of the best candidates for a Gotlandic central place remains unknown.

2.4 Context

The spatial analysis of hoard distribution shows that silver deposits concentrate in certain areas of the island and are almost completely absent from others. What were the factors that influenced deposition of hoards in those specific places? Why were some areas preferred to others? To answer these questions I will first turn to the archaeological context in which hoards were discovered.

Unfortunately this is not an easy task since the archaeological context of silver discoveries is rarely specifically recorded in detail and often, if at all possible, it has to be pieced together from the descriptions of the circumstances of discovery. The combination of the published information on some of the hoards and the datasets held by FMIS allows us to determine the context of 121 hoards, which is c. 35% of the analysed finds.

2.4.1 Settlements

The state of research on Viking-Age settlements in Gotland is certainly not impressive. To my knowledge the archaeologically excavated structural remains and cut features which could be associated with Viking-Age farm sites were investigated at just 18 sites,²⁴ where the excavated area often did not exceed 10m², and the vast majority of settlements are only implied by concentrations of decontextualized finds discovered with the use of metal-detectors. Based on the sources detailed in Appendix A (A1.1.1) I identified 180 contemporary Viking-Age settlement

²⁴ Bote (Alskog), Burge (Lumellunda), Fjäle (Ala), Gannarve (Hall), Glammunds (Ackebäck), Havor (Hablingbo), Kattlunds (Grötlingbo), Klints (Othem), Levide (Vall), Mallgårds (Levide), Norrgårde (Sanda), Petsarve (Eke), Rangvalds (Havdhem), Spillings (Othem), Uggårde (Rone), Vall (Vall), Vallhagar (Fröjel), Stånga Annex (Stånga), however in the last site the recalibrated radiocarbon dates suggest it may be a Vendel-period structure (Gustafsson 2013b:152; Östergren 1989; Carlsson 2007; Widerström forthcoming).

sites, which stands in stark contrast with the settlement situation at the mid-millennium from which nearly 4000 stone house foundations representing nearly 2000 farms are known (Svedjemo 2014: 108). It is often estimated that c. 1500 farms existed in the Viking Age, similar to the numbers recorded in cadastral maps compiled around 1700 (Östergren 1989:248; Jonsson and Östergren 1990:148; Carlsson 2007:25; Carlsson 2009:66), therefore the picture is clearly very partial. Assuming that the estimates are correct, it would mean that we only have solid archaeological evidence for approximately 1% of the Gotlandic Viking-Age settlements. Nevertheless, the sample of 180 probable settlements out of the assumed 1500, i.e. 12%, is large enough to argue that, at least in the spatial sense, it generally may be representative of settlement patterns in the Viking Age. Therefore, based on the available data I created the settlement density heat map which is presented in Figure 2.7.

A comparison with the hoard density heat map (Figure 2.3) shows some level of correlation between them on a regional scale. However, the discrepancies between the location of hoards and contemporary settlements become clear at the parish and more local levels. This impression is reinforced by the results of a statistical comparison of the two density datasets (cf. Appendix A, A2.1), which with a correlation coefficient of 0.52 could be described as moderate at best (Evans 1996). How about the relationship of hoards with individual contemporary settlements?

Review of the available sources allowed me to associate with some confidence only 53 Viking-Age coin hoard find spots with settlement material (cf. Appendix B).²⁵ The majority of these designations are based on the type of finds deemed characteristic of settlement activity discovered during archaeological metal-detector surveys. Unfortunately, only a small number of Gotlandic hoards analysed here (34 or c. 10%) were recovered during archaeological excavations. Often these excavations were confined to the hoard itself and there is no record

²⁵ CatNos: 1, 2, 3, 4, 13, 14, 15, 32, 40, 41, 50, 51, 57, 84, 85, 91, 93, 100, 106, 118, 119, 120, 131, 132, 134, 136, 143, 144, 145, 160, 165, 168, 173, 182, 185, 189, 190, 191, 203, 221, 236, 242, 250, 251, 252, 256, 259, 265, 273, 276, 285, 303, 314

whether any other features were present. Even excavation extending beyond the immediate vicinity of the findspot often failed to capitalise on the opportunity to capture the archaeological context of the find. For example, at the findspot of Garde III (CatNo285) an area of 58m² was excavated in 1977 in 10cm spits each time scanned with metal-detectors to retrieve the metal finds, however when the underlying sterile soil was reached in part of the trench, the final spit was left uninvestigated. Similarly at Mallgårds II (CatNo189) the surroundings of the hoard were excavated in 1977 and exposed two postholes, which unfortunately were not investigated further.

On the whole (Table 2.4) 18% of the archaeologically excavated hoard sites produced no other artefacts or archaeological features, 9% produced no features and only undated artefacts, one hoard (3%) was found within a cairn, 15% were found in Early Iron-Age burials and stone foundations of Early Iron-Age houses known as *kämpgravs*, and within or near Early-Iron Age field boundary walls (*stenvasts*). The remaining hoards were excavated in areas which could be associated with contemporary settlement material. However, 15% of excavated findspots produced no archaeological features, 9% only undated features, and both groups provide only conjectural, artefactual evidence which would allow hoards to be associated with putative settlements based mainly on the decontextualized objects retrieved through metal-detecting. Only 32% of the excavated findspots produced structural remains and/or cut features and therefore a more solid, contextual evidence in the form of features and/or cultural layers to link them with broadly contemporary settlements. Depending on how strict one is with the data, there is archaeological evidence to associate between 32% and a maximum of 56% of the excavated Gotlandic hoards with Viking-Age settlements, which confirms the revised results of Östergren's work.

Hoard findspot	CatNo	Excavated area	Context/site type	Archaeological features	Artefacts (other than hoard)
Ammor II	220	n/d	none	no	no
Bryor II	301	2m ²	none	no	no
Ekeskogs II	137	n/d	none	no	no
Hultungs II	36	24m ²	none	no	no
Lilla Klintegårda III	325	2m ²	none	no	no
Uddvide	113	70m ²	none	no	no
Burge II	211	27m ²	none	no	undated
Sälle	90	n/d	none	no	undated
Stale II	255	8m ²	none	no	undated
Känne I	45	737m ²	kämpgrav	no	Early Iron Age
Kännungs II	149	n/d	kämpgrav	no	Early Iron Age
Liffride II	174	n/d	earlier burial	no	Early Iron Age
Skälhorns	169	n/d	earlier burial	no	Early Iron Age
Västergårde	299	30m ²	stenvast	no	Early Iron Age
Bote I	3	6m ²	VA settlement	Viking Age	Viking Age
Glamunds I	1	36m ²	VA settlement	Viking Age	Viking Age
Glamunds II	2	28m ²	VA settlement	Viking Age	Viking Age
Häffinds II	40	36m ²	VA settlement	Viking Age	Viking Age
Häffinds IV	41	1540m ²	VA settlement	Viking Age	Viking Age
Kattlunds II	106	158m ²	VA settlement	Viking Age	Viking Age
Klints	236	160m ²	VA settlement	Viking Age	Viking Age
Norrgårda	265	53m ²	VA settlement	Viking Age	Viking Age
Spillings 1999	242	250m ²	VA settlement	Viking Age	Viking Age
Tjängvide	276	24m ²	VA settlement	Viking Age	Viking Age
Uggårde	256	8m ²	VA settlement	Viking Age	Viking Age
Garde III	285	58m ²	VA settlement	no	Viking Age
Karls	303	n/d	VA settlement	no	Viking Age
Stora Enbjänne II	165	1.17m ²	VA settlement	no	Viking Age
Stora Vellinge II	50	n/d	VA settlement	no	Viking Age
Bote II	4	4m ²	VA settlement	undated	Viking Age
Mallgårds II	189	3.5m ²	VA settlement	undated	Viking Age
Rangvalds	134	29m ²	VA settlement	undated	Viking Age
Ocksarve III	160	70m ²	VA settlement	Vendel	Viking Age
Ammunde III	37	n/d	cairn	undated	Viking Age

Table 2.4 Summary of the archaeological context and finds at excavated hoard findspots in Gotland

To briefly sum up, the hoard data gathered by me thus far indicates that only 15% (53 of 347) of hoards analysed here can be considered as associated with Viking-Age settlements. One should remember that this low number is, at least partially, a consequence of the scarcity of archaeological investigations of Viking-Age settlements on Gotland: 90% of the 180 probable Viking-Age settlements are known only from the artefactual, often debatable, evidence from

metal-detector surveys. It may, therefore, be more prudent not to completely disassociate hoards from settlements and accept that the true figure lies somewhere between the observed 15% and 56% indicated by archaeologically investigated sites. In fact, based on the available data one could safely say that at least 26% of Viking-Age settlements contained hoards (46 settlements with hoards, some with multiple finds, out of 180 I identified so far), which comfortably corresponds with the proposed range. Only a handful of the more extensive and detailed excavations undertaken at the sites of Spillings 1999, Häffinds II and IV, Kattlunds II and Norrgårda hoards²⁶ have shown that some hoards were indeed deposited within the footprints of most likely contemporary buildings, although only in the case of Spillings did a direct stratigraphic link between the deposits and the structure survive (Widerström 2009:47).

The overall impression is, therefore, that Gotlandic hoards were moderately associated with contemporary settlements, although certainly not to the degree suggested by Östergren. This statement can be strengthened further by the comparison of distances from hoards to the nearest known 180 settlements (Figure 2.8), which clearly shows that Gotlandic hoards were deposited in relative proximity to habitation (61% were found within a 2km radius), even despite the fragmentary picture of Viking-Age settlement on the island.

2.4.2 Earlier structures and settlements

The preceding discussion highlighted the problem of the contemporaneity of hoards with archaeological features and sites they were found in. On the basis of the non-silver finds discovered at the posited settlement sites designated by the criteria developed by Östergren and identified by later metal-detector surveys listed in FMIS and grey-literature reports, c. 7% (24 of 347) of Gotlandic hoards could be associated with earlier sites, dominated by artefacts

²⁶ CatNos: 242, 40, 41, 106, 265

from the Vendel period and the Early Iron-Age.²⁷ Five of these hoards were discovered within or near stone foundations of Early Iron Age houses (*kämpgravs*) and twelve in or near Early Iron-Age stone field boundary walls (*stenvasts*).

The association of the Viking-Age hoards with abandoned earlier sites and stone constructions poses tantalising questions about the reasons for such behaviour, which may partly be explained by a passage in *Guta Lag*, chapter 4:

Now the next thing is that sacrifice is strictly forbidden to all men, together with all those old customs that belong to paganism. No one may pray to either groves or howes or heathen gods, nor to holy places or ancient sites. If someone is guilty of this and it is proved against him [...] that he has invoked something of this sort with his food or drink, contrary to Christian practice, then he is to be fined three marks [...]

T. Blomkvist (2002:151) believes that ‘ancient sites’, or ‘*stafgarpar*’ in the original, refer to picture stones and importantly also to Early Iron-Age stone house foundations. Given the abundant evidence for their abandonment in mid-millennium (Cassel 1998:94; Svedjemo 2014:44-46), highlighted by the fact that besides silver other Viking-Age finds are very rarely found on the sites comprising stone foundations, it is rather unlikely that there is a continuity of settlement of the mid-millennium settlements into the 9th-11th centuries. An excavated example of Kännungs II hoard (CatNo149) found c. 10cm above the floor level of Early Iron-Age stone foundations clearly shows that it was a later, secondary deposit. One explanation for the deposition of the Viking-Age silver in earlier constructions may be their association with symbolic or ritual activities, possibly a form of ancestral cult, as suggested by Svedjemo (2014:115). However, one must remember that both *stenvasts* and *kämpgravs* are still visible features in the landscape and conceivably may have been used as markers facilitating the discovery of a deposit. For example, the Hågvalds I hoard (CatNo99) was found buried in a pottery vessel placed in a purpose-built stone ‘chest’ by a large concentration of stones

²⁷ CatNos: 43, 45, 65, 70, 99, 108, 133, 149, 156, 157, 158, 162, 184, 213, 234, 267, 282, 288, 299, 300, 304, 318, 328, 329

identified as remains of *kämpgravs* and associated *stenvasts*. The elaborate protection indicates that the hoard was intended to be retrieved, and metal-detecting undertaken in 2009 uncovered c. 30m to the north metal artefacts characteristic of a Viking-Age settlement (Paulsson 2011:7). Therefore, one should not discount the possibility that the abandoned Early Iron-Age structures also offered convenient landscape markers, which would have helped in locating places when the owners wished to collect their silver. However, the 'pragmatic' reasons for deposition did not necessarily stand in opposition to the ritual aspect of such sites: the perceived 'sanctity' of a place may have offered additional, metaphysical protection for a deposit.

2.4.3 Burials and cemeteries

A small group of 12 hoards (c. 3%) was discovered in association with the context of Viking-Age and earlier cemeteries,²⁸ and in two archaeologically excavated cases (Skälhorn, CatNo169; Liffride II, CatNo174) they were placed in mounds of burials from the Pre-Roman and Roman Iron Age. In all these cases there was either clear evidence that hoards were not grave goods, or the available information did not allow for such a connection to be made. In fact, silver coins (which are the major component of these deposits) are only very rarely found in this capacity on Gotland and I am aware of only nine such instances.²⁹ The veneration of 'grave howes' mentioned in *Guta Saga* is just one example of evidence the Latin and Norse written sources provide for the worship of the deceased and of places of burial, generally with the aim of securing the prosperity of a family or even an entire region (Gardeła 2016:171-179). Although forms and circumstances of worship differ in these descriptions, which are based on memories potentially misunderstood by later compilers, the evidence is not inconsistent (Ellis 1943:119). Importantly, some ritual acts may have involved precious metals as in Snorri Sturlusson's *Ynglinga Saga* passage describing the deposition of gold, silver and copper in the burial mound

²⁸ CatNos: 7, 35, 71, 72, 101, 127, 169, 174, 183, 202, 295, 342

²⁹ Broe (Halla); Ire (Hellvi); Hemse (Hemse); Burgsvik (Öja); Ockes I (Öja); Silte church (Silte); Lilla Bjärjes grave 52 (Vallstena); Kopparsvik graves 92 and 112 (Visby)

of Freyr, in order to assure that 'the good seasons and peace continued' (Monsen and Smith 1990:7). Silver deposits placed in a burial context but not as grave goods are seen by Zachrisson (1998:120) as a way of making symbolic connections between the living and their ancestors, and the place itself.

N. Myrberg (2009a:141) suggested that some hoards were representations of dead persons constituting material obituaries, and as such they can be seen as cenotaphs comprising deposition of items required by the deceased in the afterlife, when the deceased was missing, could not be buried in a proper way (Mogielnicka-Urban 1997:18; Blajer 2001:21) or died for specific reasons (e.g. child birth, Myrberg 2009a:139). One would, therefore, expect such deposits to resemble in their composition types or forms of artefacts usually found in graves. The only more obvious example of such behaviour among the deposits analysed is the find from Sigers (CatNo135), which comprised a dirham, an ornamented silver bangle and possibly also a bronze penannular brooch and an arm of foldable scales. The deposit was found without any obvious context, but the items comprising it are characteristic of grave goods present in contemporary burials, and it may represent goods placed in lieu of a burial.

At the same time more prosaic reasons for deposition cannot be completely ruled out, since Gotlandic burials usually take the form of stone constructions and barrows for the most part still visible in the landscape, and would have facilitated hoard retrieval should it be intended.

I have identified 136 burial sites datable to the Viking Age in the case study area. Their density is presented in Figure 2.9. A comparison with hoard density indicates that both categories are almost mutually exclusive, which is confirmed by the statistical analysis, which resulted in a correlation coefficient of 0.22. This weak correlation accounts for the fact that only less than 1% of Gotlandic hoards were discovered in the context of contemporary cemeteries. The results seem to be confirmed by analysis of the distance from hoards to the nearest contemporary cemeteries (Figure 2.10), since no telling pattern can be observed between them. In fact, it

appears that whatever weak correlation is observed may be further exaggerated by the proximity of cemeteries to settlements.

2.4.4 Markers, standing stones and boundaries

A group of 24 hoards (7%) were reportedly found under or near large stones and in one case under a field clearance cairn.³⁰ It is likely that such relatively easily identifiable features were used as convenient markers facilitating the retrieval of deposited silver. However, it is not impossible that some hoards found near stone markers may have been associated with ritual and symbolic activities. An indication of such behaviour is provided by one of the two archaeologically excavated hoards in this group, Ammunde III (CatNo37). The deposit was found in a clearance cairn in a layer of charcoal with evidence of fire damage (possibly *in situ*), and according to the excavator, J. Nihlén (Stenberger 1947:35; Thunmark-Nylén 2000:84), the silver was not placed in the cairn all at once, but appeared to have been thrown into it. The cairn was located on the boundary between meadowland and flat marshy land intersected by a brook. Most probably in the Viking Age the water table reached the cairn. The treatment of the silver objects and the location of the deposit on the boundary of land suitable for cultivation and the watery environment strongly indicate its connection with ritual and symbolic behaviour.

Should we intend to interpret silver finds associated with stone markers as placed deposits (cf. Chapter 1.5.2), the natural conclusion would be that they linked the depositor(s) with places imbued with social and symbolic meaning. One possible explanation is that such places may have represented boundaries. According to J. Kowalewski (2001:68-73) probably until the 14th/15th centuries boundaries had been perceived not in abstract linear form as we know them today, but as a number of points where the worlds met, which could be natural (trees, hills, rocks) or in the later period artificial, but still associated with the original meaning of landscape features

³⁰ CatNos: 17, 20, 33, 37, 60, 62, 75, 82, 86, 98, 121, 161, 179, 222, 225, 227, 231, 232, 233, 235, 238, 258, 301, 322

(wooden posts-trees, stones-rocks/hills). Deposits associated with stone markers could, therefore, be seen as an accessory to delineation of spaces through offerings or sacrifices associated with establishing, renewing and magically protecting boundaries of a given society. The importance of natural features also means that a hoard found at Hejde vicarage (CatNo138) found on a discrete hillock could be assigned to the discussed group.

Kowalewski's interpretation echoes Zachrisson's (1998:93-94,226) perception of Swedish runestones, which according to her constituted gateways to the farm domain and through association with ancestral lineages carved on them, offered symbolic protection of the allodial land. She believes that a similar interpretation could be proposed for silver deposits, although in my opinion the parallel is most applicable to deposits associated with stone markers. On Gotland runestones are the final development of picture stones, and are classified as a development of type E (dated to the 11th century), the typological successors of purely pictorial types C and D, which were prolific during the Viking Age (Karnell 2012:14-15). There is, therefore no reason to believe that Zachrisson's interpretation developed for runestones in mainland Sweden could not apply to the later types of the picture stones in the Gotlandic case.

When plotted on the settlement density heat map (Figure 2.11), with just two exceptions standing stones and silver deposits associated with stone markers tend to concentrate at the fringes of zones with the highest density of settlement material, which is further confirmed by the comparison of distances from hoards and settlements to the nearest standing stones (Figure 2.12). This seems to support Zachrisson's theory of standing stones and some silver deposits acting as a form of boundary markers, albeit the emerging picture suggests that on Gotland they may have been associated with regional boundaries rather than boundaries of individual farmsteads. At the same time for those preferring a more pragmatic interpretation, the results could mean that placing a marker was crucial for making sure that a hoard was retrieved from a less familiar landscape. I will return to this issue in Chapter 2.7.2.

2.4.5 Watery environment

The next group of hoards whose archaeological context can be established comprises deposits found in a watery environment or in areas associated with ritual practices. The sacred character of bodies of water in Norse mythology is well recognised (Lund 2008:59), and a contemporary example of veneration of the watery environment in the Svealandic context is provided by Adam of Bremen in his description of the temple in Uppsala (B4 Scholion 138(134)). From the analysed Gotlandic hoards, the surviving descriptions of the circumstances of discovery indicate four deposits (c. 1%) were found in areas of former bogs.³¹ I excluded from this group a Norrgårda-Norrby II (CatNo27) hoard, which was discovered in a field called 'Myren', and in a close proximity to a bog marked on the cadastral maps: there is no evidence to determine if it was originally deposited in a watery environment. Problematic is also a deposit from Pavals (CatNo181) discovered not in the bog itself, but in a field close to one called Britmyr. According to Östergren (1989:129) the site fulfilled her criteria of a contemporary settlement, even though the metal-detecting produced only undated fragments of lead and iron, and undated settlement features of dark earth, charcoal and burnt bone were recorded c. 75m north-west from the findspot. Thunmark-Nylén (2000:494), on the other hand noted that the findspot was located near two springs, one of which is believed to have been an offering place.

Two more hoards deserve our attention here. A hoard from Stora Enbjänne (I, CatNo164) was discovered in a place called Öen, which Stenberger (1947:123) identifies with a raised island called Oien/Oiar surrounded by the now-drained bog Vallmyr. Such a special location in the landscape may suggest that the deposit and place were associated with ritual practices. However, equally likely is the possibility that the location may have been chosen for its remoteness, which would help to hide the silver from prying eyes. There is a possible ritual connection of a find from Gudings (CatNo314), where a wooden box filled with Oriental and

³¹ CatNos: 66, 76, 146, 327

European coins, hacksilver and a bangle was deposited within a large field known as Gudingsåkrarna (meaning 'the holy fields of the gods', Lund 2008:62), which was inundated with hundreds of finds of Viking-Age spearheads, and also, to a much smaller degree, bronze ornaments (over 1000 objects by 2011, RAÄ 207:1), widely interpreted as an offering place. However, in 2009 a metal-detector survey produced, among other finds, artefactual evidence for Viking-Age residential activity and metalworking. The hoard should, therefore, be associated with a contemporary settlement instead, but the special character of the place which may have offered an additional supernatural protection was most likely not lost on the hoarder.

2.4.6 Metalworking and workshops

Finally, it wouldn't be possible to discuss silver hoards without attempting to place them in the context of metalworking. There can be little doubt that some of the silver deposited in the ground was intended for remelting into other objects, mainly the ornaments so important for overt expression of cultural identity and displays of status, vividly captured by ibn Fadlan in his 10th-century *Risala* (Lunde and Stone 2012:46).

The discussion has recently been made possible thanks to research of N. B. Gustafsson (2013a:4; 2013b:47) who suggested that a number of Gotlandic hoards might not have been deposited at all, and represented the scrap silver stocks of individual metalworkers lost in workshop fires. Although there is only one Viking-Age workshop on Gotland excavated in accordance with modern standards at a harbour site of Fröjel, through the analysis of finds recovered mainly during metal-detector surveys and occasionally during excavations Gustafsson (2013b:66, 69) identified 89 sites which could be associated with Viking-Age non-ferrous metalworking. These he divided into four subgroups based on the estimated intensity and quality of metalworking remains: farm sites (51), workshop sites (15), potential workshop sites (11), and harbour sites (6).

With regards to the first group, there are 26 hoards (8%)³² which could be associated with 22 (43%) farms where Gustafsson identified evidence of occasional metalworking. I also include here a hoard from Juves found not in a settlement itself, but thought by D. Carlsson (2010:9) to be located just outside a contemporary settlement in a neighbouring field, unfortunately not investigated. There are only five hoards (1%)³³ associated with five settlements where artefactual evidence for metalworking workshop sites was discovered (30%). I excluded Smis II (CatNo202) hoard which, despite its proximity to a settlement with a workshop, was deposited within a cemetery (Svedjemo 2014:116). Finally there are only two hoards (1%)³⁴ linked to two settlements with potential metalworking workshops (18%). I excluded from this group Lingvide hoard (CatNo133), discovered within an area of a possible settlement, which however produced only a single datable find, a buckle believed by Thunmark-Nylén to be pre-Viking-Age (2002: 366-367). At first glance this tally implies that with just about 10% of Gotlandic hoards associated in some way with metalworking, it may be difficult to suggest that it was a decisive factor responsible for silver deposits, although it certainly was not insignificant. One also needs to be aware that hoards found on settlements, even those with traces of non-ferrous metalworking, may have been deposited (or placed) and not retrieved for a variety of reasons, particularly that all the above associations are based exclusively on artefactual evidence, without the benefit of solid archaeologically excavated context.

However, if we look beyond these shortcomings, this group of sites clearly shows the level to which non-ferrous metalworking was practised on Gotlandic farms, most often at otherwise ordinary settlements. Nearly 43% of known Viking-Age farms (77 of 180) at some stage were subject to at least one non-ferrous metalworking episode. Out of those settlements nearly a half (43%, 33 of 77) produced one or more hoards, which is proportionately over half as much as the

³² CatNos: 1, 2, 14, 15, 32, 51, 57, 106, 118, 119, 120, 134, 143, 144, 145, 160, 182, 189, 190, 191, 242, 250, 252, 276, 285, 338

³³ CatNos: 85, 165, 203, 221, 236

³⁴ CatNos: 265, 314

26% average calculated earlier for all Gotlandic settlements (46 with hoards out of 180 known settlements). This impression is further reinforced by the comparison of the density of Gotlandic sites with evidence of metalworking (Figure 2.13) and density of silver deposits, which with the correlation coefficient of 0.60 is on the verge of what may be described as strong. These results are reinforced by the comparison of distances from hoards to nearest metalworking sites, indicating that nearly half of all silver deposits on Gotland were located within 2.5km (Figure 2.14). It appears, therefore, that metalworking could be an important factor influencing hoard deposition, although the question whether this means that hoards were deposited because of workshops or that areas most abundant in silver attracted metalworkers to where work was to be had, is difficult to answer. But given that only up to 7 hoards can be associated with dedicated workshops, whereas 26 were found in otherwise ordinary settlements, the second possibility seems more likely.

With regards to the last group of metalworking sites identified by Gustafsson, the only one which produced hoards was Bandlunde.³⁵ This is quite surprising since all emporia and major trade centres, as well as a number of central places identified in the other two case studies produced silver deposits.

2.4.7 Harbours and landing places

Given the scarcity of detailed descriptions of the circumstances of discovery of Gotlandic hoards, this is as far as the archaeological context of the findspot alone can take us. The archaeological and geological data discussed below may help identify more factors which influenced the deposition of hoards and more importantly their clustering shown by spatial analysis.

I will start this discussion with the question of the relationship of hoards and harbours highlighted by Gustafsson's research and the initial spatial analysis. Approximately 50

³⁵ CatNos: 40, 41, the site additionally produced two ornament hoards not analysed here.

prehistoric and Viking-Age harbours (or rather landing places) and fishing villages dotted around the coastline of Gotland were identified by Carlsson (1999:151; 2008:21-22) mainly through non-invasive archaeological surveys, and only a few have been excavated thus far. The map in Figure 2.15 shows a subset of these sites which produced archaeological, mainly just artefactual, evidence of Viking-Age activity, and some are not without interpretative problems. For example, scholars still struggle to agree on the character of Visby in the Viking Age, although it appears that it only emerged as a harbour in the 11th century and became an influential trading site no sooner than the 1200s (Widerström forthcoming; Roslund 2001). Similar problems are faced by the investigators of Västergarn (Carlsson 2011; Kilger et al. 2013). Despite the growing number of dirham, German and English coin finds which suggest commercial activities already during the 1000s, the exact function of the site at this time, and its relationship with the nearby Paviken, are still unknown. Chronology is not the only issue: the opinion regarding the location of a harbour at Bogevisken is divided between the more traditional approach placing it on the inner shore of the bay near the villages of Pilgårds and Boge, and a well-argued suggestion of Carlsson, locating it at the centre of present-day Slite to the north-east (Carlsson 2009:90-102).

Despite these issues, it appears that Viking-Age Gotland had a relatively high number of points of access, even if the evidence available so far does not allow for parallels with sites on the scale of the Baltic emporia to be drawn. Only at Paviken could a number of linear stone constructions leading into the water indicate the presence of port infrastructure such as piers and jetties, although none of these features has been excavated yet to confirm their association with the Viking-Age activity. Nevertheless, the handful of partially excavated Viking-Age sites³⁶ suggest that long-distance trade, craft production, non-ferrous metalworking and ship-building did take place at these locations throughout the Viking Age.

³⁶ Bandlunde (Brandt 2002, although the interpretation of the site-layout is problematic, cf. Widerström forthcoming), Fröjel (Carlsson 2012) and Paviken (Lundström 1981; Karn 2013; 2014)

The visual inspection of the hoard density map overlain with Carlsson's harbours for which evidence of Viking-Age activity exists, shows that generally they correspond with areas of the highest concentrations of hoards. More exactly, they lie at the extremities of these concentrations, potentially acting as 'gateways' for the silver reaching further inland. At the same time, the paucity of hoards in the eastern part of the island is underlined by the lack of equivalent contemporary harbours. But what is the nature of this relationship?

The most obvious possibility is the proximity of hoards to harbours (Figure 2.16a), which provides good explanation for the observed hoard concentrations in the coastal parishes of Stenkyrka, Othem, Burs and Grötlingbo and for the paucity of silver deposits along the eastern coast, but does not explain concentrations further inland. The case of the densest cluster in the southern part of the island on a border between Linde, Fardhem and Hemse parishes, which is almost equidistant to three of those harbours (Bandlunde, Barshalder and Fröjel), indicates some sort of relationship between the amount of silver deposits and accessibility to a number of harbours. In fact, it appears that nearly all inland concentrations are within c. 19km from at least two contemporary harbour sites. The approach accounting for accessibility to the largest possible number of harbours which undoubtedly served as entrepôts through which silver reached the island provides a much closer correlation with the concentrations of hoards (Figure 2.16b). The only outlier is a concentration in Alskog parish, but this may be caused by lack of relevant archaeological investigation. The cluster is located near a site where a number of stone constructions, presumably slipways, were discovered (RAÄ Lau 102:3). The name of the nearby field called Snäckgårde, contains '*snäck-*' which can be related to the word '*snekkia*' used to describe ships, particularly Viking-Age and medieval war ships (Peel 1999:57; Olsson 1972:180, 187-189). Unfortunately none of these remains was investigated archaeologically or dated, therefore this potential landing site is not included in analysis.

2.4.8 Historical and modern land use, and data bias

The analysis of the distribution of artefacts found during metal-detector surveys undertaken from the late 1970s combined with cartographic analysis of cadastral maps from c. 1700 (showing the countryside before the agricultural revolution of the 19th and 20th centuries) led Gotlandic archaeologists to conclude that although settlements moved gradually over time from more marginal areas in the Early Iron-Age to more concentrated units near main roads (Östergren 1989:192-201; Jonsson and Östergren 1990:148-149), the productive landscape, that is the infields comprising arable fields and meadows, remained the same both in location and extent (Carlsson 1979:40, 127; Carlsson 2007:25; Carlsson 2009:66). This unusual stability of agricultural landscape patterns has been recently questioned by Svedjemo (2014:178), who believes that there is a form of autocorrelation between farm tofts and arable fields, so that the movement of settlements triggered the movement of fields, at least in the long run. This could mean that in many areas on Gotland there was a change of land use after all, but it was generally confined to the area of the established infields. The analysis of the location of hoards within the historic landscape detailed in the cadastral maps from the turn of the 18th century (cf. A1.1.4) indicates that 56% of Viking-Age hoards were associated with arable fields and meadows (infields), whilst 22% were found in pasture and 22% outside the agricultural landscape, occupied mostly by forests, bogs and lakes. The analysis provides a strong indication that a large proportion of hoards was associated with areas of intensive agricultural production and therefore most densely settled areas. The 22% of hoards associated with areas of 'wilderness' are harder to explain, although one should not forget the importance of wood supply, stone quarrying and fishing to the Viking-Age populations.

On the other hand, one could argue, the majority of hoards came from the economically most desirable areas simply because in these areas the impact of farming on the archaeological deposits was greatest and therefore produced the highest concentrations of finds. This

possibility is highlighted by the fact that 87% of the analysed hoards and 88% of Viking-Age settlements were discovered in areas of modern farming (cf. A1.3.3). It should be noted, however, that just 15% of hoards and 10% of settlements lie within areas reclaimed for agriculture since the beginning of the 18th century, which is a much lower proportion than one would expect if the discovery of Viking-Age remains was solely the function of the agricultural impact. This also means that areas exploited after the agricultural revolution were relatively marginal in the Viking Age. Therefore, the potential data bias introduced by farming does not dramatically influence the observed association of the large proportion of hoards with the productive landscape.

2.4.9 Soils

The final identifiable factor which may have influenced the deposition of hoards is their association with certain soil types. In his thesis G. Svedjemo (2014:177) has shown that there is a strong correlation between the Early Iron-Age (or more exactly mid-millennium) settlements and moraine soils, whilst farms and fields at c. 1700 were more apt to be situated on lighter, sandy and gravelly soils. His analysis of Viking-Age sites indicated that 56% of settlements were located on moraine and silt soils and 35% were found on sandy soils, whilst in c. 1700 55% of fields were located on moraine and 30% on sandy soils. This suggests that the move to the lighter soils was already in place in the early medieval period. However, these results need to be treated carefully, as Svedjemo's analysis for the Viking Age is based on the use of a small number of hoards (109) as proxies for contemporary settlements. To verify Svedjemo's assertions and test their validity for hoards, I analysed the relationships between the 347 hoards and 180 Viking-Age settlements I identified earlier, 2250 remains of mid-millennium buildings,³⁷ and soil types recorded in the geological atlas of soils in Sweden (cf. Appendix A, A1.2.3).

³⁷ The dataset was kindly made available to me by Svedjemo.

The results (Table 2.5) are not dramatically different from Svedjemo's determinations, and clearly highlight a correlation between the preferences of geological substrata in the case of settlement and hoard locations. They also provide evidence for a gradual change of preference from what may be termed traditional (moraine) soils dominating in the Early Iron Age to more marginal sandy soils, whose popularity was increasing to dominate farm locations at the turn of the 18th century. When we consider that it was in the Viking Age that lighter and better draining sandy soils began to be colonised, but the majority of hoards were still found on the heavier but more productive moraine soils, this could suggest that the most intensive hoard deposition in the Viking Age was focused on lands which were newly colonised, most likely in the newly broken fields in previously marginal areas.

	Moraine			Sand			Percentage difference in density (moraine/sand) ³⁸
	area/ number	proportion	density/ km²	area/ number	proportion	density/ km²	
Soils							
	1139km²	37%		758km²	24%		
Settlements							
Early Iron Age	1383	61%	1.21	430	19%	0.56	73%
Viking Age	103	57%	0.09	52	29%	0.07	25%
Hoards							
Viking-Age (all)	178	51%	0.16	123	35%	0.16	0%
Viking-Age (exact location)	109	51%	0.10	84	39%	0.11	10%

Table 2.5 Comparison of association of site/find types and main soil types in Gotland. The overall area of moraine and sandy soils differs from Svedjemo's data since here it is based on the island's area defined by the sea level at c. 900AD

³⁸ Calculated using the formula: percentage difference (x,y)=(|x-y|/((x+y)/2))*100%, e.g. percentage difference between density of settlements on moraine soils (0.09) and on sandy soils (0.07) is |0.09-0.07|/((0.09+0.07)/2)*100%= 0.25*100%=25%. The same formula was used for calculating weight errors, cf. Appendix A, A2.3.

Moraine and sandy soils, although dominant on Gotland, comprise together just 62% of all soil types present on the island. It is possible to propose a more holistic picture of the preference for soils on Gotland (Table 2.6) by including the less common types. By studying the changes in the preference of all soil types over time (linear trends), it is possible to categorise them into two major groups of traditional (decreasing trend similar to moraine) and marginal soils (increasing trend observed in sandy substrata). The comparison shows clearly that although the general pattern of settlement did not change dramatically, in the Viking Age the proportion of settlements rose by 11 percentage points on the marginal soils compared to the previous period. It is particularly interesting to notice that the shift from the traditional to marginal soils was about twice as strong in the case of silver deposits, confirming on the one hand that hoards were not as closely associated with contemporary settlements as previously believed, and on the other showing a previously unnoticed close connection between deposition of silver and marginal areas.

Once converted to density per km² which accounts for the uneven distribution and areas different soil types occupy, it transpires that the overall density of hoards per km² is higher within marginal soils than in traditional soils and the trend is far more noticeable in hoards whose exact location is known. When we apply the same method to settlements, although one needs to be aware that the following calculations are based on a very small sample of the estimated number of settlements (just over 11%), the overall density of Viking-Age settlement also appears higher on marginal soils. The percentage difference in density/km² shows the distribution of the Gotlandic Viking-Age settlements was c. 15% more dense in marginal soils than in traditional soils. Since settlements were still overwhelmingly located on the established traditional soils, the density calculations may suggest intensive colonisation of marginal and less available soils was forced by problems with availability of new land. This suggestion is congruent with the very rigid inheritance and land purchase laws on Gotland (*GL*, particularly Chapters 28 and 42), which effectively made division of family property impossible (cf. Chapter 2.6).

Meanwhile, the percentage difference in density/km² of hoards deposited in less available marginal soils was between c. 37% (all hoards) to 59% (hoards with exact location known) higher than in traditional soils. In a sense hoards ‘push’ into the marginal lands much more intensively than Viking-Age settlements. The meaning of this observation is not easy to explain and I will return to this issue in Chapter 2.6, once more advanced statistical method of regression modelling is applied.

	Traditional			Marginal			Percentage difference in density (traditional/marginal)
	area/number	proportion	density/km²	area/number	proportion	density/km²	
Soils							
	2041km²	66%		810km²	26%		
Settlements							
Early Iron Age	1809	80%	0.89	440	20%	0.54	49%
Viking Age	121	67%	0.06	55	31%	0.07	15%
Hoards							
Viking-Age (all)	217	63%	0.11	128	37%	0.16	37%
Viking-Age (exact location)	127	59%	0.06	87	41%	0.11	59%

Table 2.6 Comparison of association of site types with traditional and marginal soils in Gotland

2.5 Regression analysis

The above discussion identified a number of factors which may be responsible for the observed concentrations of hoards determined by kernel density approximation. The next step in my analysis is regression modelling, developed with the help of Dr D. Lunn, which allows one to determine what combination of the proposed explanatory variables can best explain factors behind the observed spatial patterns of hoard deposition.

For the following analysis I used a generalised linear model (GLM) employing Poisson distribution, most suitable for modelling the number of times an event occurs, in this case hoard depositions.³⁹ The dependent variable (i.e. density of hoards) was analysed in a model space defined by 115 hexagonal polygons with a diagonal of 8km, which corresponds to the 4km search radius used in the kernel density estimation. The tested explanatory variables included:

- number of harbours within c. 19km radius (harbno);
- distance from the nearest harbour (hardistS);
- number of nearby contemporary settlements (setcount);
- distance from the nearest contemporary settlement (setdistS);
- number of nearby contemporary cemeteries and burials (burcount);
- distance from the nearest contemporary cemetery or burial (burdistS);
- number of confirmed nearby metalworking workshops (wprcount);
- distance from the nearest confirmed metalworking workshop (wprdistS);
- number of nearby potential workshops (wpocount);
- distance from the nearest potential workshop (wpodistS);
- number of all nearby workshops (confirmed and potential) (wacount);
- distance from the nearest confirmed or potential workshop (wadistS);
- number of all sites associated with evidence of metalworking (allmetcount);
- distance from the nearest site with evidence of metalworking (allmetdistC);
- number of standing stones (stcount);
- distance from the nearest standing stone (stdistC);
- number of standing stones *in situ* (stincount)
- distance from the nearest standing stone *in situ* (stindistC),
- distance from the coastline at c. 900AD (coadistS) and

³⁹ Detailed methodology is described in Appendix A, A2.4

- area of productive infields shown on c. 1700 maps (arable fields and meadows) (infareaS);
- area of the agricultural landscape shown on c. 1700 maps (fields, meadows and pasture) (cultareaS);
- area under modern agriculture (agriareaS);
- area under urban development and infrastructure (urbarea);
- area under modern extent of forests (forestarea);
- area of moraine soils (morareaS);
- area of sandy soils (sandareaS);
- area of soils used traditionally prior to Viking Age (tradarea);
- area of soils marginal prior to Viking Age (margareaS);
- categorical variable for a hexagon having access to coast (coastal).

All calculations were undertaken in the RStudio statistical package, and early on highlighted a problem with hexagon 92 in the area of Fardume träsk, which time and again negatively influenced the goodness of fit or simply invalidated all tested models. The reason why the equations were struggling to fit this area into models is that it comprised nine hoards, but otherwise was devoid of known archaeological sites of Viking-Age date, with the exception of a solitary 11th-century runestone from Valla. Therefore, the tested models had no relevant data (particularly settlements and harbours) to use in order to explain the recorded abundance of silver deposits. Once this area was excluded from calculations, a series of successful models was created, with the most successful summarised in Table 2.7. The resulting model comprised a set of statistically highly significant explanatory variables, with significance well below 0.05, which means that their confidence level ranged from well over 95% to nearly 100%. The score of 361.49 in the Akaike information criterion (AIC), was the lowest of all tested models, and indicates a good relative quality of the model for a given set of data. The Pearson's chi-squared test (χ^2)

used to determine goodness of fit of the GLM Poisson model with a residual deviance of 105.81 on 106 degrees of freedom, returned p-value of 0.49, meaning that there is insufficient evidence to suggest that the tested model is a bad fit. Thus, by avoiding the double negative we can say that the model is correctly specified. In order to additionally check the goodness of fit of the model and to identify any other potential outliers, a half normal plot was produced (Figure 2.17). As the simulated envelopes contain all absolute Pearson residuals, it confirms that the model is correctly specified and no significant outliers are present (naturally except for the excluded area of Fardume träska). Finally, the results of the Moran's I analysis on the model's Pearson residuals in ArcGIS indicate that they are not spatially autocorrelated and therefore the model is correctly specified in the spatial sense (Figure 2.18).⁴⁰

In summary, the results of the regression analysis provide a statistically robust set of variables, which can be used to explain the reasons for the formation of the observed hoard concentrations in Gotland. Because the Poisson distribution used here belongs to the exponential family, and the explanatory variables are expressed in different units, and some of them are transformed, the use of 'Estimate' coefficients for comparison of the strength of the influence these variables had on the observed hoard concentrations is complicated, except for the direction of the relationship: inverse in the case of negative values or direct in the case of positive values. A much more relevant comparison can be made with the use of values of the statistical significance (p-values) listed in the 'Pr(>|z|)' column: the smaller the p-value, the higher the statistical significance of a variable as a predictor of the observed hoard concentrations.

⁴⁰ All calculations and methods used for regression model testing used in this chapter and analogous chapters in the remaining two case-studies (3.5 and 4.5) were verified by Dr D. Lunn.

Model Gotland (mod8.1) equation:					
glm(formula = hoardno ~ harbno + hardistS + setdistS + tradarea + margareaS + infareaS + allmetcount, family = poisson, data = hex82_2a[-92,])					
Deviance Residuals:					
Min	1 st quartile	Median	3 rd quartile	Max	
-2.4465	-0.8107	-0.4019	0.3744	2.9564	
Coefficients:					
	Estimate	Std. Error	z value	Pr(> z)	
(Intercept)	-0.388772	0.435384	-0.893	0.37189	
harbno	0.288759	0.071632	4.031	5.55E-05	***
hardistS	-0.184897	0.081716	-2.263	0.02366	*
setdistS	-0.310457	0.107969	-2.875	0.00403	**
tradarea	0.017293	0.008212	2.106	0.03523	*
margareaS	0.199543	0.071234	2.801	0.00509	**
infareaS	0.385818	0.082024	4.704	2.55E-06	***
allmetcount	0.071145	0.026902	2.645	0.00818	**
Significance codes: '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1					
(Dispersion parameter for Poisson family taken to be 1)					
Null deviance: 444.66 on 113 degrees of freedom					
Residual deviance: 105.81 on 106 degrees of freedom					
AIC (Akaike information criterion): 361.49					
Pearson's chi-squared test (χ^2): 0.4869341					

Table 2.7 Summary of the Gotlandic GLM regression model calculated in RStudio

Firstly, and unsurprisingly, the model suggests that the formation and intensity of hoard concentrations is strongly associated with the productive landscape of infields (infareaS), which were subject to the most intensive cultivation, certainly in the past 300 years. One needs to be aware, however, that this association may to a degree be influenced by the data bias and partially reflect the reasons for discovery of hoards, rather than their deposition. Obviously before silver could be deposited in the ground it had to be obtained first. The results of the

spatial and regression analyses highlighted the importance of relative ease of access to the largest possible number of harbours (harbno), and failing that relatively close proximity to at least one of them (hardistS), although the significance of the latter relationship is very much lower. This close relationship highlights the importance of (long-distance?) trade for the influx of silver to Gotland. The regression model provided a clear confirmation of the association of hoard concentrations with areas which produced most abundant evidence for non-ferrous metalworking (allmetcount). Hoarding also appears to be pronounced in proximity to contemporary settlements (setdistS), even if the number of known Viking-Age settlements is low and leaves a degree of uncertainty about the reliability of the observed results. The proximity of hoards to settlements combined with their relative absence from settlements themselves,⁴¹ may reinforce the correlation of silver deposits with the agriculturally productive areas pictured on cadastral maps and probably also exploited in a similar manner in the Viking Age. This means that a significant number of hoards were associated with the Viking-Age fields rather than settlements themselves. This association with farmland rather than settlements is further reinforced by a significant correlation between hoard concentrations and areas of traditional (tradarea) and marginal soils (margareaS). However, deposition in areas dominated by marginal soils is by an order of magnitude more significant than in areas where traditionally used soils were more common.

2.6 Importance of hoarding for land ownership

The latter observation combined with the conclusions of Chapter 2.4.9 is particularly important for hoarding in Gotland where, I would argue, silver deposits can be perceived as important agents in land ownership and social structures. The importance of the integrity of land and provisions for its legal protection from misappropriation through neglect, inheritance,

⁴¹ 15% (53 of 347) of hoards associable with the identified contemporary settlements (cf. Chapter 2.4.1).

neighbourly disputes, sale and purchase (banning completely the sale to non-Gotlanders) feature heavily in the *Guta Lag* (CH2, 20, 24e-28, 32, 47, 55, 63), but nowhere more categorically than chapter 28 where statements such as ‘no one may sell land unless pressing need arises’ or ‘land may never be bought out of the family’ are used. Although written in the 13th century, many alliterative phrases and some residual rhythmic passages indicate that an earlier form of oral law underlies the known manuscripts (Peel 2009:xxiv-xxv), and it is likely that many of the legal provisions may have their origin in the late Viking Age. Considering the importance of land to the Gotlanders and the widespread occurrence of unclaimed hoards on the island in the Viking Age, I would suggest that a great proportion of Gotlandic hoards may be associated with the land itself, and particularly with productive landscape of the field systems of a given settlement⁴² as well as within the social and legal structures.

An example of such symbolic association comes from *Svarfdæla saga*, or *The Saga of the People of Svarfadardal*, written in the 14th century, although describing events dated to 875-980:

Thorstein the Tumultuous now took control of the valley between mountain and fjord on the other side of the river. He went to the mountains and erected a boundary stake at the uppermost edge and broke a comb and threw the pieces on the ground. Afterwards he had silver buried in three places, a half mark in each place, and that strip of land is called Kamb. Thorstein named witnesses, made the valley his legal domicile, and gave it his name, calling it Svarfadardal (10, Hreinsson 1997:161-162).

This fragment, referred to by scholars in the context of hoarding and boundaries (e.g. Eggers 1940:30; Hatz 1974:161; Zachrisson 1998:199), indicates that the process of acquiring land involved not only staking one’s claim to it by, literally, marking it out in the landscape, but also – and more importantly – by symbolically forging one’s own personal bond with the land through offering up a private possession. Zachrisson (1998:199) believed that deposition of personal objects and silver on the outskirts of the newly taken land (which at least with regards to silver is not made explicit by the text) was meant to bind Thorstein to his claim’s boundaries where

⁴² The association of hoards with allodial land was Zachrisson’s (1998:218) conclusion for the pattern of Viking-Age hoards in Uppland and Gästrikland.

his private possessions would act as symbolic guardians of the border zone in his stead. I would like to take Zachrisson's interpretation a step further, and would emphasise the key importance of Thorstein's confirmation of his claim with hoarded silver. Zachrisson's study of Eddaic poetry and folklore suggests that in the Viking Age, the precious metal that one possessed was intimately associated with one's own self:

(...) it was a keeper and preserver of his happiness and well-being. By obtaining a treasure by force, one stole another person's wellbeing. Since happiness in older times was perceived as a limited resource, one not only stole the other person's treasure but also his or her well-being. This may be the reason why digging for treasure was considered to be a fatal act (Zachrisson 1998:221).

Therefore, by binding oneself to land through buried silver, one effectively added a potent new layer of protection of the prosperity of one's farm, seeing that any seizure of land that had been claimed in such a way would be symbolically tantamount to an attempt on the owner's life. This is particularly important in the case of Gotland where the majority of land divisions observed in the Viking Age are likely to have been already established in the preceding periods. Therefore, the process of forging a personal bond with the newly acquired land was even more important as the established farms and the rare new additions could change hands almost exclusively through inheritance or violent actions, making the need for symbolic personal connection more significant in the case of disputes, particularly so in the increasingly crowded and relatively rare marginal soils. In my opinion this could suggest that the most intensive hoarding in Viking-Age Gotland, particularly in the form of placed deposits, was focused on lands which were newly colonised, most likely newly broken fields. This could well have intensified the need for symbolic behaviour described in the *Svarfdæla saga* – or to appease the *genius loci*.

2.7 Reasons for (non-)retrieval of silver

2.7.1 Introduction of the container/weight method

The analysis of the spatial distribution of silver deposits and the discussion of their archaeological context, combined in the regression analysis, highlight the association of hoards with sites and regions which could have facilitated the influx of silver and provided conditions suitable for mercantile exchange – certainly silver had to be available first before it could be deposited. But they fail to explain why silver was put in the ground and, more importantly, why it was never reclaimed. The discussion has also shown that context alone may not be sufficient to determine whether the deposition of silver was made for ‘pragmatic’ reasons with the aim of retrieval, or whether the silver was deposited or rather placed deliberately without such intention.

A hint as how to tackle this problem, and the point of departure for the following discussion, is a passage from the memoirs of the famous 17th-century diarist and hoarder Samuel Pepys, describing events of the Second Dutch War of 1667. On the night of 12 June, on the news that the Dutch had broken the chain in the Medway and inflicted England's greatest naval disaster, after conferring with his wife and father, Pepys, fearful of his future, decided to send with the pair a part of his fortune in gold coins to put in safekeeping at his estate outside London. Only four months later was he able to retrieve what was buried, digging at night to avoid attracting unwanted neighbourly attention. Pepys describes the struggle in a most evocative way, and his trepidation and anger at the debacle is clear:

(...) my father and I, with a dark lantern; it being now night, into the garden with my wife, and there went about our great work to dig up my gold. But, Lord! what a tosse I was for some time in, that they could not justly tell where it was; that I begun heartily to sweat, and be angry, that they should not agree better upon the place, and at last to fear that it was gone but by and by poking with a spit, we found it, and then begun with a spudd to lift up the ground. But, good God! to see how sillily they did it, not half a foot under ground, and in the sight of the world from a hundred places (...) But I was out of my wits

almost, and the more from that, upon my lifting up the earth with the spudd, I did discern that I had scattered the pieces of gold round about the ground among the grass and loose earth; and taking up the iron head-pieces wherein they were put, I perceive the earth was got among the gold, and wet, so that the bags were all rotten (...) which, all put together, did make me mad; and at last was forced to take up the head-pieces, dirt and all, and as many of the scattered pieces as I could with the dirt discern by the candlelight, and carry them up into my brother's chamber, and there locke them up (...) with several pails of water and basins, at last wash the dirt off of the pieces, and parted the pieces and the dirt, and then begun to tell [them]; and by a note which I had of the value of the whole in my pocket, do find that there was short above a hundred pieces, which did make me mad (10th October 1667, Pepys 1893; my underscoring).

The passage is used by archaeologists and numismatists to illustrate a common interpretation of hoards as buried for safe keeping during periods of political turmoil or absence (cf. Grierson 1975:124-125; Kershaw 2014:158). But I believe that, if read carefully, it offers much more than that. An important conclusion which could be drawn from Pepys' experience is that the inadequacy or indeed lack of a container would pose a serious problem for anyone who intended to retrieve their buried wealth. This issue is particularly poignant if we consider hoards in the context of the early medieval silver economy, where the commonly accepted commodity-money was silver, conceivably buried for safety and accessed when needed. Furthermore, deposition in the face of danger was likely to be made in a container, although the choice of the material may be random. Consequently, deposition without a container could be indicative of intentional irreversibility which would resonate well with the ritual behaviour, similarly to the deposition in watery environment, which could be both intentionally and technically irreversible.

I would argue, therefore, that hoards buried with the aim of retrieval were placed in containers. Conversely, I assume that deposits without receptacles are more likely to have been placed without the aim of retrieval and should, therefore, be associated with ritual and symbolic practices.

However, already at the first step I faced a problem - only 16% of Gotlandic hoards were explicitly recorded as found in containers (Figure 2.19). For a further 7% the descriptions of the circumstances of discovery suggest that they were deposited in suspected organic containers -

when no organic material was found but coins and other objects were found in stacks, clumps etc. For another 7% there is sufficient information to establish that they were deposited without a container. This leaves an overwhelming c. 70% of hoards which have no information if any kind of container or artefact arrangement was present or not. One could argue that for these hoards the poor description of the circumstances of discovery could be blamed for not indicating the existence of a container or any special deposition of items found at the time of discovery. From the archaeological point of view there are two likely explanations: such hoards were either deposited without a container to begin with, or the container was probably organic, but had decomposed by the time of the discovery and post-depositional processes had disturbed the arrangement of artefacts.

Let us consider the latter possibility first of all. The preservation of organic material depends on a multitude of factors, but two of them are crucial: the acidity of soil and the presence of anaerobic conditions. According to C. French (2003:12) 'calcerous soil conditions favour the preservation of molluscs, bone and carbonised remains, and without the addition of water to exclude air are detrimental to most other forms of organic environmental evidence. Acidic soil conditions usually destroy the molluscan and animal/human bone remains, but do allow the preservation of plant remains and pollen, although again the addition of water and the exclusion of air is the only way to ensure the preservation of organic remains in these circumstances.'

In other words, it could be expected that organic containers, particularly of leather or fabric, have best chances of survival in relatively acidic and, most importantly, wet soil. These observations are confirmed by C. Sease (1992:Table 1) and I. Good (2001:211), who also indicates that linen and cellulosic fibres keep even better in very rare (in the Baltic zone) waterlogged alkaline conditions. Unfortunately with regard to particular hoards such data on soil conditions does not exist. Neither of the reports from archaeologically excavated findspots I was able to access, contained any information on soil acidity and water content.

However, some understanding of these two crucial aspects of soil conditions can be gained from the datasets of total available water content (TAWC), and the map of soil pH in Europe published at the European Soil Portal (cf. A1.3.2). These datasets prepared for the entire area of the European Union are in a relatively low level of detail, with the pH available in 5km and the TAWC in a 1km resolution, and are not capable of reflecting local variations in soil chemistry at particular findspots. The results of the following analysis are therefore approximations, only capable of highlighting general trends, which reflect relative proportions rather than accurate values, and should be treated with caution.

Container type	Mean pH	Mean TAWC
All finds	5.072	51.809
Organic	5.049	52.517
Suspected organic	5.079	43.159
Pottery	5.082	51.970
None	5.065	54.797
No data	5.070	53.043

Table 2.8 Comparison of soil chemistry in Gotlandic hoards grouped by the type of a container

Comparison of pH and TAWC in different categories of hoards with the overall mean of all deposits shows some interesting patterns (Table 2.8). Despite the inaccuracy of the data, the results seem to confirm French's and Sease's observations, as hoards found in organic containers were discovered in soils which on average are relatively more humid and acidic. However, out of four hoards found in waterlogged conditions, which would be most conducive to the preservation of organic containers, none was found in a receptacle. It seems, therefore, that despite favourable soil conditions, the presence of a container, particularly in the watery environment, was often determined by the intentions of a person making a deposit rather than soil conditions, a factor which cannot be quantified by the dataset.

More interestingly, however, hoards in which a container was not recorded at the time of discovery, but whose presence can be suspected from the arrangement of artefacts, were discovered in less acidic and drier soils. From the archaeological point of view such hoards seem

representative of circumstances where a container was in all likelihood present but has not survived due to low acidity and primarily the relative dryness of soil. This group of hoards could, therefore, be used as a benchmark for determining which deposits from the 'No data' category were deposited in similar or drier and less acidic conditions and therefore are likely to have been originally contained in organic receptacles which did not survive.

In terms of values obtained from the European soil datasets, those hoards for which we have no information about the presence or absence of a container, but which may have originally been contained, can be expected to have been deposited in Gotlandic soils with pH higher than 5.082 (relatively low acidity), and TAWC lower than 42.471 (relatively low humidity). By applying the respective cut-off values to the 'No data' category, it transpires that only 16 hoards in Gotland, that is c. 5% of all finds (or c. 7% of 'No data'), are likely to have originally been in containers (Figure 2.20). Therefore, it would be mistaken to claim that the majority of hoards with insufficient information as to the presence/absence of a receptacle were originally placed in containers which simply did not survive.

Naturally, it is possible to argue that 'No data' hoards are just the result of poor description of the circumstances of discovery before they became the focus of archaeological scrutiny in the 20th century, particularly in its second half. When we look at the chronological structure of such deposits expressed as a proportion of all hoard discoveries by quarter-century, and only if we leave out the period before 1825 when the sample is very small (only 7 finds), there is a slight indication that from the turn of the 20th century the proportion of 'No data' hoards is generally lower than the median average proportion.⁴³ However, when we apply a 95% confidence level to the calculated median it transpires that only for the period 1875-1899 is the difference statistically significant (Figure 2.21) and it is less than 2%. Furthermore, even in the last 40 years,

⁴³ 10-year median was introduced instead of 25-year in order to increase the accuracy of calculations and reduce the spread of confidence interval.

when the largest number of findspots were discovered or investigated by archaeologists, the proportion of hoards found in containers is no greater than at the turn of the 20th century, when the investigation of silver hoards was all but monopolised by numismatists whose attention was focussed primarily on coins, not containers (Figure 2.22). Moreover, even the earliest finds, if found in containers, were reported as such, e.g. the discovery of a hoard from Havdhem vicarage in 1711 (CatNo129) and Ganne in 1733 (CatNo263). I believe, therefore, this indicates that regardless of when the discoveries were made, the information on an accompanying container or any special arrangement of artefacts was equally likely to be reported if present.

I would suggest, therefore, that the majority of deposits without explicit information on the presence or absence of a container, except those reclassified as a result of the soil chemistry analysis, were in fact deposited without a receptacle and as such deposited without the aim of retrieval. I am aware this is a simplification, but a necessary one in order to create an interpretative model which would help us understand the general trends of hoard deposition, particularly since the exact archaeological context of Viking-Age hoards is rarely known. This hypothesis can be supported by statistical comparison of silver weight distribution in hoards from the 'No data' group with deposits discovered without receptacles and hoards found in containers or indications of such (Figure 2.23; cf. Appendix A, A2.5). The graph clearly shows far greater similarity between the median average weights and interquartile ranges of 'No data' with 'None' category, than with contained hoards. In fact, with the exception of two outliers, almost the entire weight distribution of deposits discovered without receptacles corresponds with the interquartile range of the 'No data' hoards.

With the assumption that 'No data' hoards were generally deposited without containers, I cross-referenced the calculated weight of silver with the data on the presence/absence of containers, taking into account hoards reclassified by the soil chemistry analysis (Figure 2.24). The comparison shows clearly that smaller deposits are significantly more likely to be deposited

without containers, whereas larger hoards tend to be deposited in containers. The ‘tipping point’ at which hoards become deposited more often in containers falls in Gotland at approximately 600g. Incidentally, the Gotlandic 600g cut-off point corresponds with three marks of weighed silver. According to laws codified in *Guta Lag*, this was the standard amount payable in fines to the general assembly, including for serious crimes such as infanticide, heathen practices, wounding in a church or killing a man at his home (Peel 2009:198-214). The highest payable penalty of 24 marks weighed silver was a full wergild for a Gotlander, which corresponds to c. 4800g and only hoards found in receptacles contained enough silver to meet this fee. This could suggest that many of the large contained Gotlandic hoards acted as a ‘portable but standardised medium for the payment of social obligations’ (Bradley 1987:358) such as compensations, dowries and ransoms and this group could be treated as savings deposits.

2.7.2 Discussion

The above observation linking large contained hoards to savings deposits may serve as a starting point of a discussion in which I would like to propose an estimation of the balance between the economic and extra-economic reasons for deposition of Gotlandic hoards. A very basic tally of hoards in each major contextual category with regards to criteria of weight and the presence/absence of a container (Figure 2.25),⁴⁴ clearly shows that the largest proportion of hoards deposited in containers, particularly of the large variety (above 600g) is found in contemporary settlements. In fact, of all hoards found in containers large ones are 6 times more likely to be found on settlements than are the small ones. Furthermore, in all four cases⁴⁵ where the contextual archaeological evidence is sufficient to show that hoards were buried within contemporary buildings, the deposits were large and contained. As such, they could be accessed with relative ease and replenished when needed, particularly that of all weight/container

⁴⁴ One should be aware of the relatively small size of samples in each interpretative group, which may influence the results of the analysis.

⁴⁵ CatNos: 41, 104, 242, 265

categories large contained hoards lie on average (median) nearest contemporary settlements. All those lines of evidence demonstrate that this category represents economic aspects of silver deposition and could be perceived as **savings hoards**.

At the opposite end of the spectrum lie small containerless deposits. They are ubiquitous on Gotland, which does not make their interpretation any easier. They do, however clearly dominate (75%) the group of deposits found within cemeteries and earlier burials, arguably associated with cultic practices and ancestral worship. A similar pattern can be observed among deposits discovered within earlier abandoned settlements, particularly from the Early Iron Age. The deposition within the watery environment and in the context of ritual sites is exclusively containerless and clearly dominated by small deposits. Particularly the placing of deposits in an environment which would make their retrieval very difficult if not impossible, and strengthening the irreversibility of the act by deposition without containers suggests very strongly an association with ritual and symbolic behaviour. Small containerless hoards can, therefore, be interpreted as **placed deposits** (cf. Chapter 1.5.2) of personal possessions used in ritual or symbolic 'transactions'; fulfilment of a sort of a contract made between the worshipper and the gods or ancestors.

It appears, therefore, that primarily the small deposits (below c. 600g) discovered without containers are more likely to be placed without intention of retrieval. Consequently, the large hoards (above c. 600g), protected by organic, pottery and metal receptacles, seem more indicative of deposition with the intention of retrieval, and therefore of behaviour triggered by economic and political factors. However, by employing this distinction we are left with two groups of hoards, which on one hand comprise large deposits for which no evidence of a container exists, and on the other, small hoards which were nevertheless deposited in containers.

The small contained hoards can be seen as savings of poorer members of the silver-owning society, or savings that were partially claimed, but not replenished. But given the fact that on Gotland such hoards are so rare in general (11% of all hoards) and at settlements in particular (just 6%), I would be inclined to see them as haphazard collections of wealth hidden in the face of danger as **emergency hoards**. It may seem at this stage a far-reaching conclusion, however strong evidence for such interpretation will be provided in the Pomeranian and Svealandic chapters. In the meantime a suggestion may be tentatively supported by the dearth of evidence of large-scale conflict on the island which displayed a unique stability of land use patterns. According mainly to Carlsson (1979:40,127; 2009:65-66) and Östergren (1989:192-201) the productive landscape remained relatively unchanged from the Roman Iron Age until the early 18th century. There is no archaeological evidence for horizons of destruction,⁴⁶ major political and social upheavals, and the silence of contemporary written sources about any such events in Gotland should not be ignored. Of course, Viking-Age weaponry is present in Gotlandic burials, but they do not automatically imply a martial society: 'it was the right to carry weapons that essentially signified and separated free men from unfree men, women and children' (Kjellström 2014:237). Naturally it would be naïve to see Viking-Age Gotland as a shining beacon of pacifism and brotherly love in an otherwise turbulent world: killings and woundings must have been a common occurrence to trigger at least 16 paragraphs of *Guta Lag* which deal with the aftermath of such actions, and these could be the main reasons for the unretrieved emergency hoards, and the major part of unclaimed savings hoards. Whenever the later sagas do mention the island in the context of conflict (e.g. Monsen and Smith 1990:132,183,424), the narrative never implies that Gotland was in a state of prolonged warfare or suffered invasion; it was rather used as a base for piratical attacks on passing merchant shipping and subjected only to sporadic coastal

⁴⁶ The only, albeit conjectural, exception could be the discovery of nearly 132kg of burnt clay from a stratum c. 10cm thick observed in all test pits excavated at the harbour site of Bandlunde (Bengt2002:247). There is, however, no evidence that the burnt clay could be associated with conflict or other dramatic events.

raids. Furthermore, *Heimskringla* describes Gotlanders who deliberately avoid confrontation with St. Olav by paying a tribute (Monsen and Smith 1990:221), rather than endanger their lives and homes with the uncertain outcome of war. I would argue, therefore, that on Gotland large contained hoards were most likely representative of savings, and their smaller contained versions were associated with emergency deposits, both made with the aim of retrieval in the future, but unclaimed due to some calamity befalling the owner(s).

The remaining category of large containerless deposits is the most problematic. On the one hand the amount of silver they contain puts them closer to the savings hoards, whereas the absence of a container may be indicative of an intention of non-retrieval. In cases when the archaeological context is known, the largest number of these ‘grey area’ deposits was found within contemporary settlements which would suggest a closer association with more pragmatic reasons for hoarding. However, when viewed as a proportion of contextual categories they form about a quarter of deposits found in the watery environment and within earlier settlements strongly associated with ritual and symbolic behaviour – although admittedly the number of these finds is low. The situation is not made any clearer by the fact the largest proportion of ‘grey area’ hoards was deposited within *stenvasts*, whose ancient origins may have provided a symbolic context for deposition in connection with ancestral cult or ritual renewal of boundaries. However, the highly visible form and usually close proximity of Viking-Age settlements at least in 25% of cases made them good locations for contained hoards, most likely deposited with the aim of retrieval. I will, therefore, leave this group of deposits for now as a truly problematic ‘grey area’, and try to reassess their meaning once data from the remaining two case studies is analysed (Chapter 6.2.3).

To briefly sum up the discussion on the mechanisms for non-retrieval of silver so far, the cross-referencing of hoard weights with the presence/absence of a container and the context of the deposition allows the following assumptions to be made:

- **Small containerless** deposits are most likely associated with symbolic and ritual practices (**placed deposits**);
- **Large containerless** hoards are harder to interpret and form a somewhat 'grey area';
- **Small contained** hoards are most likely representative of haphazard deposition in the face of danger (**emergency hoards**);
- **Large contained** hoards are most likely savings deposited with the aim of more or less regular access (**savings hoards**).

On the way to the above categorisation I have already discussed the majority of archaeological contexts of hoard discoveries identified in Chapter 2.4. Naturally, the link between placed deposits and watery environment, earlier settlements and burials is not exclusive and there are exceptions, which should be expected; contained hoards, albeit in a visible minority, were found in all these contexts except waterlogged sites. But as I discussed above, the dual character of these places is perfectly viable. Similarly, the abundance of placed deposits in contemporary Viking-Age settlements should not come as a surprise, as certain rituals were undoubtedly enacted in places where people lived. These may have involved making sacrifices or offerings dedicated not only to gods and ancestors but also to any 'non-functional' purpose or intention. Certainly 'not all sacrifices include making offerings but all offerings that involve giving up something of (economic) value can be regarded as 'sacrifices' in a mundane sense, if not in a religious sense' (Sofield 2015:113). In this definition the containerless and thus intentionally irreversible placed deposits of silver, which was of unquestionable economic value, are likely to represent offerings (whether in settlements or elsewhere). A number of placed deposits found in settlements that underwent archaeological excavations support this proposition, although those able to provide useful information did not exceed 10m² and should be treated with caution. One of these, Bote II (CatNo4) was found in connection with a stone-slab hearth built over the skeletal remains of a large animal. A hoard from Mallgårds (II, CatNo189) found near two postholes, and Bote I (CatNo3) spread in a cultural layer, may have been deliberately placed

just outside contemporary buildings. The small size of excavations precludes more elaborate interpretations but it is probable that these deposits may have been placed as foundation/closing offerings. Further support for a symbolic interpretation of small containerless deposits placed in settlements will be provided by the Svealandic material.

Hoard category	Median average distance (km)			
	Viking-Age settlements	Harbours	Standing stones	Coast
Savings	1.26	10.87	3.90	7.83
Emergency	2.55	10.33	1.90	4.41
Grey area	1.91	9.15	3.70	9.12
Placed deposits	3.76	8.11	5.85	1.49
Contained	1.70	10.87	2.92	4.50
Containerless	2.97	8.38	4.39	2.73

Table 2.9 Distances from Gotlandic hoards associated with stone and landscape markers

One interpretative context has escaped our attention so far: stone and landscape markers. Figure 2.25 shows that the deposition of hoards associated with markers is certainly complex and resembles the situation observed in the case of *stenvasts*. The group is dominated by containerless deposits, but also comprises the second largest proportion of contained hoards (just 2% less than in Viking-Age settlements) whose majority have the characteristics of emergency deposits. The complexity can be made more transparent by analysing the distances of this group's weight/container categories from different types of archaeological features (Table 2.9). The contained hoards buried by markers were located on average nearly twice as close to contemporary settlements as containerless deposits. The difference is most pronounced between savings hoards and placed deposits. The first category was found within c. 1.3km of settlements, suggesting that they were deposited within relatively easy access, whereas the latter was found on average 3.8km away, which supports the posited association with the ritual creation and renewal of, probably regional, boundaries. Interestingly, placed deposits associated with markers are found in closest proximity to the Viking-Age harbours and the coast. This raises an interesting possibility that Gotlanders felt a particular need to establish and

symbolically reinforce boundaries around places most exposed to foreigners, all the more important for a rather uniform society determined to uphold and advertise its identity and otherness to the outsiders, exemplified by the Gotlandic laws and unique style of ornaments. Intriguingly, deposits bearing the characteristics of emergency hoards were found in closest proximity (1.9km) to Gotlandic standing stones, placing them near the posited regional boundaries where feuds, particularly those associated with land ownership, were most likely to arise.

This finally brings us to the largest group of 63% of Gotlandic hoards, for which the information on the context of deposition (either archaeological or reconstructed from descriptions of discovery) simply does not exist. Still, some conclusions may be drawn based on their association with the major soil types discussed above. Silver deposition in both traditional and marginal soils has a similar structure and is dominated by containerless deposits, although to a lesser degree than in contexts which are easier to associate with ritual behaviour, such as watery environment. The relatively high proportion of contained deposits (25%) is similar to the proportion of deposition seen in contemporary settlements. This may suggest, particularly for the traditional soils where the contained hoards were dominated by savings deposits, that some of them may have been deposited at or near contemporary settlements, which are still unidentified. But this conjectural explanation would grow thin if it was to be extended to the large number of containerless deposits, especially of the small variety. Instead, as I will demonstrate, contextless placed deposits are particularly likely to be associated with ritual and symbolic behaviour aimed at forging a symbolic bond with the acquired land and/or its protection.

Firstly, it appears that such containerless deposits placed in traditional soils were found on average (median) closer to contemporary settlements (1.8km) than were those in marginal soils (2km). Admittedly the difference is not remarkable, but it corresponds to the scale of the average-size Early Iron-Age enclosures (e.g. Vallhagar) and early 18th-century fields (cf. maps in

Svedjemo 2014, particularly fig. 1.4 and 1.6) and there is no reason to believe that in the Viking Age their size was significantly different. It may seem, therefore, that in the physically crowded and legally complicated conditions on Gotland, after internal colonisation 'saturated' the available traditional soils, the expansion towards marginal soils was achieved not by a dramatic shift but by carving out one field at a time. Secondly, the chronological structure of these otherwise contextless deposits (Figure 2.26) suggests that deposition in marginal soils was indeed started by placed deposits in the second half of the 9th century.⁴⁷ This can, therefore, be seen as the moment when the shift of settlement patterns had begun. Intriguingly, this is exactly the point when the first emergency hoards were deposited on Gotland, indicating that changing settlement and possible expansion were linked to social tensions. If the deposition of savings deposits could be taken as a proxy for settlements, which is probable, it may be concluded that the first settlements on marginal lands were established about 70 years after the colonisation of marginal soils had begun.⁴⁸ Naturally, these results need to be confirmed by detailed analysis and excavations of contemporary settlements, but presently the state of research is simply insufficient to conduct such verification. Although my findings are based on a series of assumptions and may be seen as conjectural, they do offer an intriguing insight and new line of inquiry for the archaeology of Gotlandic Viking-Age settlements.

⁴⁷ There are three placed deposits from 830s (CatNos: 45, 108, 267), however all were deposited within Early Iron-Age structures and should most likely be associated with an ancestral cult.

⁴⁸ The earliest known placed deposit on marginal soils (without a context) is Lunds, *tpq* 864 (CatNo331) and the earliest savings hoard found on marginal soils is Häffinds IV, *tpq* 934 (CatNo41) found at the harbour site of Bandlunde.

3 Pomerania

3.1 Introduction

3.1.1 Case study

The first problem I encountered in my attempt to investigate the deposition of hoards in Pomerania, was as basic as it was crucial: what is Pomerania and how to exactly define its territorial extent?

My point of departure was a fragment from Herbord's *Dialogus de vita sancti Ottonis episcopi Babenbergensis* written in 1158-1168 (Petersohn 1969:587):

The derivation of the word Pomerania appears to indicate the nature of its name and situation. For Pommo in the Slavonic language is equivalent to near, or around, and Moriz is equivalent to sea. Hence the word Pomerania just as Pomerizania denotes that which is situated near or round about the sea. This country (...) can be described as triangular, inasmuch as on three sides three lines which join together at their extremities make three angles, one of which is more obtuse than the others; the line forming this angle stretches to Leuticia and towards Saxony and bends back again towards the north and the sea (...) It has then Polonia as its neighbour for a long space as far as the confines of Leuticia and Saxony (B2CH1, Robinson 1920:17-18).

Although this description situates Pomerania quite well, it is sparse on topographic details which could be used as boundaries for the case study. This task is impeded not only by the fact that the concept of the extent of Pomerania changed throughout history (Piskorski 2002:22), but also by a lack of consensus among historians and archaeologists, at least partially due to their national and political background. The problem is exemplified by two fundamental archaeological works about Pomerania, both written in the 1930s: O. Kunkel's *Pommersche Urgeschichte in Bildern* and W. Łęga's *Kultura Pomorza we wczesnym średniowieczu na podstawie wykopalisk*. German archaeologist Kunkel in his synthesis of Pomeranian prehistory, perceived Pomerania as an area between the Rivers Recknitz and Łeba, whilst Polish

ethnographer, historian and archaeologist Łęga, saw it as an area between the Rivers Oder and Vistula (Piskorski 2002:112). The latter perception seems to have dominated the archaeological and historical discourse ever since, unsurprisingly after World War II in particular, with the area to the west of the Oder being referred to as Polabia. In the archaeological material, however, there is little evidence for a cultural boundary on the Oder in the Viking Age (Piskorski 2002:145-148), which tends to support the view of St. Otto's biographer.

Consequently, in the following discussion I refer to Pomerania in its widest geographical extent as the area defined to the north by the Baltic coast (including the islands of Rügen, Uznam and Wolin), to the west by the River Recknitz, to the south by the Rivers Warta and Noteć, and to the east by the Vistula and Nogat. In the eastern extent I also included the area of Wysoczyzna Elbląska and Żuławy Wiślane with the crucial emporium of Truso at Janów Pomorski located, according to the 9th-century merchant Wulfstan, at the boundary between Slavic Wendland and Witland settled by Baltic/Prussian tribes (Bately 2007:48-50; Jagodziński 2010:11-12). At the same time I decided not to extend the case study further west to the River Warnow, despite its potential association with the large trade centre participating in long-distance exchange at Rostock-Dierkow. Although the site itself is dated to between the 8th and 9th centuries (Bogucki 2006:122), it is of little value for the discussion of hoards as there are no contemporary (pre-11th century) silver deposits within a 70km radius from the site.

3.1.2 Written sources and historical background

The written sources which provide an insight into the political, historical and religious situation in Pomerania were briefly characterised in the introduction (Chapter 1.3). Written from the perspective of Western scholars they naturally provide most detail for regions in the sphere of interest of Frankish and German rulers. The further east we travel the more the source material is stretched and gaps become filled by often contradictory theories developed since the late 19th century. It is not my purpose to provide an in-depth analysis of the political and tribal situation

in Pomerania, admirably summarised by J. Piskorski (2002:30-99). I will, therefore, focus on information most relevant for the research questions of the thesis.

The *Bavarian Geographer*, one of the earliest written sources for Pomerania, indicates that it was occupied by a number of tribes divided into a number of *civitates* or settlement units believed to be focused around strongholds whose archaeological remains are ubiquitous within the case study (Chapter 3.4.2; Appendix A, A1.2.2). The easternmost tribes mentioned by the document, which can be attributed to the Pomeranian territory, are Wolinians (*Uelunzani*) and Pyritzans (*Prissani*) located at the mouth of Oder River, before the anonymous author lists the Baltic Prussians (*Bruzi*) inhabiting territories east of the Vistula. The unknown tribes inhabiting lands between the two rivers are described collectively as Pomeranians (*Pomerani*) by Adam of Bremen (B2 Scholion 14(15)) in the mid-11th century, although estimates of the number of Pomeranian tribes vary widely from just one great tribe to eleven regional units (Piskorski 2002:81).

Thus the political and tribal structure of Pomerania is a source of a heated debate, although the majority of historians agree that Pomerania was not a uniform organism, but displayed cultural coherence (Piskorski 2002:30). The contemporary written sources confirm that individual Slavic tribes were likely to form larger organisms, such as the Lutici (*Leutizi*) federation of four smaller tribes: Redarians (*Redari*), Tollensians (*Tholenzi*), Circipanians (*Circipani*) and Kessinians (*Chizzini*) listed by Adam of Bremen and a hundred years later by Helmold of Bosau (AoB B2 Scholion 16(17); HoB B1CH2). The authors suggest that the Lutici developed (probably after the uprising of 983) from an earlier tribal federation of Veleti (*Wilzi*) encountered by Charlemagne in 798 and described as comprising four regions (*regiones*) in the *Bavarian Geographer*, presumably corresponding to the member tribes. The complicated picture of the tribal situation in Pomerania should not surprise as it was in all probability highly unstable: some tribes

collapsed, others divided, yet others fused through alliances, conquest or otherwise (Piskorski 2002:79-80).

By the mid-10th century the Slavic lands on the Baltic coast were firmly in the crosshairs of Ottonian Germany and its historians. Some of the most dramatic events took place in the year 955, which Widukind (B3CH44-55) and Thietmar (B2CH9-12, 44) describe as a time of exceptional uncertainty and upheaval, when after nearly 50 years of attacks on Western Europe the Hungarian raids culminated in a battle on the River Lech. Almost simultaneously a massive uprising of Slavs led by the princes of the Obodrite (*Obodriti*) federation, Nacco and his brother Stoignev, at the instigation of the outlawed Saxon counts Wichman and Ekbert, took place in Polabia. The events occurred beyond the case study area, although the decisive battle which saw the defeat of the Slavic forces took place on the River Raxa, identified with Recknitz at the western border of Pomerania. It is very likely that the events reverberated among the tribes across Pomerania, and even directly involved some of them – a detachment of the Rani (Rugians) tribe inhabiting the island of Rügen fought in the final battle alongside the victorious margrave Gero. The rebellion was triggered by aggressive German politics, spearheaded by the establishment of new bishoprics, to dominate the Slavs (Reuter 1998:162). After 955 pressure on the Slavs only intensified (Reuter 1998:165-66) and in 983 there broke out another major Slavic uprising against the Ottonian expansion initiated this time by the Lutici federation in Rethra (*HoB* B1CH16), the tribal centre of Redarians, which spread to the Obodrite federation led by Prince Mistui (*ToM* B3CH17-19). The conflict started on July 29 with the attack on Havelberg; three days later fell the bishopric of Brandenburg, followed by Calbe and Hamburg. Unchecked raids reached the River Tanger, but finally the Slavs were, according to Thietmar, ‘completely annihilated’ in August by joint Saxon forces under margrave Dietrich. The final defeat was presumably not as devastating as the German chronicler would like us to think, since it succeeded in halting the Saxon political and religious expansion for nearly 10 generations (Reuter 1998:179), until the Wendish crusade of 1147.

Lively political interactions, although not as dramatic and not as well attested in written sources, can also be seen in the Polish part of Pomerania. The main factor there is the vested interest of the emerging Piast dynasty in gaining access to the Baltic. The earliest evidence of this attempt at northern expansion is attested by Widukind (B3CH19) who indicates that in the 960s (967?) Mieszko I was fighting Veleti and Wolinian tribes, although there is no evidence that he controlled the mouth of Oder (Piskorski 2002:73). Neither does it seem that this goal was achieved by his son Bolesław Chrobry, since in 1007 the embassy of the 'representatives of Lutici and the large city of Wolin' (*ToM* B6CH33) succeeded in terminating the friendly relationship between the Polish ruler and emperor Henry II. Traditionally also the battle of Cidini/Zehden in 972 has been accepted as evidence that Mieszko fought there with margrave Hodo in defence of Pomerania, *ergo* it had to be under the Piast control by that time. There is little evidence, however, to support this theory and M. Piskorski (2002:75-79) convincingly suggests that the battle described by Thietmar (B3CH29) is more likely to have taken place in middle Polabia, presumably in the land of Sprewians, where Piasts pursued a very active policy from the beginning. In such a context the battle of Zehden could be seen as an attempt to secure Mieszko's western flank. Some archaeological evidence of Piast presence in central Pomerania in the 980s is indicated by substantial rebuilding after 979/986 of the stronghold in Kołobrzeg-Budzistowo seen as a result of Mieszko's activity there (Leciejewicz and Rębkowski 2007:308). Despite the lack of strong archaeological evidence of Piast presence in the eastern part of Pomerania, namely Gdańsk, before the mid-11th century, it is possible that by 997 it was within the Piast sphere of influence (Chapter 3.3.10). Piast intrusion into central and eastern parts of Pomerania (i.e. between the Oder and the Vistula), seems to have been sealed in 1000 by the creation of a new bishopric in Kołobrzeg, subordinate to the newly created Archdiocese of Gniezno (Piskorski 2002:73). The bishopric, however, collapsed within the next few years, presumably as the result of a pagan uprising, and subsequently the Polish state lost control over

Pomerania until the 12th century, with a brief interlude when it was restored for 20 years in 1047 by Kazimierz Odnowiciel (Piskorski 2002:87-88).

Despite often forceful Christianisation attempts, particularly in the western part, Pomerania remained pagan throughout the Viking Age until the 12th century. The written sources provide relatively little information about the beliefs of the Slavs, and written sources are relatively late, mainly from the late 10th century and after. The most comprehensive account of beliefs among the tribes inhabiting Pomerania is Thietmar's description of the religion of the Lutici (B6CH23-25). The cult appears to have been centred on the temple of Swarozyc in Rethra (Riedgost), which was surrounded 'by a great forest which the inhabitants hold to be inviolable and holy.' The description paints a picture of centralised forms of worship focused on regional temples and shrines, with paraphernalia such as sacred standards and portable figures taken into battle, organised by a special caste of priest, who had the sole right to undertake divinations by casting lots and consulting the behaviour of sacred horses, and to make sacrificial offerings of animals and humans (also mentioned in *ToM* B4CH13). However, such structures probably developed relatively late, most likely as a conscious response to Christianisation introduced more often than not with fire and sword (Lübke 2001:383-385). Equally late are descriptions of Slavic temples, including Thietmar's depiction of a temple in Riedgost/Rethra, mentioned also by Adam of Bremen (B2CH21(18)), a possible temple in Kołobrzeg (*ToM* B7CH72) and Helmold's description of Arkona (B2CH12). Despite their presence in the written sources, temples are notoriously difficult to identify archaeologically. Although they are suspected to have existed in e.g. Ralswiek, Szczecin, Arkona and Wolin, recent investigations combined with reinterpretation of older excavation reports puts the existence of such dedicated structures in question (Stanisławski 2013:131-132). Probably more widespread as well as earlier were rituals utilising open cult places, such as the sacred grove of a god Prowe, described by Helmold (B1CH83).

The contemporary and near contemporary written sources provide little information on the political and social structure of Slavic tribes in Pomerania. It seems that some tribes developed a distinct stratum of nobility, since princes are repeatedly mentioned in the context of the Obodrite federation. Adam of Bremen mentions that Rani even had a king (*qui soli habent regem*, AoB B4 Scholion 121(117)). Helmold (B1CH83) indicates that the power of the nobility was mitigated by assemblies gathering in places of worship where the population congregated with their prince (*regulus*) who sat in judgement and presided over cult practices and sacrifices. But a hierarchical social structure was not necessarily the norm among all tribes, and at least in some regions decisions were made by acclamation of the assembly of equals:

There is no individual lord who presides over all of these people who are collectively referred to as Lutici. When important issues are discussed at an assembly, there must be unanimous agreement before any action can be undertaken. If one of their countrymen opposes such a decision during assembly, he is beaten with rods. If outside the assembly, and openly, he must either lose everything through burning and immediate confiscation, or he must come before that body and, in accordance with his status, pay compensation for his sin (*ToM* B6CH25).

3.2 Hoards in Pomerania

Scholarly interest in the early medieval finds of precious metal in Pomerania has a long tradition, starting with the monographic works of individual findspots undertaken mainly by German numismatists in the end of the 19th and early 20th century, particularly H. Dannenberg, E. Bahrfeldt, J. Menadier, S.H. Nesselman, H. Nützel and A. Suhle, published in specialist numismatic periodicals, but rarely used in later archaeological literature (summary in Kiersnowscy 1959:10). The most important works on the subject within the case study were inventories of Viking-Age silver hoards prepared within a research framework associated with the 1000th anniversary of the Polish state, undertaken by Zakład Numizmatyki Instytutu Historii Kultury Materialnej Polskiej Akademii Nauk, and published in 1959-1966 in the series *Polskie Badania Archeologiczne* (henceforth PBA) edited by W. Hensel (Śląski and Tabaczyński 1959;

Kiersnowscy 1959; Kiersnowski 1964; Haisig et. al. 1966). These publications formed the basis of my research and were supplemented by works of J. Hermann and P. Donat (1973; 1979a; 1979b), catalogues by G. Rispling (2005) and S. Brather (1996), publications in periodicals such as *Archeologia Żywa* and *Wiadomości Numizmatyczne*, and the information kindly shared with the project by M. Bogucki.

My research of the published material has identified within the case study 242 hoards in the definition presented in Chapter 1.5.1. The following discussion will be based on 136 hoards fulfilling all criteria set out in Chapter 1.2, which comprise c. 77% of deposits that could be dated to the period in question and c. 61% of all coin hoards known from Pomerania which were deposited well into the 12th century (Table 3.1).

All hoards in case study	229
Coin hoards in case study	222
All hoards with good localisation	217
Coin hoards with good localisation	211
All hoards with dating within period	179
Coin hoards within period	176
Hoards suitable for analysis in case study	136

Table 3.1 Suitability of Pomeranian hoards for analysis

Pomeranian hoards rarely have detailed descriptions of the circumstances of their discovery, which would allow identification of the archaeological context of finds. In order to infer the context from a wider archaeological background in those cases when suitable information is absent, I created a number of secondary datasets comprising details of other contemporary archaeological site types, topography, hydrology and geology. This task proved to be complicated and time-consuming, due to the relative inaccessibility of such data for Pomerania and problems stemming from differences in format, structure, level of detail and accuracy of multiple datasets consulted. The divide was particularly pronounced between the Polish and

German parts of Pomerania. The list of these datasets and source-critical comments are presented in Appendix A, A1.2.

3.3 Spatial analysis of hoard distribution

Figure 3.1 shows the distribution of hoards whose location is known and which could be dated to between 800 and 1050. I included a small hoard from Penzlin dated to after 798 (CatNo364) and a find from Wolin (VIII, CatNo446) dated to the 2nd half of the 8th century, presumably part of a larger dispersed hoard.

It is clear even at a first glance that hoards are not distributed randomly, although the pattern appears more dispersed and clusters are fewer than in Gotland. This observation is confirmed by the results of the Average Nearest Neighbor analysis (Figure 3.2), which shows that given the z-score of -3.387, there is less than 1% likelihood that this clustered pattern could be the result of random chance. Again, to quantify the intensity of these concentrations I applied kernel density estimation within a radius where the clustering processes are statistically significant, which in the case of Pomerania was calculated to 22km (cf. Appendix A, A2.1). The results of kernel density analysis are presented in Figure 3.3 as a heat map.

This distribution, however, only represents the number of hoard finds and their distribution but does not take into account the amount of deposited silver. Similarly to Gotland the overall weight of silver in Pomeranian deposits is known, mainly due to the meticulous work of R. Kiersnowski, in 70% of analysed hoards. In the case of 20 deposits (15%) the weights were his estimates, which I nevertheless decided to retain since they were based on Kiersnowski's intimate knowledge of the material, original reports and early literature, but also because they are widely accepted by researchers. For the remaining 30% of Pomeranian hoards where the weight data is unavailable I calculated average weights of whole and fragmentary items using the same method as in Gotland (Table 3.2, cf. Appendix A, A2.3).

Naturally, the sample size for the calculations was much smaller than in the case of Gotland, therefore there is a possibility that the results may not fit the actual weights as accurately. Furthermore, due to lack of suitable numismatic data, it was impossible to calculate the weight of Byzantine and English coins and the values obtained for Gotland were used. Moreover, the small sample of reliable information on the German coin fragments made it impossible to reliably calculate the lower confidence interval, meaning that calculated weight may be in this case lower than what would be expected of the whole population. Just as in Gotland, the most obvious problems were caused by variance of weights of fragmentary and whole non-coin objects. Finally, in the case of 13 hoards (10%) the available descriptions did not contain the information on either the weight or the number of artefacts, and consequently the calculations could not be made. Despite these issues the results presented here are sufficiently accurate with a median error of $\pm 11\%$. I believe them, therefore, to be suitable for calculating the overall weight of silver in the 20% of hoards where the published weight data does not exist.

	Median weight (g)	95% bootstrap confidence interval	
		Lower	Upper
Oriental coins			
whole	2.94	2.81	3.21
fragment	0.55	0.15	0.84
Byzantine coins			
whole	2.55	2.46	2.65
fragment	1.17	0.95	1.45
German coins			
whole	0.92	0.71	1.16
fragment	0.25	n/d	0.27
English coins			
whole	1.30	1.07	1.35
fragment	0.66	0.51	0.77
Other European coins			
whole	0.89	0.59	1.20
fragment	0.57	0.47	0.75
Other objects			
whole	21.20	n/d	40.85
fragment	3.70	0.31	6.99

Table 3.2 Results of the average weight calculations for Pomeranian hoards

Using the published and calculated weight data I conducted spatial autocorrelation analysis to determine if, as in Gotland, the weight of silver may influence the observed hoard clustering (cf. Appendix A, A2.1). The results showed that given the z-score of 0.50 in the global Moran's I test, the pattern does not appear to be significantly different than random (Figure 3.4). This means that although the hoard findspots are clearly clustered, the amount of silver is distributed among them at random, therefore does not influence the clustering, and confirms the Gotlandic results.

As I indicated in the Gotlandic chapter, Pomeranian hoard concentrations identified with the help of kernel density estimation can generally be linked to known and possible central places. In the following chapters I will review these concentrations individually, before proceeding to review the archaeological context of silver deposits.

3.3.1 Ralswiek

Starting in the west, the weakest of the observed concentrations is located on the Island of Rügen and is most likely associated with an international trade centre in Ralswiek (Figure 3.5) believed to be, alongside Arkona, one of the main tribal centres of Rani. It was a large open settlement consisting of 12-17 farms with houses, storage buildings and craftsmen workshops where evidence for metal, amber and bone working is present. The site was accompanied by an elaborate harbour with 15 to 17 of purpose-built mooring basins accessible via artificial channel (Hermann 2000:163-166; Jöns 2009:173-174). The beginning of Ralswiek could be dated to the 9th century and the suggestion that it might have started in 775 is based on a wrong interpretation of a dendrochronological date, which was taken from a tree that started growing in 775, but was cut in 878 (Bogucki 2006:122; Dulnicz 2001:284). The main development took place in 9th/10th century, but the site declined during the 10th, although there is evidence that the cemetery was used still in the 12th century. Ralswiek is the findspot of by far the largest 9th-century Pomeranian hoard: 2.7kg of Oriental coins and their fragments were deposited in a cylindrical woven basket within a building otherwise no different than others discovered in the

area near the landing stage of the harbour. Only two more hoards were found on the island, and given the *tpq* 1046 of the hoard from Garz, it is unlikely that it could be associated with Ralswiek.

The relative paucity of silver hoards is somewhat surprising given the presence of a large international trade centre. Some explanation of this conundrum may be given by observations made by Helmold of Bosau:

[Rani] are a cruel nation, living in the middle of the sea and extremely devoted to idolatry; they lead the entire Slavonia, have a king and most famous temple. Therefore, because of the special veneration of the temple (...) they force the conquered peoples to pay tribute to the temple (...) After a victory they take gold and silver to the treasury of their deity, and the rest they divide between themselves (B1CH36).

Rani do not have coin and do not use money when buying goods, but whatever you want to buy in the market, you can purchase for sheets of cloth. Gold and silver, which by chance or through robbery or from taking people into slavery or otherwise acquire, they turn into ornaments for their wives or bring to the treasury of their god (B1CH38).

In the same chapter Helmold describes what happened when Rani were forced to pay tribute to Henrik Gotskalkson in 1123/4, in the sum of 4400 marks of silver:

When they emptied both the public treasury and all gold and silver that they could find among private persons, they paid out only half the sum (...) (B1CH38).

These three passages combined with the archaeological evidence pointing to economic underdevelopment of the island in comparison to neighbouring areas (Piskorski 2002:283) seem to suggest that despite the existence of an international trade centre and the leading political role suggested by written sources,⁴⁹ there was little silver in circulation on Rügen. Sheets of cloth were used in transactions in favour of precious metals, which resembles the institution of the Icelandic *vaðmál* or marten skins used by Prussians (AoB B4CH18(18)). Furthermore, silver and gold soon after acquisition appears to be transferred from the economic sphere into

⁴⁹ 'It is the most valiant of Slavic peoples, who alone have a king; without consulting them, no public matter can be undertaken; so they fear them because of their favour with the gods, or rather of idols, whom they worship more than other Slavs' (HoB B1CH2). Helmold's passage is almost a *verbatim* copy of AoB B4CH18(18).

symbols of status and identity in the form of ornaments or entered the ritual and symbolic domain as offerings to the god(s). It is also striking that one of the Rugian hoards is clearly associated with an international trading settlement and the remaining two were discovered within or very near strongholds (less than 500m), where the presence of markets attracting long-distance traders dealing in silver coins could be expected. Although the information provided by Helmold is later than the period considered here, his account seems to resonate rather well with the situation represented by Viking-Age hoards and other archaeological finds.

3.3.2 Menzlin-Görke

A small concentration of hoards in the region of lower Peene is most likely associated with another large international trade centre at Menzlin-Görke (Figure 3.6). The complex straddling both banks of the Peene River consisted of a large, c. 10ha open settlement and a cemetery of 800-850 burials (Dulinicz 2001:278, 283–284). The trade centre is dated from the end of the 8th to the beginning of the 10th century, mainly on the basis of dendrochronology of samples retrieved from an embankment linking the settlement with the river spanned by a bridge leading to the Görke part of the complex. The cemetery is well dated to between the mid-9th and the beginning of the 10th century, and includes Scandinavian and Frankish style burials (Bogucki 2006:123). The settlement comprised a number of sunken-floor buildings interpreted as workshops due to large amount of slag and waste from metalworking and crafts. A vast number of imported artefacts such as Badorf, Tating, Muschelgrus wares, Mayen basalt, glass vessels, millefiori beads, West European and Scandinavian ornaments, stray Arabic coins and collection of weights indicate intensive and varied long-distance trade links (Jöns 2009:174-176). The Menzlin-Görke complex was abandoned by the mid-10th century broadly at the same time when Wolin entered its heyday. This is mirrored well in the hoard material, as none of the deposits which could be associated with Menzlin date after the first decades of the 10th century. It

indicates that Menzlin played an important role in redistribution of silver during the early stages of its influx into Pomerania.

3.3.3 Wolin

By far the most intensive and largest concentration of hoards in Pomerania is located in and around the emporium and the tribal centre in Wolin (Figure 3.7). Fourteen hoards dated to the period in question were found within the settlement and its immediate surroundings, however the two Tabaristani coins comprising Wolin VIII (CatNo446), are most likely part of one of the later deposits. The concentration includes by far the largest hoard in the case study area found at the beginning of the last century near a village of Dramino (CatNo432). The hoard dated to after 950 and weighed nearly 11.5kg.

Wolin most likely emerged from three open settlements in the end of the 8th or the beginning of the 9th century (Łosiński 2008:33), although some evidence exists (mainly residual pottery from early medieval deposits) that it may have been occupied already in the Migration Period (Bogucki 2006:123). In the early 9th century Frisian artefacts and some stray Oriental coins appear in cultural layers alongside Slavic finds, although these contacts all but disappear in the remaining decades of the 9th century (Stanisławski 2013:150). In the southern part of the settlement a ditch dated to the 1st half of the 9th century was found, most likely representing an element of the oldest phase of defences. Fully developed defences emerged in the 2nd half of the 9th century and comprised a palisaded bank reaching the harbour, which itself was surrounded by defensive constructions c.880-900 (Bogucki 2006:123). Gradual revival of exchange took place during the 1st half of the 10th century – glass beads arrived in larger amounts, and small numbers of Baltic and Scandinavian objects can be found in cultural layers. Wolin entered its heyday and the phase of economic boom in the mid-10th century, which lasted for a hundred years until the gradual decline, initiated most likely by raids of Magnus the Good in 1043 (Stanisławski 2013:151). This period is marked by the influx of mainly Oriental silver,

finds of scales and weights, imports of Scandinavian, Baltic and Rus provenance, as well as more exotic imports including shells from the Indian Ocean, glass beads of Syrian and Egyptian origin and silk fragments from Central Asia. This is also the period of increased craft production including glass, horn, metal and principally amber (c. 270 000 items) (Stanisławski 2013:151; Adamczyk 2013:303). The development of Wolin as a true international emporium in the second half of the 10th century correlates very well with the decline of Menzlin mentioned above (cf. Callmer 1994:66), but is also visible in hoards, of which all (with the exception of problematic Wolin VIII) found within a 50km radius date from the 10th century, and – where more exact dating is available – from its second half, except Łężyca II (CatNo478), which may be a part of Łężyca I (CatNo477) dated to after 1024.

Wolin's international character and wealth originating from long-distance commercial exchange attracted the attention of the contemporary writers. Commonly identified with Wolin (e.g. Piskorski 2002:85) is 'a great city on the Surrounding Ocean' which had 'twelve gates and a harbour' encountered by Ibrahim ibn Yaqub al-Isra'ili al-Turtushi during his travels in northern Europe (Lunde and Stone 2012:166). In the 11th century the emporium was described by Thietmar as '*civitas magna Livilni*' (B6CH33).⁵⁰ Approximately 60 years later Wolin, or *Jumne* as he calls it, made a similar impression on Adam of Bremen:

[Jumne is] a most noble city, affords a very widely known trading center for the barbarians and Greeks who live round about. (...) It is truly the largest of all the cities in Europe, and there live in it Slavs and many other peoples, Greeks and barbarians. For even alien Saxons also have the right to reside there on equal terms with others, provided only that while they sojourn there they do not openly profess Christianity (B2CH22(19)).

3.3.4 Neubrandenburg

The concentration near the modern-day Neubrandenburg (Figure 3.8) comprises the earliest hoard in the case study as well as some of the latest. Unlike the previous concentrations its

⁵⁰ The generally accepted identification of Thietmar's Livilni with Wolin is based on the phonetic similarity (*Li-vilni*), and on the political situation mentioned in the chapter (Petrulevich 2009:73).

existence is much harder to pinpoint, mainly because there are no emporia or international trade centres known in the area.

One of the candidates could be a stronghold located to the east of Neubrandenburg, called Ravensburg. The large, tri-partite defended site saw small-scale investigations in 1968 and 1971, when remains of one sunken-floor building were excavated, but according to the finds inventory (Herrmann and Donat 1979a:387) they didn't appear to be particularly rich. Furthermore it is only dated until the end of the 9th century and therefore is unlikely to be associated with the later hoards. Another Neubrandenburg stronghold, called Bacherswall, located on an island in the Lieps Lake, believed to be a possible location of Rethra, the main settlement of the Redarii tribe (Hollnagel 1964:253-264) was also abandoned around the same time. The nearest stronghold that emerges after the collapse of the Neubrandenburg sites is Glienke, located c. 7km to the east, which bears evidence of trading activity with the Carolingian Empire, Norway and the East and could be a fortified seat of Redarian nobles (Messal 2005:153–160). The dendrochronology of samples taken at the site indicate that it was built after 870. No new building activity has been recorded after 957, which may indicate that the site was abandoned soon after that date (Schmidt 2002:46), but it is not clear to what degree this could be caused by, e.g. modern truncation of the uppermost archaeological strata.

The presence of strongholds, potentially representing local political centres and foci of commercial activity, could to a degree explain the presence of the concentration, although it fails to explain two 11th-century hoards. It seems, therefore, that the reasons for the abundance of hoards in the area are more complex. Given the location of hoards along Tollensee and its tributaries, maybe the explanation for the cluster should also be sought in association with a potential north-south aligned trade route linking the Baltic with the Havel basin? There are, however, two problems with this explanation. Firstly, in the 9th-1st half of the 10th century the Neubrandenburg area was almost certainly supplied in silver from the trade centre in Menzlin,

but there is little evidence that the link extended to the Havel at that time: the hoard from Ruthenberg (CatNo355) can only be dated to the 10th century and Zehdenick (CatNo349) to 10th-11th centuries, whereas the more accurately dated hoard from Barsdorf (CatNo348) is from the beginning of the 11th century. On the other hand, after the decline of Menzlin it is harder to find an entrepôt responsible for the influx of silver. In theory the old route leading via Menzlin could have been still used and extended to Wolin, but the complete absence of hoards dated to the 2nd half of the 10th and the 1st half of the 11th century between Neubrandenburg and Wolin, makes this suggestion unlikely. At the same time hoards on the Havel (including a hoard from Oranienburg, *tpq* 1002, outside the case study area) indicate that the silver was more likely to flow from the south. This seems to suggest that Neubrandenburg was more likely to be a final receiver of the silver traffic rather than a transit point benefiting from being located on a long-distance trade route. This interpretation would resonate well with the possibility of the area being the political and religious centre of Redarians.

3.3.5 Schwedt

Another concentration of Pomeranian hoards is centred to the west of present-day Schwedt, near the village of Berkholz (Figure 3.9). As in the previous case there is no obvious central place with which it could be associated. Probably the most likely candidate would be the Schwedt stronghold, located on the banks of Old Oder (Stara Odra) and dated from the turn of the 11th to the mid-12th century. The early 20th-century works undertaken by C. Ballenthin exposed a 1m thick cultural layer within the stronghold, which produced vast amounts of artefacts including stray coins, a bronze figurine of a bearded man, combs, ornaments (temple rings, neck-rings, finger-rings, armrings, brooches, belt buckles, glass, carnelian beads), weapons, scales and weights, fragments of over 600 pottery vessels (Herrmann and Donat 1979b:23-26). Despite the paucity of modern excavations the site does give an impression of an important trade, possibly political and maybe religious centre, which presumably controlled the trans-Oder traffic in the

region. The chronology of hoards forming the concentration on the western banks of the Oder correlates quite well with the chronology of the stronghold.

3.3.6 Szczecin-Stargard Szczeciński

The concentration between Wolin and Schwedt is most likely associated with two important Pomeranian sites at Szczecin and Stargard Szczeciński (Figure 3.10). Szczecin emerged as an open settlement in the second half of the 8th century associated with a possible tribal religious centre located at the summit of Wzgórze Zamkowe. By the 2nd half of the 9th century the settlement already had a regular grid of wooden roads and buildings and was surrounded by ramparts. At the beginning of the 10th century in the river valley below the stronghold arose a large settlement with a regular grid of buildings surrounded in the northern part by a rampart. New fortifications were built in the 1080s which started the heyday of Szczecin as a city republic (Łosiński 2008:31-32). According to J. Piskorski (2002:157) Szczecin possibly may not have been inferior to Wolin, although it is clear that it didn't play a major role in the long-distance trade. The development of specialised crafts in Szczecin started at a significant scale only in the 12th-13th centuries (Bogucki 2006:124-125). It was nevertheless strategically located on an important north-south route connecting Greater Poland (Wielkopolska) with the Baltic and Wolin along the Oder. Szczecin's importance in the Viking Age was most likely as a political centre established by the Ukrani tribe within the Veleti-Lutici federation, which (by the end of the 9th century according to W. Łosiński and in the 11th century according to V. Schmidt) became the centre of a separate tribal unit, and the centre of Ukrani moved to Drense (Piskorski 2002:159).

In the 1st half of the 9th century Stargard Szczeciński was an open settlement but by the mid-9th century it became a substantial stronghold surrounded by ramparts, and protected additionally by three arms of Ina River. Probably contemporaneously an open settlement developed to the south and west, and a trade/craft settlement on a separate island further west, where the Stargard hoard was found (Rogosz 1973:258). It is unlikely that Stargard played an equally

important political role as Szczecin, but it was undoubtedly located strategically at the junction of trade routes leading east-west from Szczecin to Kołobrzeg and north-south from Wolin to Pyrzyce and further to Greater Poland (Rogosz 1973:259).

3.3.7 Nętno-Płoty/Resko

In the case of two concentrations of hoards along the Rega and its tributary Stara Rega it is difficult to suggest a focal point responsible (Figure 3.11). The task may be a little easier for the southern concentration, where among a number of strongholds one clearly stands out. A settlement complex of Nętno, comprising a stronghold and two open settlements located on an island on Lake Gągnowo, lies on a route providing the shortest link between river systems of Rega and Drawa, which connect Greater Poland with the Baltic. The site has been subject to limited archaeological prospection (Olczak and Siuchniński 1966:51-58), however in 2003 the excavations which revealed remains of a wooden bridge connecting the island with the shore uncovered an elaborately ornamented spearhead (Chudziak et al. 2009:102-103, 107-108). This was undoubtedly a high-status item, which may suggest that the stronghold at Nętno was a local centre controlling the flow of silver indicated by silver hoards.

The northern part of the concentration is located in the area of strongholds at Płoty and Resko, however both sites were only investigated by fieldwalking and the results are not published. It is, therefore, impossible to draw any conclusions about their relationship with hoards, although their association with the posited trade route along Rega should not be discounted.

3.3.8 Kołobrzeg (Budzistowo)

The next concentration of hoards is located in the lower Parsęta basin, most likely focused on the stronghold and a trade centre in Budzistowo, south of Kołobrzeg (Figure 3.12). The oldest occupation within the stronghold area could be dated to the beginning of the 9th century, although it is hard to determine the nature of the settlement in that period. By the end of the

9th century the settlement was surrounded by earth and timber ramparts, presumably constructed around 878/879 (Leciejewicz and Rębkowski 2007:307). Although the date is based on dendrochronology of two planks residual in one of the later layers, it makes it possible to connect the construction of the stronghold with the collapse of an earlier tribal centre in Bardy further south (Łosiński 2008:34). Within Budzistowo stronghold there are numerous remains of buildings, the oldest dated by dendrochronology to 917. In the 980s, presumably 979 or 986, the fortifications were rebuilt using a technique characteristic for the Piast state, which indicates that by that time Kołobrzeg fell under the influence of Mieszko I (Bogucki 2006:125; Leciejewicz and Rębkowski 2007:308; Łosiński 2008:35). In 1000, the stronghold became the seat of a Piast bishopric under Reinbern. W. Łosiński (2008:78) suggests that beforehand Kołobrzeg besides being a tribal political centre was also a religious centre, which is implied by a passage in Thietmar's *Chronicon*:

He [Reinbern] destroyed the shrines of idols by burning them and purified a lake inhabited by demons, by throwing into it four rocks anointed with holy oil and sprinkling it with consecrated water (B7CH72).

From the 10th and 11th centuries come numerous artefacts indicative of a developed trade and craft production, although Kołobrzeg reached the highest level of prosperity at the end of the 11th and in the 12th century (Bogucki 2006: 125). Even the oldest layers provide strong evidence for iron, antler and amber working. The existence of long-distance contacts is confirmed by a comb with analogies in the cemetery in Birka, bronze weights, a Norwegian bronze bracelet, glass, carnelian and rock crystal beads (Leciejewicz and Rębkowski 2007:308). It is believed, therefore, that the stronghold assumed the role of a proto-urban trade and craft production centre. It seems, however, that the main source of importance and prosperity of Kołobrzeg was salt production. Thietmar refers to Kołobrzeg as *Salsa Cholbergensis*, which could indicate that its salt deposits were known in Germany. An indirect argument for the importance of salt production is the discovery in the earliest layers of the stronghold of herring bones which

comprise 93.4% of ichtiological remains, whereas in the nearby open settlements herring remains are only trace (Leciejewicz and Rębkowski 2007:307-308). This raises the possibility that Kołobrzeg was the centre of processing and preservation of herring, presumably for trade.

All these lines of evidence suggest that Kołobrzeg was a crucial regional trade centre with international connections most likely responsible for the influx of silver into the region, evident in the hoard material, probably with the only exception of a small hoard from Grzybowo (CatNo458) which predates it.

3.3.9 Słupsk

The second strongest hoard concentration in Pomerania is clearly focused on Słupsk (Figure 3.13). Despite a relative paucity of archaeological investigations, the unfinished excavations undertaken in 1965-1966 (Janocha 2004:22-23) suggest that the Słupsk stronghold was built at some point in the 9th century on an artificial mound raised on an island between arms of Słupia River. It was small, with the internal area capable of accommodating no more than 10 houses, evident as beam-slots with traces of fire damage and burnt structural daub, although no exact dating is available. The stronghold was surrounded by two open settlements. In one of them the archaeologists discovered a layer of burnt material with traces of wooden structures, nearly 2.5m thick, unfortunately undated. The recovered artefacts comprise pottery, animal bones, an 8th-century spur, an amber bead, iron arrowheads, a whetstone and a chisel, which certainly do not imply mercantile activity or long-distance contacts. This stands in stark contrast with the abundance of hoards, one of which was found just several hundred metres outside the stronghold and finds of stray Arabic coins in the area of the modern-day Słupsk. According to H. Janocha (2004:23), the stronghold was located by a ford crossing Słupia on an important trade route linking Gdańsk and Szczecin. Słupsk was, therefore, strategically located to control the east-west movement of people and goods through the region, including silver (also reflected in the layout of the hoard finds). Possibly its primary role was as a regional inland 'staging post',

located at a junction of routes linking the Baltic with Kujawy, Greater Poland and Mazovia in the interior via Słupia and Brda attested by hoards from Tuchola (CatNo388), and possibly Bielawy (CatNo403).

3.3.10 Gdańsk

Another concentration of hoards is most likely associated with Gdańsk (Figure 3.14), although the traditional concept of its origins in the 9th century and formation as a proto-urban centre in the 970s at the initiative of the early Piasts (Bogucki 2006:128; Śliwiński 2009:127-148) has been challenged by recent discoveries. New evidence (Paner 2009:64-66) indicates that the earliest settlement dwellings discovered in the area of Ratusz Głównego Miasta could be dated from 930, not the 7th-8th century as previously believed. The existence of ramparts investing the settlement based on the interpretation of a wattle structure which was meant to stabilise the face of the defensive bank, were also put into question. One of the more recent interpretations is that they represent an attempt to stabilise ground for structures dated to 1330s (Bogucki 2006:127). The interpretation of the settlement as a proto-urban centre does not seem, however, to have been challenged, although its extent was probably smaller than initially assumed (Paner 2009:65). To the north-west was another settlement, located to the south of the church of St. Nicholas, where a market was to function in 980-1140 (Bogucki 2006:127; Paner 2009:65). Probably the greatest blow to the established theories came with the new dendrochronological dating of the nearby stronghold located at the confluence of the Vistula and Motława, whose construction, dated previously to the 970s-980s, was believed to be a manifestation of the Piast control in eastern Pomerania. The 2003 re-excavation of trenches investigated in 1948-1956 by K. Jądzewski and new dating of timber samples from ramparts and the earliest buildings indicates that the stronghold cannot be dated before 1054 (Paner 2009:66). Although the political presence of Piasts in Gdańsk cannot be archaeologically proven before the mid-11th century, it is almost certain that it was in some form of dependence on

Bolesław Chrobry by 997, hence this is where St. Adalbert (Wojciech) departed from on his mission to Prussia, indicated by a note in John Canaparius' *Vita sancti Adalberti episcopi Pragensis*:

And the prince [Bolesław Chrobry] knowing his intentions, gives him [St. Wojciech] a boat and for the safety of the journey supplies it with thirty warriors. But he first came to town of Gdańsk, located on the edge of [this] vast state and touching the sea (CH27, Abgarowicz 2009, my translation from Polish).

The new chronology of the beginnings of Gdańsk settlement as a facilitator of the silver influx is corroborated by the chronology of silver deposits in the region, as none of the hoards could be dated before 942 (Gdańsk-Wrzeszcz, CatNo398).

3.3.11 Bydgoszcz

The last concentration of Pomeranian hoards lies in the area of present-day city of Bydgoszcz (Figure 3.15). Quite striking is the fact that with only one exception (Strzelce Dolne I, CatNo384) all hoards date from the 11th century, which makes it the youngest geographic group of hoards analysed here. The area is dominated by a latitudinal line of strongholds in Pawłówek, Bydgoszcz-Fordon and Bydgoszcz (located just outside of the case study area), all dated from the 1st half of the 11th century. According to S. Kalinowski (2013:111-127) these strongholds located between the Rivers Noteć and Vistula formed an extension of the so-called *limes nadnotecki*, a line of defensive settlements along the Noteć ending with the stronghold in Nakło, universally interpreted as the northern boundary of the earliest Piast state with Pomerania. The line of defended settlements between Bydgoszcz and Pawłówek is reinforced by the so-called *wały kujawskie*, a system of double ditch and bank earthworks designed to defend the area from the north and north-west (Kalinowski 2013:117). The borderland character of the area is also reflected by a very low density of contemporary settlement (Figure 3.17). Although the political affiliation of strongholds to either Pomerania or Piast state is disputed (Kalinowski 2013: 118-119), archaeological investigations suggest that besides their military function, strongholds in

Pawłówek, Bydgoszcz-Fordon and Bydgoszcz were the centres of specialised craft production and exchange evident in finds of stray coins, mercantile utensils and imports (Kalinowski 2013:117). The sites were strategically located not only for military purposes, but clearly to take advantage of important trade routes linking Gdańsk with Greater Poland and Kujawy, which is corroborated by the hoards.

3.3.12 Truso

Equally important and interesting are the areas where the hoards are all but absent even though the archaeology provides ample evidence for trade and long-distance contacts. The prime example of this situation is Wulfstan's Truso (Figure 3.16), located on Lake Drużno near the present-day village of Janów Pomorski, (Batelly 2007:48-50; Jagodziński 2010:11-12). According to the research of M. Jagodziński (2010: 98-108) Truso emerged at the beginning of the 8th century as a site of seasonal craft production (amber and horn) and trade, which was undertaken most likely directly from boats. The early finds are rare but include a variety of imported types including objects in Carolingian and Vendel styles, and a Gotlandic disc-on-bow brooch.

Between the early and mid-9th century the settlement was prepared for permanent occupation through the construction of a regular network of roads subdividing it in plots with houses, workshops, storage and livestock buildings. In this phase the international contacts with Western and Northern Europe intensified, demonstrated by finds including Badorf ware, oval brooches in Berdal and Ljones style, glass beads characteristic for the German and Scandinavian areas, but produced in Marseille and northern Italy. For the first time contacts with the Arabic world become visible through glass beads, but manifest most clearly in dirhams, which include 1065 stray coins, all dated to before 850. To this period belongs the only silver hoard from Truso, found in the remains of a boat within the so-called 'ship wrecking area' (Jagodziński 2010:134-135). Despite the development of Truso in the next phase dated until the end of the 10th century, which included the construction of harbour basins and putative defences, and lively exchange

(seen e.g. in finds of cubooctahedral weights, trefoil brooches, Scandinavian and British Isles style ornaments), there is no evidence of new coins entering Truso. This is characteristic of the 'Prussian phenomenon' noted by R. Kiersnowski (1964), who suggests that the silver economy has been rather swiftly rejected (or not reintroduced) by the Prussians after the first wave of dirhams reached the area. The reasons for this phenomenon, despite lively discussion, are not yet resolved. M. Jagodziński (2010:138) for a possible explanation refers to the Adam of Bremen's passage on the Prussians:

Gold and silver they hold in very slight esteem. They have an abundance of strange furs, the odour of which has inoculated our world with the deadly poison of pride. But these furs they regard, indeed, as dung, to our shame, I believe, for right or wrong we hanker after a martenskin robe as much as for supreme happiness. Therefore, they offer their very precious marten furs for the woollen garments called faldones (B4CH18(18)).

An intriguing and rather convincing explanation of this situation was proposed by M. Bogucki (2007:96-100). Based on his analysis of the chronological structure of coins in Truso and Prussian hoards he suggests that nearly all Oriental coins found in Prussia up to the mid-9th century passed through Truso. He argues that the emporium was founded by the Scandinavians, who introduced and operated the silver economy, since Prussians already in the Roman period used only bronze coins, not the silver denarii so prevalent in the rest of the Baltic zone. The fact that by the time of Wulfstan's description of the emporium in the 880s only Prussians are mentioned and Scandinavians are nowhere to be seen, suggests that from the mid-9th century this multi-ethnic entity was ruled by Prussians, and those who wanted to trade in Truso had to respect local customs, which used other non-silver means of exchange.

By the beginning of the 11th century the evidence of craft production and trade is no longer present in Truso, although finds of pottery dated to this time suggest that the site was still occupied (Jagodziński 2010:108). M. Bogucki (2006:132; 2007:82-83) suggests that the demise of the site as an emporium should be dated to the middle or the third quarter of the 10th century and connected to the increased presence of Piasts in the Vistula delta, who possibly destroyed

the settlement and redirected trade routes to Gdańsk. But this supposition appears to have been based on the traditional opinion that Piasts controlled Gdańsk from c. 970s. In the light of the new dendrochronological dating of the Gdańsk stronghold, there is little archaeological evidence for organised Piast presence there before the mid-11th century, although it could not be completely rejected *ex silentio*. I believe that there is little evidence for an organised 'hostile takeover' of Truso by Gdańsk in the manner of Gudfred's destruction of Reric and resettlement of its merchants to Hedeby in 808 (Brather 2003:514-515). Based on the emergence of an organised trading settlement in the 930s in Gdańsk and the chronology of hoards in its area presented above, it seems more likely that evolution of Gdańsk as a regional and long-distance trade centre in the 10th century was gradual and coincided with the gradual demise of the emporium in Truso, marked by the drop in the number of finds that could be dated to the second half of this century and later (Jagodziński 2010:106-107). The investigation of reasons for this reorientation deserves more space than is allowed by the confines of this dissertation, but I would suggest that the attested Prussian reluctance to accept precious metals as means of exchange may be the culprit. It would be a poor economic decision to reject silver in the world dominated by a silver economy, which may have pushed merchants dealing in silver into the arms of a new emporium located strategically at the mouth of the Vistula with direct links to the emerging Piast state.

3.3.13 Concentrations – brief summary

The main purpose of this section was to broadly describe the background of hoard concentrations with the aim of identifying central places, such as strongholds or emporia, which could have facilitated the influx of silver into Pomerania – after all the silver had to be made available first before it could be deposited. The analysis suggests that archaeologically verified trade centres (Ralswiek, Menzlin, Wolin, Kołobrzeg, Gdańsk) were indeed associated with hoard concentrations, including the strongest one at Wolin, although it cannot have been the sole

reason for the presence of hoards, as well-attested Truso produced only one hoard, and the concentration which could be associated with Ralswiek is the weakest of all. In both cases the written sources offer some explanation, suggesting that these sites and the associated areas operated largely outside economic systems where silver was used as the primary means of exchange. The second group of concentrations could be associated with central places in the form of strongholds, seen as political centres and presumably seats of local elites, such as Schwedt, Szczecin, Stargard Szczeciński, Słupsk and possibly Nętno. An interesting feature of this group is that there is limited archaeological evidence to firmly associate them with long-distance trade. Probably part of the problem is that all of these sites, maybe with the exception of Szczecin, were subject to limited archaeological investigations and the quality and the quantity of the material cannot be compared with well-excavated sites such as Ralswiek or Wolin. Although the potential for new discoveries of exotic goods cannot be rejected, it seems logical that their role in the redistribution of silver, which arrived through the coastal entrepôts, was secondary to their political and strategic function. Almost without exception these sites are located either at the junction of known regional trade routes (Słupsk, Szczecin, Stargard), or on these routes between watersheds (Nętno). A little more problematic is the concentration of Schwedt, as I was unable to find reference to any major trade routes with which it could be associated with. It nevertheless has one of the richest inventories of finds within the group, lies on the Old Oder and undoubtedly was well positioned to control the traffic between Wolin, Szczecin and Greater Poland. Probably in the same context we should consider a small concentration of hoards at Płoty/Resko. Although the state of the archaeological research at these two sites is insufficient to identify any central place the concentration could be associated with, it is almost equidistant to concentrations of Wolin, Kołobrzeg, Nętno and Stargard, and therefore at a point ideally placed for a junction of potential routes linking these sites. No single stronghold, despite the evidence of mercantile exchange, stands out as a single central place responsible for the concentration at the modern-day Bydgoszcz, although they seem to be

associated with the border between Pomerania and Kujawy. Probably the most problematic is the concentration of hoards near Neubrandenburg, where finding a single central place is difficult. Still, the area harbouring the Redarian political and religious centre most likely was the final destination of silver arriving from Menzlin and from the Ottonian Empire.

3.4 Context

Having considered the main factors which could be responsible for the availability of silver found in hoards, I will focus on the reasons for their deposition (and non-retrieval) starting with the information on the archaeological context in which hoards were discovered. Similarly to Gotland the task is made difficult by the fact that only for 35% of hoards analysed here (48 finds) is it possible to reconstruct the archaeological context of silver deposits from the descriptions of the circumstances of discovery. In stark opposition to Gotlandic finds, Pomeranian hoard findspots were seldom revisited by the archaeologists and made subject to metal-detector surveys or excavations. The only exception is the hoard from Kuźnica Czarnkowska (CatNo420) investigated archaeologically soon after discovery in 1988 and revisited in 2007 by M. Andrałojć, by which time all archaeological layers were destroyed. Neither investigation produced evidence of early medieval activity in a wider area (Andrałojć et. al. 2011:68-69). Overall only 5 hoards (3.7%) were discovered by archaeologists.⁵¹

3.4.1 Settlements

In Pomerania there is ample evidence for Viking-Age settlements (8291 sites, cf. Appendix A, A1.2.1) whose density map is presented in Figure 3.17. It is clear that settlements form distinctive clusters, but are also almost completely absent from a large part of eastern Pomerania and along the southern boundary along the Warta and Noteć. These areas, as well

⁵¹ CatNos: 376, 384, 419, 473, 480

as boundaries between concentrations, are presently under dense and compact cover of forests which may imply that the observed patterns may be slightly influenced by a data bias (see Chapter 3.4.9). They seem, however, to reflect the original settlement patterns since the observed settlement concentrations correspond extremely well with areas deforested before the 12th century, which were identified by a thorough reconstruction of historical forest cover in Polish Pomerania by K. Ślaski (1951:208-209). The only exception is a settlement 'hot spot' between Złotów and Wyrzysk, where the forest cover reconstructed by K. Ślaski is more intensive than in other areas with similar density of settlements.

When compared with the hoard density heat map (Figure 3.3) it is clear that there is a degree of correlation with the settlement density map (Figure 3.17) on a regional scale, mainly at Menzlin, Rügen, Neubrandenburg and Wolin, but elsewhere the correlation is far lower. Statistical comparison of the two density rasters with correlation coefficient of 0.39 is weak (Evans 1996). Unsurprisingly, no Pomeranian hoards were found within sites which could be described as ordinary rural settlements. Fifteen silver deposits (11%) found within sites with evidence of early-medieval occupation comprised four hoards discovered within strongholds,⁵² two in 'suburban' settlements outside strongholds,⁵³ two in trade centres at Truso and Ralswiek, and possibly up to seven in Wolin,⁵⁴ although here descriptions are too vague to be certain - only in the case of Wolin XXII there is concrete information to tie it with the craft and trade part of Wolin emporium at Srebrna Góra. Among these finds four were discovered within most likely contemporary buildings.⁵⁵

The overall impression, based on the available evidence, is that hoards in Pomerania are generally dissociated from open, i.e. undefended, rural settlements. It is, however, somewhat mitigated by analysis of distances from hoards to nearest settlements (Figure 3.18). The

⁵² CatNos: 384, 401, 438, 455

⁵³ CatNos: 473, 480

⁵⁴ CatNos: 440, 441, 443, 445, 446, 447, 453

⁵⁵ CatNos: 376, 384, 453, 480

discrepancy between the data based on the exact location of hoards and settlements in the German part of the case study (cf. Appendix A, A1.2.1) and the generalised locations for the entire area of Pomerania, is most likely caused by the inaccuracy of the second set of data, rather than the difference between the German and Polish parts of the study area. Regardless of which set of figures is more representative, however, the conclusion of this statistic is the same: although none of the Pomeranian hoards was found within the contemporary rural settlements, the majority, between 57% and 70%, were deposited within 2km. These results correspond well with the Gotlandic situation, which could imply that Pomeranian hoards were deposited in association with the productive landscape of rural settlements and were still relatively accessible, although certainly less so than on Gotland.

3.4.2 Strongholds

In Pomerania strongholds are a ubiquitous feature of the Viking Age, and in the time frames discussed in this work, generally are relatively small with an average internal area of 0.3ha, defended by a combination of ditches, banks and/or timber structures. Despite a long history of research on Pomeranian strongholds beginning already in the early 19th century,⁵⁶ an overwhelming majority of sites - if investigated archaeologically at all - were only subject to fieldwalking, borehole sampling or limited trial trenching (cf. Olczak and Siuchniński 1966, 1968, 1970, 1976, 1985, 1989; Herrmann and Donat 1973, 1979a, 1979b; Chudziak et al. 2009). Just a handful were subject to open-area excavations. This inadequate state of research poses problems for the interpretation of the function of strongholds, whether they functioned as refuges or were inhabited permanently and played a role of political and possibly economic centres. Where more detailed investigations have been undertaken, cultural layers and often

⁵⁶ A summary of this early period of investigation was published in the fundamental work of W. Łęga (1930:295-327).

structural remains of houses are usually present, which would suggest that the second interpretation is more adequate for Viking-Age Pomerania.

Although the available data may be short on detail, the large number of these sites (459) allows for some more general conclusions to be drawn. The comparison of the density of stronghold sites and hoard findspots (Figure 3.19) shows an even lower correlation (coefficient 0.35) than in the case of rural settlements.⁵⁷ This, however should not come as a surprise when we consider that strongholds were most likely regional or local focal points of political and possibly economic structures, underlined by their defensive character, designed to protect the inhabitants and/or provide refuge for the nearby population in times of conflict and political unrest. More informative is the analysis of distances between hoard findspots and the nearest strongholds. Although nearly a half of hoard findspots was located over 5km from the nearest stronghold, within the relative proximity of strongholds (up to c. 3km) the proportion of hoards gradually decreases the further from a stronghold they are found (Figure 3.20). This relationship becomes even stronger when we compare it with distances between strongholds and open settlements: whereas 17% of hoards were found within 500m from a stronghold (or 36% within 2km), only 3 % of settlements are known within the same distance (17% within 2km). The tendency for over a third (36%) of Pomeranian hoards to be deposited within a relative proximity of strongholds could support the interpretation of these sites as playing a role in redistribution of silver across Pomerania.

Pomerania is the only case study with plentiful evidence for Viking-Age defended sites. Borg in Birka and Torsburgen on Gotland are the solitary archaeologically confirmed contemporary defended sites in their respective case studies. It is a very interesting situation since FMIS records in Svealand and Gotland 704 strongholds dated mainly to the Migration Period, but

⁵⁷ I include here Wolin, Kołobrzeg and Gdańsk, which despite their function as international or regional centres of trade with international links, boasted formidable defences designed to protect the inhabitants (although jury is still out on Gdańsk). Even when removed from the statistic, the proportions, albeit less pronounced for the 0-500m distance, still present the same pattern as described above.

some still being used and constructed until the mid-7th century. It is believed that only a minor part of these sites were actual fortifications – the majority ‘should be seen as symbolically important features in the landscape, demonstrating military power and authority as well as political and economic power’ (Hedenstierna-Jonson 2009:95). The reasons for the abandonment of strongholds in the Viking Age are not satisfactorily explained. But it is believed that after the Migration Period Scandinavia entered a state of a low-intensity institutionalised form of ‘endemic’ warfare emphasising ritual and display with riding and skirmishing as dominant tactics (Hedenstierna-Jonson 2009:95-96). These changes meant that building of permanent defences was no longer required, although fighting undoubtedly still took place, including the attacking and burning of halls (Hedenstierna-Jonson et al. 2013:288). In light of this interpretation, the abundance of strongholds in Pomerania, whose defensive qualities regardless of their political or symbolic function must be recognised, can be taken as evidence of large-scale and frequent warfare, which is supported by contemporary written sources and archaeology.

3.4.3 Burials and cemeteries

Cemeteries in early-medieval Pomerania are rare and for a long time the area was believed to have been dominated by burial rites which left no remains identifiable archaeologically and sporadic cemeteries from this period were associated with Scandinavians in the context of multiethnic trading settlements (Zoll-Adamikowa 1979:219). More recent research, particularly the new chronology of Alt Kābelich-Neuenkirchen type burials has shown that they can be dated as early as the 9th, possibly even 2nd half of the 8th century, although the majority were still formed in the 10th century (Łosiński 2008:51-54). The new dating posed a question whether this type of burials is in fact inherently Slavic rather than influenced by Scandinavians, and the discussion is still open. In the 9th century, besides barrow burials associated with Scandinavians, the first mound cemeteries associated with indigenous Slavonic populations emerged in

northern Germany and along the Baltic coast. Construction techniques were deemed more characteristic for the southern groups of Western Slavs, and became the most popular burial form among the Pomeranian Slavs in the 11th and 12th centuries. It seems, therefore, that at the latest from c. 800, Pomerania had three burial traditions (Łosiński 2008:53-54): Scandinavian (flat and barrow burials associated with international trade centres), indigenous Slavic (Alt Käbelich type burials) and Slavic but alien forms of southern origin (barrow cemeteries of Dolice type).

I was able to identify within the period in question only 165 cemeteries in Pomerania, which even despite the new research shows how rare they are, particularly when compared to the abundance of settlements. The density heat map of cemetery distribution indicates a dissociation of Pomeranian hoards and Viking-Age cemeteries with the correlation coefficient of both datasets is only 0.34 (Figure 3.21). The comparison of distances between hoards and contemporary cemeteries indicates no meaningful relationship (Figure 3.22). In fact, only 2 deposits,⁵⁸ i.e. 1.5%, could be associated with contemporary burial grounds, although the association of Wolin XI is only based on an unverified information that it was found in the area of Wzgórze Wisielców (Kiersnowscy 1959:121), where a barrow cemetery used in the 9th and 10th centuries was located. Up to three more hoards (further 2%) were discovered in burials or cemeteries dating to earlier periods.⁵⁹ Deposits from Kania and Noskowo-Bzowo were discovered in prehistoric megalithic tombs whilst Gdańsk I was probably found in the area of a cemetery belonging to Pomeranian culture, dated to 7th-3rd centuries BC (Kiersnowscy 1959:41, 55, 76).

The deposition of silver in the context of burials was in Pomerania a very sporadic affair. Although a ritual character of such deposition or at least the potential for a spiritual protection

⁵⁸ CatNos: 348, 448

⁵⁹ CatNos: 386, 395, 470

of hoards intended for retrieval should not be discounted completely, there is no information in the written sources which would allow for parallels with the Norse ancestral cults to be made. Furthermore, only with a single possible exception of Gdańsk I, associated with a Pomeranian-culture cemetery (which are usually flat), the remaining five hoards were deposited within barrows and megalithic tombs, which may have easily served as markers facilitating retrieval of silver. I will return to this issue in Chapter 3.6.2.

3.4.5 Watery environment

A small group of 4 containerless deposits⁶⁰ (3%) was found in waterlogged terrain during peat extraction in the 19th century. Placement of silver in terrain which made the retrieval difficult if not impossible, and intentionally irreversible through the lack of containers are strong indicators for association with a ritual or symbolic behaviour (cf. Chapter 2.4.5). The evidence for the veneration of the watery environment in the Slavic context may be rare, but it is confirmed by the contemporary Thietmar (B1CH3) who described a sacred spring Glomuzi (present-day Lommatzsch) used for divination by the local Dalemnici (Glomaci) tribe.

3.4.6 Markers, landmarks and boundaries

A relatively large proportion of Pomeranian hoards were found near large stones (10 or c. 7%)⁶¹ and at topographic landmarks comprising almost invariably more or less discrete hills (also 10 or 7%),⁶² including one deposition at the mouth of a small gulley separating two hillocks.⁶³ As discussed in the Gotlandic chapter, deposits associated with stone and landscape markers may have been linked to symbolic practices associated with establishing, renewing and magical protection of boundaries. But it is equally possible (and as we will see more likely in Pomerania)

⁶⁰ CatNos: 370, 403, 421, 458

⁶¹ CatNos: 352, 354, 358, 366, 399, 408, 417, 454, 462, 476

⁶² CatNos: 363, 371, 372, 387, 413, 424, 429, 430, 457, 459

⁶³ CatNo413

that such characteristic features were useful, when the owner(s) intended to retrieve silver, particularly if it was deposited in a less familiar landscape. Indeed, when overlain on the settlement density heatmap, stone and landscape marker hoards are almost invariably located at the edges of settlement concentrations in borderlands between densely settled areas (Figure 3.23).

This brings us to an interesting observation which could be made in the earlier comparison of distances from hoards to Pomeranian strongholds. Figure 3.20 shows that after the gradual decrease, the proportion of hoards rises again at distances over 3km from the nearest stronghold, particularly at c. 3.5, which is quite close to the average distance between two nearest strongholds (at c. 6.4km). It appears, therefore, that a relatively significant proportion of Pomeranian hoards may have been located mid-way between neighbouring strongholds. This more or less equidistant zone could in turn be interpreted as a boundary of a hypothetical 'territory' of a stronghold. I realise that this is an arbitrary term, which implies more cohesiveness than may have been the case. Nevertheless, defining territories which mark the spatial extent of an area of influence – of a stronghold in this case - in such a way, is a basic concept of spatial reasoning in current analytical archaeology (Ducke and Kroefges 2008:245; Nakoinz 2010:252). Moreover, in the interpretation of C. Lübke (2001:385) such stronghold territories could correspond with the *Bavarian Geographer's* term *civitates*, which 'should be considered as units of settlement, to which belonged a stronghold as major topographical and strategic element.' Unfortunately, the existing historical and archaeological data is neither sufficient nor detailed enough to reconstruct the actual extent of territories of each of the 459 strongholds.

In order to test my hypothesis I calculated theoretical stronghold territories using a method described in Appendix A (A2.6), whose results are presented in Figure 3.24. Naturally I am aware that the modelled boundaries may differ from the true territories of Pomeranian *civitates* in

Lübke's definition, since they are geometric representations of all points which have the same distance to the nearest strongholds under the assumption of contemporaneity and equal 'weight' or importance of all strongholds. Nevertheless, the calculations are firmly based on local topography and hydrography whose features were and still are of crucial importance to the formation of boundaries, and in the absence of detailed archaeological data, if treated with due caution, have the potential to give new insights into hoarding habits and patterns in Pomerania.

The comparison of distances from hoards to such topographically weighted-geometric boundaries between stronghold territories (Figure 3.25) creates a very interesting picture: 49% of Pomeranian hoards were located within 1km of the modelled stronghold boundaries. In this case again the discrepancy between hoards and settlements is significant: only 35% of rural settlements were found within the same distance. The difference is even more pronounced at the lowest distance band within the immediate vicinity of boundaries where proportionally nearly twice as many hoards are found (32% hoards versus 17% settlements). To this group, however, belong a number of hoards found within trade centres, strongholds and their suburbia, which I believe should take priority over proximity to a boundary. Once excluded, the proportion of hoards which could be still associated with boundaries drops to 42% within 1km (26% within 500m), but still remains significant. Interestingly, the observed correlation is even more pronounced for hoards deposited in association with stone markers and particularly landmarks, which on average are located much closer to the modelled boundaries (median distance c. 0.6km) than the remaining deposits (1.1km). Along with other arguments raised in this section and in the Gotlandic chapter this result may confirm the validity of the boundary calculations.

3.4.7 Proximity to waterways

Unlike Gotland, Pomerania is covered by a dense network of rivers and post-glacial lakes, which acted as obstacles as well as facilitators of transport. The latter function is particularly important in Viking-Age Pomerania where no formalised roads existed and the forest cover in the 10th-11th

centuries reached c. 65% (Ślaski 1951:209). The comparison of distances to nearest lakes and rivers (Figure 3.26) indicates that open settlements and hoards both tend to be located near sources of water, with settlements being located generally closer: c. 46% of hoards and c. 58% of settlements were found within 1km of lakes and rivers. However, when we consider only the major rivers (scoring 4 and more in Strahler classification), which are more likely to have served as thoroughfares for transport and trade, the picture is quite different (Figure 3.27). Although the majority of both hoards and settlements were located at distances over 5km, proportionately nearly twice as many hoards as rural settlements were located within 1km of major rivers (17% and 10% respectively), and the difference is particularly clear in the lowest distance band (13% vs 5%). There is, therefore, an observable relationship between hoards and major rivers, whereas settlements quite clearly tend to avoid them. Large rivers, able to accommodate larger fleets of larger ships, made nearby settlements more vulnerable to waterborne attacks and raids. M. Jankowiak (pers. comm.) observed that dangers also faced those who were travelling on rivers: chances for escape were slim when met with a hostile fleet, and often the only option was a fight for survival, as the following passage from *Yngvar's Saga* may illustrate:

He sailed up-river (...) Then late in the summer they saw a large number of boats coming towards them, round-shaped, with oars all around gunwales and making straight for Yngvar's fleet: so, since they were going as fast as a flying bird, he had no choice to wait for them (CH5, Palsson and Edwards 1989).

According to Jankowiak (pers. comm.), strong political control was necessary to secure traffic on large rivers, if they were to be utilised as major arteries of mercantile traffic, although potential dangers were unlikely to stop some of the more adventurous types such as Yngvar. The archaeological evidence seems to support Jankowiak's hypothesis. When a more secure and narrow dating is available for rural settlements located within 1km of large rivers, 24 can be dated to the 9th, 28 to the 10th, but 67 to the 11th century. A similar pattern persists in the case of well-dated hoards: only 8 hoards dated to before 980 were found within a 1km of major rivers,

as opposed to 17 deposited after that date. In this context the northerly expansion of the Piast principality and to a lesser degree the general decrease in hostilities with the Ottonian empire after the Polabian Slav uprising of 983 would be the most likely factors facilitating the control and security of major rivers and associated trade routes. The likely connection of this group of hoards with mercantile activities could be strengthened by the fact that many of them were discovered at or near known places of trade: Wolin, Kołobrzeg-Budzistowo, Stargard Szczeciński and Słupsk.

3.4.8 Soils

As we have seen on Gotland, the deposition of hoards within certain soil types indicated that silver deposits 'colonised' marginal sandy substrata more vigorously than Viking-Age settlements. In a similar way in Pomerania I analysed the relationship of 755 settlements from the Roman Iron Age, 8291 Viking Age rural settlements and 136 hoards with the main types of soils (Table 3.3; cf. Appendix A, A1.2.1 and A1.2.3).

Unfortunately, due to the low accuracy of the geological data from Poland available to me I was only able to divide them into categories of 'moraine', 'sandy' and 'other' soils. The more holistic approach undertaken on Gotland, based on exact soil types and resulting in a well-informed division into traditional and marginal soils, was unfortunately impossible to carry out successfully in Pomerania. Nevertheless, just as the initial analysis on Gotland (cf. Table 2.5) the comparison in Pomerania shows that moraine soils may be considered as more traditional since they were clearly preferred by settlements in the Roman Iron Age, whereas the preference for sandy soils increased in the Viking Age. The 6-percentage-point increase in the proportion of settlements in sandy soils is almost completely offset by a 5-percentage-point decrease in moraine soils, which suggests a shift of settlement towards previously more marginal lands, although on a scale smaller than on Gotland. Nevertheless moraine soils remained the preferred

location of settlements in the Viking Age. With regard to silver deposits the preference for sandy soils is clear, particularly so in the case of hoards whose exact location is known.

	Moraine			Sand			Percentage difference in density (moraine/sand)
	area/ number	proportion	density/ 100km ²	area/ number	proportion	density/ 100km ²	
Soils							
	29820km ²	44%		28983km ²	43%		
Settlements							
Roman Iron Age	435	58%	1.46	230	30%	0.79	60%
Viking Age	4361	53%	14.62	2975	36%	10.26	35%
Hoards							
Viking-Age hoards (all)	54	40%	0.18	58	43%	0.20	11%
Viking-Age hoards (detailed and exact location)	25	36%	0.08	33	48%	0.11	32%

Table 3.3 Comparison of association of site/find types and main soil types in Pomerania.

These results are even more pronounced once converted to density per 100km². The density of Pomeranian hoards in more marginal sandy soils measured as a percentage difference is up to 32% higher (well-located deposits) than in traditionally used moraine soils. On the other hand, the density of Pomeranian Viking-Age settlements on moraine soils was 35% higher than on sandy soils. This corresponds to the results of analogous analysis on Gotland (Table 2.5) where settlement density is c. 25% higher on moraine than on sandy soils. It is, therefore, not impossible that if only the geological data allowed for reclassification of Pomeranian soils grouped presently as 'other', the results may be similar to those observed in Gotlandic traditional and marginal soils. The available data, such as it is, shows nevertheless that the

process of colonisation of better draining and previously marginal sandy soils in Pomerania was similar to Gotland and in a sense also 'spearheaded' by hoards.

3.4.9 Modern land use, and data bias

As we have seen, hoards are known from a relatively small proportion of Pomerania. It could be argued that the observed concentrations may simply be due to the fact that in these areas the impact from farming on the archaeological deposits was greatest and therefore produced the highest concentrations of finds. After all in Gotland over 86% of the analysed hoards were discovered in areas of modern intensive farming. This potential data bias is harder to quantify in Pomerania, where only 44% of deposits were discovered within the context of modern agricultural landscape, but 39% were located within areas of modern urban fabric and infrastructure. This makes the determination of the nature of land use at the time of discovery, mostly before the end of the 19th century (26% of hoards) before the modern 'urban sprawl' took place, more difficult. It is possible that the observed concentrations could be influenced by the data bias resulting from the agricultural works and/or urban growth. But this certainly does not mean that the observed patterns are the sole result of a data bias. If this was the case, one would expect similar patterns across all categories of archaeological sites, which is not the case in Pomerania. A simple comparison of hoards and rural settlements shows significant differences: where 46% of hoards were found in modern agricultural areas and 17% in forests, between 72% and 84% of rural settlements (depending on the accuracy of their location) were discovered within areas of modern agriculture and only 4% within forests.

3.5 Regression analysis

To determine the combination of variables best explaining factors behind observed spatial patterns of hoard deposition in Pomerania I used the same regression method as in Gotland (cf. Appendix A, A2.4). The dependent variable (i.e. density of hoards) was analysed in a model space

defined by 95 hexagonal polygons with a diagonal of 40km, which corresponds to the 22km-search radius used in the kernel density estimation. The tested explanatory variables included:

- distance from the nearest boundary of Viking Age stronghold territory (brydist);
- number of Viking-Age strongholds (strcount);
- distance from the nearest Viking-Age stronghold (strdistC);
- number of Viking-Age settlements (setcount);
- distance from the nearest Viking-Age settlement (setdistC);
- number of Viking-Age cemeteries (burcount);
- distance from the nearest Viking-Age cemetery (burdistC);
- number of Viking-Age emporia (empcount)
- distance from the nearest Viking-Age emporium (empdist);
- distance from the nearest Viking-Age central place (ncpdist) as defined at the beginning of the chapter, including emporia of Wolin and Truso, trade centres of Ralswiek, Menzlin, Kołobrzeg-Budzistowo, as well as sites of strongholds with archaeological evidence for high-status position, trade and/or specialised craft production: Słupsk, Bydgoszcz (centred on stronghold of Bydgoszcz-Fordon), Nętno, Glienke, Schwedt, Szczecin and Stargard Szczeciński;
- number of Viking-Age central places (ncpcount);
- distance from the nearest major river (rmdistC);
- distance from the nearest body of water (any river or lake) (radistC);
- distance from the coastline (coadistS);
- area under modern agriculture (agriarea);
- area under urban development and infrastructure (urbareaC);
- area under modern extent of forests (forestarea);
- area of moraine soils (morarea);

- area of sandy soils (sandareaS); and
- categorical variable describing whether a hexagon is associated with the coastline (coastal).

• Model Pomerania (mod40.2) equation: •					
glm(formula = hoardno ~ strdistC + brydist + rmdistC + setcount + (ncpdist + sandareaS) * coastal, family = poisson, data = hex40a)					
Deviance Residuals:					
Min	1 st quartile	Median	3 rd quartile	Max	
-2.1227	-0.7956	-0.1424	0.4872	1.8022	
Coefficients:					
	Estimate	Std. Error	z value	Pr(> z)	
(Intercept)	2.301708	0.741441	3.104	0.00191	**
strdistC	-0.929499	0.261559	-3.554	0.00038	***
brydist	-0.196363	0.066673	-2.945	0.00323	**
rmdistC	-0.362424	0.159898	-2.267	0.02342	*
setcount	0.002272	0.000879	2.584	0.00976	**
ncpdist	-0.015375	0.005827	-2.638	0.00833	**
sandareaS	0.047223	0.023428	2.016	0.04383	*
coastal	2.976497	1.027126	2.898	0.00376	**
ncpdist:coastal	-0.048797	0.014684	-3.323	0.00089	***
sandareaS:coastal	-0.091392	0.052929	-1.727	0.08422	.
Significance codes: '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1					
(Dispersion parameter for Poisson family taken to be 1)					
Null deviance: 253.831 on 94 degrees of freedom					
Residual deviance: 80.651 on 85 degrees of freedom					
AIC (Akaike information criterion): 237.76					
Pearson's chi-squared test (χ^2): 0.6133409					

Table 3.4 Summary of the Pomeranian GLM regression model calculated in RStudio

The calculations based on the above variables produced a series of fitting models, with the most successful summarised in Table 3.4. The model comprised a set of statistically highly significant explanatory variables, with significance well below 0.1, which means that their confidence level ranged from over 90% to nearly 100%. The AIC score of 253.83 was the lowest of all tested models, and indicates a good relative quality of the model for a given set of data. The Pearson's chi-squared test (χ^2) returned p-value of 0.61, meaning that the model is correctly specified. In the half normal plot (Figure 3.28) the simulated envelopes contain all of the absolute Pearson residuals, which confirms that the model is correctly specified and no significant outliers are present. Finally, the results of the Moran's I analysis on the model's Pearson residuals indicate that the model is correctly specified in the spatial sense (Figure 3.29).

The model confirms the results of spatial and contextual analysis discussed above. The first important conclusion is that variables describing the extent of modern agriculture and urbanisation proved not to be statistically significant. Meaning that the potential bias discussed above had no statistically significant influence on the observed hoard concentrations. The model suggests that the formation and intensity of hoard concentrations is statistically most significantly influenced by proximity to strongholds (strdistC). Strongholds were major topographic and strategic elements in the landscape, centres of political power, important and convenient milestones at regional trade routes, particularly when considering them in the context of slave trade. Human merchandise, albeit self-propelled, would require a considerable amount of provisions in order to keep them in a good condition so that they could fetch suitably high prices. Strongholds were capable of offering political control and relative stability which facilitated mercantile activity. They were also most likely target markets for luxury goods coveted by the upper echelons of society, but probably not exclusively. Strongholds' important role in the redistribution of silver would not be possible without central places associated with long-distance trade (ncpdist) and particularly the coastal entrepôts (ncpdist:coastal) whose statistical significance for formation of hoard concentrations is an order of magnitude greater

than their inland equivalents. In this context proximity to major rivers (rmdistC) should most likely be perceived as an indicator of trade routes facilitating movements of people and goods including silver. The model shows that silver concentrations were not confined exclusively to strongholds and central places. Although it suggests no association between hoard concentrations and proximity to settlements, silver deposits were clearly not buried in utter wilderness judging by a high significance of a variable corresponding to areas with high density of contemporary settlement (setcount). This confirms the results of D. Wehner's (2010:263) research undertaken in the hinterland of Wolin, who suggested that while rural populations did participate in local trade with central places, however the benefits from long-distance connections were marginal. At the same time, the model confirms an earlier observation that hoard concentrations were influenced by proximity to the modelled boundaries of stronghold territories (brydist). The reasons for this relationship are at this stage not immediately obvious but will become clearer in the next chapter (3.6.2), when the weight/container classification of hoards is applied. The model also highlights correlation between hoard concentrations and areas of marginal sandy soils (sandareaS), particularly inland (the negative sign of the sandareaS:coastal coefficient). Finally, the high statistical significance of the categorical explanatory variable for areas located near the coastline (coastal) indicates that the likelihood of hoard concentrations is nearly three times higher to occur within on average c. 30km distance from the Baltic coast than elsewhere in the case study, mainly because of proximity to the coastal trade centres.

3.6 Reasons for (non-)retrieval of silver

3.6.1 'No data' hoards, soil chemistry and silver weight

In stark contrast to Gotland, nearly a half of Pomeranian hoards (48%) was reportedly deposited in containers, predominantly pottery but also organic and suspected organic. A rather unique

Pomeranian feature is that in a number of finds deposited in pottery receptacles the silver was additionally protected by cloth, leather fragments, or birch bark (6%),⁶⁴ and sometimes covered by ceramic lids or upturned vessels (3%),⁶⁵ or both.⁶⁶ For a further 3% of hoards there is sufficient information to establish that they were deposited without any kind of container. This leaves c. 49% of hoards which have no information if any kind of container was present (Figure 3.30).

Container type	Mean pH	Mean TAWC
All finds	5.726	54.682
Organic	5.583	58.935
Suspected organic	5.912	50.976
Pottery	5.697	54.260
None	5.749	56.260
No data	5.699	56.407

Table 3.5 Comparison of soil chemistry in Pomeranian hoards grouped by the type of a container

The comparison of pH and TAWC in different categories of hoards with the overall mean of all deposits (Table 3.5) confirms the results observed in Gotland: hoards found in organic containers were discovered in relatively more humid and acidic soils whereas hoards in which a container was not recorded at the time of discovery, but its presence can be suspected were discovered in the least acidic and driest soils. One has to be aware, however, that the statistic for suspected organic container hoards is based on just two deposits⁶⁷ and should be treated with caution. Following the method described in the Gotlandic chapter (2.7.1), by applying the respective soil chemistry cut-off values to the 'No data' category, it transpires that just 6 Pomeranian hoards (4% of all hoards or 9% of 'No data') may have originally been deposited in containers (Figure 3.31). This result provides another piece of evidence that the majority hoards for which there is no information about the presence or absence of a container, were not originally contained.

⁶⁴ CatNos: 366, 386, 401, 404, 429, 457, 476, 480

⁶⁵ CatNos: 372, 399, 439, 474

⁶⁶ CatNo459

⁶⁷ CatNos: 419, 473

When we look at the chronological structure of Pomeranian hoards expressed as a proportion of all hoard discoveries by quarter-century, and if we leave out finds discovered after 2000 when the sample is very small (just 2 finds), there is an indication that from the last quarter of the 19th century the proportion of 'No data' hoards is generally lower than the median average proportion. When we apply a 95% confidence level to the calculated median⁶⁸ it transpires that only in the discoveries made before 1800 and in the period 1850-1874 is the difference statistically significant (Figure 3.32) but in the latter period it doesn't exceed 3%. Furthermore, the proportion of hoards found in containers in the last quarter of the 19th century, when the presence of containers was rarely on the agenda of antiquarians reporting the discoveries, is higher than at any point in the 20th century when archaeologists had become increasingly involved in the discoveries (Figure 3.33). Moreover, even the earliest finds, if found in containers, were reported as such, e.g. the discovery of a hoard from Gdańsk (I, CatNo395) in 1591 or Wolin (IV, CatNo441) in 1670. Also the statistical comparison of silver weight distribution (Figure 3.34; cf. Appendix A, A2.5) clearly shows far closer similarity between interquartile ranges of 'No data' and 'None' category, rather than contained hoards, although admittedly the difference is less pronounced than on Gotland – most likely due to the far smaller size of the sample. These lines of evidence, I believe, strengthen my hypothesis proposed for Gotlandic hoards that the majority of deposits from the 'No data' group, except those reclassified as a result of the soil chemistry analysis, were deposited without a receptacle and without the aim of retrieval.

Cross-referencing of the weight of silver with the data on the presence/absence of containers, including hoards reclassified by the soil chemistry analysis, produced statistics which are strikingly similar to those achieved for Gotland (Figure 3.35): smaller hoards are significantly more likely to be deposited without containers whereas larger hoards were more often

⁶⁸ 10-year median was used instead of 25-year to increase the accuracy of calculations and reduce the spread of confidence interval (cf. footnote 43 in Chapter 2.7.1).

discovered in containers. The Pomeranian 'tipping point' falls at approximately 250g, which is significantly lower than 600g in Gotland, and does reflect the generally smaller size of Pomeranian hoards,⁶⁹ which presumably represent differences in accessibility of silver and hoarding behaviour. It is not impossible that weights of the Pomeranian hoards are reflecting Slavic legal/weight systems similar to those observed in Gotland, but unfortunately no comparable evidence in the written sources exists to take this suggestion further.

3.6.2 Discussion

The comparison of Pomeranian hoards in each major contextual category with regard to criteria of weight and the presence/absence of a container (Figure 3.36)⁷⁰ immediately shows a stark contrast with Gotland: in Pomerania placed deposits are relatively rare and only dominate the deposition in the watery environment where curiously the structure is identical to Gotland. I believe, this result provides further confirmation for my suggestion that small containerless deposits can be perceived as associated with symbolic and ritual practices and placement of silver without intention of retrieval.

Despite the lack of evidence for hoarding within rural settlements in Pomerania, 15 and potentially even 21 (the remainder of Wolin hoards), that is between 11% and 15% of Pomeranian silver deposits were found within contemporary strongholds and trade centres, where they are clearly dominated by contained deposits. Contrary to Gotland, these are not large contained savings hoards, but belong to the smaller variety, tentatively labelled as emergency deposits in the Gotlandic chapter. The Pomeranian group of hoards allows me to deliver on my promise and provide archaeological evidence to support this claim. In the present case study overall 23 hoards were located within or in close proximity (1km) to 15 strongholds.

⁶⁹ Median weight of a Pomeranian hoard is 160g as opposed to 339g in Gotland.

⁷⁰ Again, the relatively small size of samples in each interpretative group may influence the results of the analysis.

Despite the relatively limited amount of archaeological investigations at strongholds, in a number of cases the data is sufficient to establish a link between dramatic events recorded at those sites and hoards, which I will discuss now in some detail.

The best example of such association is the hoard from Strzelce Dolne (CatNo384), recovered during archaeological investigations of a stronghold at a depth of 1.5m in a pottery vessel placed below burnt remains of a wooden building near ramparts. The hoard is clearly associated with a dramatic event, and its *tpq* 800 corresponds with the earliest phase of the stronghold dated by pottery to the ceramic phase C (800-950, Hilczerówna 1967).

A similar link can be established for Dargocice hoard *tpq* 1002 (CatNo457) deposited on a prominent hill some 400m away from a stronghold. Trial trenching undertaken in 1967 (Łosiński, Olczak and Siuchniński 1970:53-58) exposed a thin (6-10cm) cultural layer with evidence of burning in one of the trenches and pottery suggesting that the site was abandoned at the beginning of the 11th century, which corresponds well with the *tpq* of the hoard.

Although 16 hoards were discovered in Wolin and its vicinity, dating of only 5 deposits is accurate enough for comparison with the archaeological discoveries, and in three cases a more or less direct link can be made. There is no archaeological evidence of major destruction episodes in Wolin, but a number of hoards could be associated with major investments in defensive infrastructure of the emporium. A small hoard Wolin IV *tpq* 909 (CatNo441) discovered on Srebrne Wzgórze may correlate with the construction of a palisade there, contemporary with a massive palisaded bank raised around the main part of the emporium in Stare Miasto dated by dendrochronology to 903(+8/-3). The construction would have required over 5000 one-hundred-year-old oaks from an area of almost 40ha (Stanisławski 2013:102-104). It seems reasonable to expect that such an enormous task was undertaken in response to some perceivable danger, which may have resulted in the unclaimed silver deposit. Little is known about Wolin XII from the second half of the 10th century (CatNo449) discovered in the vicinity of

the town, but it is probably associated with the remodelling of the defences in the main part of the emporium dated to 3rd quarter of the 10th century (Stanisławski 2013:104). Wolin XXII found on Srebrne Wzgórze *tpq* 982 (CatNo453) is contemporary with the final phase of the emporium's defences built in a technique characteristic of the Piast state, dated to the last quarter of the 10th century. The possibility of a volatile political situation in this period, dominated by the great Slav uprising in which Wolinians may well have participated as allies of the Lutici, who certainly had no love for the Piasts (*WoC* B3CH19; *ToM* B6CH33; cf. 3.1.2), is further attested by the influx of Scandinavian artefacts and people (Stanisławski 2013:293-294), as well as literary evidence that the emporium found itself under the political control of the Danish state (Morawiec 2010:151).

More problematic is the correlation of Stargard Szczeciński hoard *tpq* 1050 (CatNo473), excavated just outside a stronghold within a craft and trade suburban settlement. The archaeological excavations within the stronghold indicate that its ramparts were destroyed and rebuilt at least four times, in two cases following intensive fire damage (layers VII and V). Unfortunately Rogosz (1973:238-243) provides only broad dating of layers from the 9th (layer IX) to the end of the 12th (layer III) century, but it can be concluded that the hoard dated to the mid-11th century would be contemporary with layer V, i.e. the layer in which the intensive destruction of ramparts was recorded. Furthermore, the hoard was found in layers overlying the suburban settlement, where structural remains were no longer present, and within an area of intensive burning, which the excavator interpreted as associated with smithing. However, in my opinion the deposition of silver, which itself bore the evidence of fire damage, was related to a dramatic event alluded to by the recorded destruction of ramparts and the apparent disappearance of the organised settlement.

A somewhat less direct connection between hoarding and dramatic events can be seen in Kamień Pomorski, where a hoard with *tpq* 980 (CatNo437) was found within an important

regional stronghold and is coeval with layer VIII dated to the 10th century, where a dense grid of buildings situated along the ramparts was excavated. In the next layer dated to the 1st half of the 11th century the gridded pattern disappears (Filipowiak 1962:91-92). It is in my opinion probable that the hoard, found just outside the stronghold, may be linked to this rather significant change, which corresponds with the arrival of Scandinavian artefacts such as a rune-inscribed bone (*fup* and *kur*) and a vessel made from a Norwegian soapstone discovered in cultural layers (Bogucki 2012:96).

Overall out of these 7 hoards which could be associated with events of destruction and/or remodelling of defences of nearby strongholds, one falls into the grey area category (CatNo449; cf. Chapter 6.2.3), one could be considered abandoned savings (CatNo457), but 5 (70% of the group) were small contained deposits, which I believe provides strong evidence for interpreting this container/weight category as emergency hoards.

The next category of deposits found in the context of earlier burials, which in Gotland was strongly associated with placed deposits, in Pomerania is intriguingly dominated by contained hoards. A similar, but even more pronounced pattern is the case of deposits found at stone or landscape markers, which are composed almost exclusively of savings hoards. There appears to be little evidence, therefore, for use of such places in Pomerania in association with ritual establishing and reinforcement of boundaries. Nevertheless, these hoards were found in close proximity to the modelled boundaries of stronghold territories, on average (median) 0.9km away, but relatively far from nearest rural settlements (1.3km) and certainly away from strongholds (4.6km). In a word, they appear to be focused in areas which can be considered as marginal. Such a location is certainly not very convenient for a regular access, which suggests that savings hoards in Pomerania were revisited less frequently than in Gotland, especially since no hoards are known from within Pomeranian rural settlements. Pomeranian savings hoards were located twice as far from contemporary settlements as Gotlandic finds (1.6 vs 0.8km),

which is particularly conspicuous considering that only c. 11% of Gotlandic Viking-Age settlements are known.

So how to explain this difference? Whereas for Gotland there is very little evidence for conflict in archaeological and written sources, in Pomerania they indicate almost continuous state of warfare, weaponry is present not only in burials, but also in the investigated ubiquitous strongholds whose military function cannot be ignored. All these points suggest that the Viking Age in Pomerania meant volatile and unsettled times, which would have increased the likelihood of owners being unable to reclaim hoards which were otherwise intended to be retrieved. A passage describing this situation in a very evocative way can be found in Helmold's *Chronica*:

As soon as the tumult of war sounds, they hide corn cleaned from chaffs, gold, silver, and all the valuables in pits, whilst their wives and children they hide safely in the fortresses and forests. For the gains of the enemy they leave nothing, but their dwellings, which they abandon without the slightest regret (B2CH13).

The text implies the Slavs' tendency to hide valuables in secure places in the case of danger or war. Although it is often argued that in the case of an attack there is no time to bury treasure, there is no reason why only immediate threats with no possibility of reacting should be considered (Wehner 2010:263). We have seen examples of emergency deposition in strongholds. But when the security of fortifications could not be reached for whatever reason, the most rational course of action would be to carry one's wealth to another place of refuge distant enough to avoid the attention of the attackers (such as forests), where it would be much safer than in settlements, which were the primary focus of aggression and plunder. Therefore, in the almost perpetually troubled Pomerania it was probably safer to locate savings away from settlements, in which case the presence of a marker of some sort would be beneficial to avoid the situation encountered by Samuel Pepys, whenever a withdrawal or addition (probably less frequent than on Gotland) was to be made. The same would apply in the case of emergency deposits, when people found themselves displaced by warfare into less familiar environments. Hoards associated with markers and boundaries and probably also discrete earlier burial

structures can, therefore, be seen as savings or 'refugee' emergency hoards of Pomeranian populations not retrieved as a result of the violent demise of the owners or their capture into slavery.

The last and the most numerous group of hoards I shall discuss comprises deposits for which the context cannot be established except for their association with the major soil types. Contextless deposits found in moraine or sandy soils have the same proportion of contained hoards, however hoards found on the more traditional soils are clearly dominated by savings deposits, whereas more marginal sandy soils more often have emergency hoards. This difference most likely stems from the liminal character of sandy soils: deposits found on traditionally exploited moraine soils, particularly savings hoards, lie much closer to contemporary rural settlements (median 1.6 vs 2.2km), whereas deposits found on relatively marginal sandy soils are closer to the modelled boundaries of stronghold territories (median 1.1km vs 1.4km). It seems, therefore, justified to apply to the contextless contained deposits the interpretation proposed for hoards associated with markers.

Importantly, however, the otherwise contextless hoards have the second highest proportion of small containerless deposits, which based on the evidence presented thus far can be linked with extra-economic behaviours. It is possible that they can be explained by the theory proposed for Gotland, where I argued that small containerless deposits may have been placed to form a bond between the owner and newly colonised lands. This explanation can be supported in Pomerania by the results of the regression analysis which highlighted the clustering of silver deposits in areas with plentiful sandy soils, and simultaneously indicated that deposition on traditionally occupied moraine soils had no statistically significant influence on hoard clustering. Although I was unable to observe an equally clear chronological dimension to this process as in Gotland, it appears that just as in Gotland the savings deposits arrive on Pomeranian sandy soils relatively

late, in the mid-10th century.⁷¹ Although the shift of settlement to marginal sandy soils led in a sense by hoards is as clear in Pomerania as it is in Gotland, one has to be aware that the attitudes, and indeed beliefs, described in the context of a Scandinavian *milieu* were not necessarily embraced in Slavic Pomerania. Undoubtedly the Scandinavian influence and the physical presence attested archaeologically at least from the 9th century (Łosiński 2008:144-169) enabled the dissemination of Norse ideas of symbolic behaviour, which may have been partially incorporated by the Slavs into their own belief systems. Nevertheless, a complementary explanation, perhaps more suited to Slavic culture and beliefs (of which we admittedly know little, cf. Komar and Chamajko 2013), may be suggested by Helmold's description of customs of the Rani tribe (B1CH38) quoted in Chapter 3.3.1. The passage mentions silver being used by Slavs in a ritual context and offered to deities in a temple. But as I argued above, dedicated temples at tribal centres were a late and rare arrival in Pomerania and places of worship were more likely to resemble the spring of the Glomaci or the sacred grove of Prowe, both of which were reportedly located in remote areas. It is possible, I believe, that in Pomerania some of the placed deposits, particularly the contextless finds from the marginal sandy soils, which even presently are generally covered by forests, may be offerings or sacrifices placed at such natural holy places.

⁷¹ Dramino *tpq* 950 (CatNo432). There is one earlier savings hoard Ralswiek *tpq* 842 (CatNo376), however it was found within a trade centre.

4 Svealand

4.1 Introduction

4.1.1 Case study

The third case study which I decided to analyse was Central Sweden. Similarly to Pomerania, it was not easy to determine what the extent of the case study should be. Traditionally Swedish research confines the discussion on Central Sweden to Mälardalen, the valley of the Mälaren Lake, whose extent, however, is rarely defined in any detail. I decided to look at the region in question in a wider geographical, but also historical context and chose the area of Svealand, or Sweden proper. Presently Svealand incorporates the *landskaper* (historic provinces) of Uppland, Södermanland, Västmanland, Närke, Värmland, and Dalarna. However, historically Värmland was counted as part of Götaland until the 19th century. On the other hand Gästrikland, presently counted as part of Norrland, was historically part of Tiundaland, which in turn was a constituent region of Uppland (Zachrisson 1998:10).

Initially, therefore, I intended to analyse Svealandic hoards within the confines of the historic provinces of Uppland, Södermanland, Västmanland, Närke, Gästrikland, and Dalarna. It quickly became clear, however, that the northernmost provinces of Gästrikland and Dalarna despite comprising nearly 45% of the area produced very sparse evidence for Viking-Age coin hoards (8%) and the archaeological sites datable to the period (10%). This disparity combined with a very different topography and geology from the majority of Mälardalen put the uniformity of the case study in question and created problems for statistical analysis, particularly regression modelling.

For these reasons I excluded Gästrikland and Dalarna from the Svealandic case study, and limited its area to the provinces of Uppland, Södermanland, Västmanland and Närke in the area based

on the historic territorial entities of *hunds*, organised for the sake of common military service at sea (Duczko 2000:10, fig.2).

4.1.2 Written sources and historical background

There is relatively little information about Viking-Age Sweden and particularly Svealand in contemporary or near contemporary written sources, being effectively confined to the works of Rimbert and Adam of Bremen. Despite sparsity, what is available offers a unique insight into the political and social structure, pagan beliefs, and the Christianisation efforts in the area in the Viking Age.

Adam of Bremen provides a useful, if not accurate, geographical description of Sweden in the 11th century:

Let us now proceed to give a brief description of Sueonia or Sweden [*Sueoniae vel Suediae*]. On the west, Sweden has the Goths and the city of Skara; on the north, the Warmilani with the Skritefingi, whose chief city is Helsingland; on the south, the length of the Baltic Sea, about which we have spoken before. There is the great city of Sigtuna. On the east, Sweden touches the Rhiphaean Mountains, where there is an immense wasteland, the deepest snows, and where hordes of human monsters prevent access to what lies beyond (AoB B4CH25(25)).

The fragment puts Svealand at the edge of the known world, but also indicates that still in the 11th century Goths or Götar were considered separate peoples from the Svear, which is reinforced in two other paragraphs:

Björkö [*Birca*] is a town of the Goths [*oppidum Gothorum*] situated in the middle of Sweden [*Suevoniae*] not far from the temple called Uppsala (AoB B1CH60(62)).

The Swedes and the Goths [*Sueones et Gothi*] - or, if this name is preferable, the Northmen - had, indeed, entirely forgotten the Christian religion and could by no means be easily persuaded to believe (AoB B1CH61(63)).

In Adam of Bremen's eyes Sweden is 'extremely fertile; the land is rich in fruits and honey besides excelling all others in cattle raising, exceedingly happy in streams and woods, the whole region everywhere full of merchandise from foreign parts. Thus you may say that the Swedes

are lacking in none of the riches, except the pride that we love or rather adore' (*AoB* B4CH21(21)).

The mercantile mindset of the Svear and their proficiency in animal husbandry was complemented by their military prowess: 'There are many Swedish peoples, excelling in strength and arms, besides being the best of fighters on horse as well as on ships' (*AoB* B4CH22(22)).

They were ruled by kings of ancient lineage, however 'the power of these kings depends upon the will of the people, for what all in common approve, that the king must confirm, unless it be that his decision, which they sometimes reluctantly follow, seems preferable. And so they enjoy equality at home' (*AoB* B4CH22(22)). The dependence of the king on several tiers of assembly is detailed in Rimbert's description of the second mission of Anskar to Birka in 852/4 (*VA* CH26-28), which indicates that the relationship between the king and assembly was quite dynamic, presumably depending on the strength of royal power at any one time; during the first mission of Anskar to Birka in 829, king Björn at Haugi singlehandedly allowed Anskar and Witmar to preach and convert (*VA* CH11).

The turbulent history of the conversion of the Svear described by Rimbert and Adam of Bremen was compounded by a very strong attachment to pagan religion epitomised by the temple in Gamla Uppsala 'which the Swedes consider the most eminent in the cult of their gods' (*AoB* B1CH60(62)). Despite the conversion of the Upplandic king Eric Segersäll (c. 970-995, who later relapsed into paganism) and his son Olaf Skötkonung (995-1022), believed to be the first king of Sweden (Lindkvist 2003:224), pagan beliefs and the position of Uppsala temple remained formidable even in the late 11th century. During the reign of king Stenkil (1060-1066) bishop Adalward the Younger was forced to flee Sigtuna for Skara in Västergötland, following a foiled attempt to burn the Uppsala temple (*AoB* B4CH29(29)). Even as late as 1084 king Inge the Elder (referred to as Anunder in *AoB* Scholion 140(136)) was deposed for refusal to offer the prescribed sacrifice to pagan gods at an assembly. The politically tinged character of these

conflicts suggests that traditional beliefs were often used as a weapon against the centralisation of power by the Swedish kings (cf. Duczko 2000:13).

4.2 Hoards in Svealand

There is no comprehensive catalogue of precious metal deposits in the historic heartland of Sweden, and systematic scholarly interest in hoards is relatively late, with the exception of the numismatic work of C. J. Tornberg (1848). Probably the earliest attempt at cataloguing hoards found within the case study was U. Linder's (1935; 1936) work on hoards from Södermanland, revisited only after 50 years by K. Jonsson (1986) in an unpublished dissertation. The well-known and most detailed CNS series did not include finds from Svealand. An important part of my catalogue was formed by the information published by the long-running project of the Swedish Kungliga Myntkabinettet, the *Sveriges Mynthistoria: Landskapsinventeringen* (henceforth SML), which catalogued within the case study finds from Uppland and Närke (Wiséhn 1989; Golabiewski Lannby 1990). Of invaluable help was the detailed work on Uppland and Gästrikland by T. Zachrisson (1998). Gaps in the catalogue were filled as far as possible using the information published by G. Hatz (1974), I. Hammaberg et al. (1989) and other publications, including grey-literature excavation reports, an online periodical of the Numismatiska Forskningsgruppen at Stockholm University *Myntstudier*, catalogues of S. Brather (1996) and G. Rispling (2005) as well as SHM online catalogue. Of great help was A. Söderberg of Sigtuna Museum. He provided me with detailed information on the more recent finds from Sigtuna, as yet largely unpublished.

My research on the available material has identified within the case study 96 hoards in the definition presented in Chapter 1.5.1. The following discussion will be based on 65 hoards fulfilling all criteria set out in Chapter 1.2, which comprise c. 87% of deposits that could be dated to the period in question and c. 76% of all coin hoards known from Svealand which were deposited into the 12th century (Table 4.1).

All hoards in case study	96
Coin hoards in case study	86
All hoards with good localisation	82
Coin hoards with good localisation	77
All hoards with dating within period	75
Coin hoards within period	73
Hoards suitable for analysis in case study	65

Table 4.1 Suitability of Svealandic hoards for analysis

Svealandic hoards just as in the previous case studies often do not have detailed descriptions of the circumstances of their discovery. In these cases the identification of an archaeological context of finds was made on the basis of a wider archaeological background. I created a number of secondary datasets corresponding to those used in Gotland and Pomerania. The list of these datasets and source-critical comments is presented in Appendix A, A1.1. In all relevant analyses I used the coastline at c. 900AD rather than the modern one, which lies approximately 5m higher than in the Viking Age due to the post-glacial uplift. During the Viking Age Lake Mälaren was a brackish inlet of the Baltic Sea and it will be treated in this work as part of the Baltic Sea rather than the lake which it is now.

4.3 Spatial analysis of hoard distribution

Figure 4.1 shows the distribution of hoards whose location is known and datable to 800-1050, however the earliest hoard in Viking-Age Svealand was deposited after 810 (Birka III, CatNo515). The distribution of hoards may appear to be slightly more random than in the previous case studies, however several clusters can clearly be seen. The results of the Average Nearest Neighbor analysis in ArcGIS confirms the clustering, as with the z-score of -5.88, there is less than 1% likelihood that this clustered pattern could be the result of random chance (Figure 4.2). In order to graphically represent the intensity of hoard concentrations I used kernel density

estimation function in ArcGIS within a radius calculated to 20km (Figure 4.3, cf. Appendix A, A2.1).

The distribution presented in Figure 4.3 represents only locations of individual hoard findspots, but it does not consider their size, or more exactly the weight of silver. Svealandic hoards are not much different from the previous two case studies in that the published data rarely includes the information on the overall silver weight. As in Gotland very helpful were the original redemption receipts held in the SHM online catalogue. Overall, for 46 Svealandic hoards (71%) I was able to reconstruct the information on the silver weight. For the remaining 29% I calculated the size of hoards using the same method as in Gotland and Pomerania (Table 4.2, cf. Appendix A, A2.3).

	Median weight (g)	95% bootstrap confidence interval	
		Lower	Upper
Oriental coins			
whole	3.02	2.78	3.40
fragment	1.27	0.90	1.46
Byzantine coins			
whole	2.69	2.38	2.80
fragment	1.08	0.54	1.58
German coins			
whole	0.99	0.79	1.52
fragment	0.54	0.45	0.90
English coins			
whole	1.27	n/d	n/d
fragment	0.56	n/d	n/d
Other European coins			
whole	1.43	1.36	1.51
fragment	0.40	0.29	0.50
Other objects			
whole	20.09	n/d	23.13
fragment	5.03	n/d	9.13

Table 4.2 Results of the average weight calculations for Svealandic hoards

The sample size used in calculations was much smaller than in Gotland or Pomerania, therefore there is a possibility that the results may not fit the actual weights as well. The accuracy was inhibited by the fact that the weight of English whole and fragmentary coins could only be

calculated on the basis of a hoard from Thuleparken (CatNo489). The most persistent problem, encountered already in Pomerania and Gotland, was caused by the variance of weights of fragmentary and whole non-coin objects, which did not allow me to calculate reliable lower confidence intervals. The calculated average weights could not be applied to one Svealandic hoard (Bägerstad, CatNo541) since in this case the available information did not contain details on the number of artefacts. The relatively small size of the sample and comparatively smaller availability of the information about the weights of individual artefacts resulted in a median error of $\pm 15\%$. One needs to accept that, although not significantly, the error is higher than in the other two case studies, but the only solution to this complication would be to physically visit collections and manually weigh all objects, which was not really feasible. Therefore, I used the results of the calculations presented in Table 4.2 to approximate the weight of silver in the remaining 28% of hoards.

To determine if the weight of silver influenced the clustering of hoards in Svealand I undertook spatial autocorrelation analysis (cf. Appendix A, A2.3). The resulting z-score of 1.47 in the global Moran's I test (Figure 4.4) indicates that the amount of silver deposited in hoards had no statistically significant influence on the observed clustering of hoard findspots, which reflects observations made in Gotland and Pomerania. This result provides a final piece of evidence to suggest that despite clear clustering of hoards in certain areas of the Baltic zone, within each historical and geographical region investigated, the amount of silver was distributed at random and there are no statistically discernible areas where heavier or lighter hoards concentrate. This in turn would indicate that, provided silver was available, the size of a hoard was likely to be determined by the function its owner intended it to fulfil. This observation, I believe, provides another line of evidence which validates my approach of dividing Viking-Age hoards into the savings, emergency and placed deposits.

But let's not get ahead of ourselves. For now I would like to return your attention to the kernel density estimation, which has shown that hoards from Svealand form several distinctive concentrations. I will discuss them individually before I proceed to analyse the context of these finds.

4.3.1 Birka

The most central hoarding 'hot-spot' in Svealand is focused on Birka (Figure 4.5), which is undoubtedly one of the most famous and most researched of Baltic emporia (e.g. Birka Studies series – Ambrosiani and Clarke 1992, 1994, 1995; Miller and Clarke 1997; Ambrosiani 2001; Wigh 2001; Andersson 2003; Ambrosiani 2013; Bogucki 2006:221-225, 373-374). I will, therefore, only provide a brief description here.

The Birka complex on the island of Björkö in Lake Mälaren comprises a defended settlement built on a regular grid system referred to as the 'Black Earth', a hillfort ('Borg'), and a number of cemeteries with a total of c. 2300 burials. Throughout its existence it produced ample evidence for trade, specialised craft production and processing of furs (Ambrosiani 2008). The intensity and variety of contacts can be seen most clearly in the numismatic material. Besides hoards, Birka produced over 400 stray coins, mainly of Oriental origin, but also Byzantine, Carolingian, English and Scandinavian issues (Gustin 2011:230-234).

Birka is located in the centre of Mälaren at a junction of East-West communication routes leading from the Baltic via straits at present-day Stockholm, and a North-South route called Fyrisleden leading from the Baltic over a portage at Södertälje, via Birka, the portage of Draget in Kalmar parish, along Ullvifjärd strait towards Sigtuna and Uppsala and up the Fyris river system towards Vendel (Ambrosiani 1991:99-101). This central location certainly facilitated long-distance trade and would have contributed to the wealth of its inhabitants indicated by the written sources. *Vita Anskari* describes the attack on Birka by the exiled Swedish king Anund who promised to spare the town for 100 pounds of silver, although the Danes with whom he

allied himself, resented this decision saying 'that each individual merchant in the place had more than had been offered to them' (VA CH19). There is a good chance that the amount of silver each of Birka's merchants was meant to possess was exaggerated either by Rimbert, or by the Danes to convince Anund to attack. But even if we assume the exaggeration factor of 10, this would mean that there were enough inhabitants who had approximately 3kg of silver at their disposal to warrant an all-out attack averted only by unfavourable results of divination by casting lots. Incidentally, one of Birka's hoards (I, CatNo513) weighed over 2kg, suggesting that such wealth was certainly within the reach of Birka's inhabitants.

The written sources indicate a close association of Birka with royal power through the physical presence of the king or his prefect (VA CH11, 19, 26-28). There is little evidence for a permanent king's residence in Birka, and the royal seat was probably located at contemporary Hovgården on the nearby island of Adelsö, where large burial mounds, three of which are called *Kungshögar* or 'king barrows', a harbour with a breakwater around a sheltered lagoon and remains of a large hall were discovered (Brunstedt 1996).

Birka was established in the last quarter of the 8th century. The settlement was surrounded from the east by earthen defences with six gaps, interpreted as possible gates. There are at least two phases of construction of ramparts which in their earliest phase, dated to the late 8th-early 9th century, had most likely a symbolic rather than functional character (Holmquist Olausson 1993:83). The date of the second phase of town fortifications when they achieved their final form is problematic. L. Holmquist Olausson (1993:83; 2002:159) puts it in the 9th century or more exactly before 886, whereas others suggest the early (e.g. Bogucki 2006:225) or even mid-10th century (Callmer 1994:70). The defences of the neighbouring hillfort Borg are somewhat less problematic. It is assumed that Borg existed even before the emergence of Birka as an emporium, probably already in the Migration Period (Arbman 1939:45-57; Hedenstierna-Jonsson 2009:99; Holmquist Olausson 2002:160). It displayed two main phases of construction

with the earlier destroyed by fire at the beginning of the 9th century. The later phase was burnt repeatedly towards the end of the 10th - beginning of the 11th century (Holmquist Olausson 2002:161).

The circumstances surrounding the collapse of Birka are not known. The abandonment of the emporium is dated to the 970s, based predominantly on coin finds from the topsoil, since the uppermost stratigraphy within the Black Earth was destroyed by ploughing in the 19th century. The stratigraphic chronology of Birka agrees with the hoards: the earliest was dated to after 810 and the latest to after 963. A hint of why Birka was abandoned is provided by relatively recent excavations of the so-called Garrison (Hedenstierna-Jonson 2006:51-52). The Garrison was a terraced area surrounded by earthen ramparts enclosing the remains of a smithy and a large hall located strategically to block direct access from the waterfront to the Borg (Hedenstierna-Jonson 2009:100). The investigations produced abundant finds, whose character and distribution suggest violent and dramatic events leading to a sudden abandonment of the Garrison at some point in the second half of the 10th century - there is no evidence of rebuilding or even attempts to clean the area (Lundström et al. 2009; Lindbom 2015). It is not impossible that these events could be associated with one of the destruction horizons of the Borg hillfort, and may have led to abandonment of the emporium or at least contributed significantly to its demise.

The scene for Birka's downfall was set by the political events of the late 970s. W. Duczko (2000:28-29) suggests that in the years following Harald Bluetooth's baptism, Svealand may have been under Danish control. The challenge to Danish overlordship came in the 970s from Erik Segersäll (the Victorious) who ruled in Uppsala alongside his brother Olof based in Birka. After Olof's death in 975 Erik refused to give his brother's part of the kingdom to his nephew Björn (Styrbjörn of the sagas) supported by Harald Bluetooth, which led to the withdrawal of the royal protection to Birka (Duczko 2000:29). The internal strife culminated in 984 with the battle

of Fyrisvellir and Erik's victory. Contemporaneously, the Russian Primary Chronicle indicates a period of significant political instability in the east. In 977 'when Vladimir in Novgorod heard that Yaropolk had killed Oleg, he was afraid and fled abroad' (Cross and Sherbowitz-Wetzor 1953:91). Vladimir returned a year later to Novgorod with Varangian allies, expelled Yaropolk's lieutenants, advanced against him and began a process of a consolidation of his power which lasted into the mid-980s.

These events certainly impacted on Birka's *raison d'être* – long-distance trade and the flow of silver. It is probably not a coincidence that the latest Svealandic hoard comprising exclusively Oriental coins is dated to 976 (Fågelsången, CatNo511), and that the last hoard deposited in Svealand before a complete hoarding hiatus which lasted throughout the 980s⁷² was buried c. 978 (Finnboda, CatNo496). I will discuss the chronological aspects of hoarding in more detail in Chapter 5.

Birka's demise disrupted trade and exchange networks in Svealand (and possibly impacted the rest of the Baltic zone in some way), until such time when another centre emerged. Traditionally it has been thought that Sigtuna took over central and mercantile functions from Birka already in the 980s (Clarke and Ambrosiani 1991:71), however the more recent research indicates that there are no market and specialised craft activities visible in the earliest stages of Sigtuna (Zachrisson 1998:151-152). The excavated find material and floor plans of buildings in the earliest phase show no divisions for specialised activities within and between houses, which instead only display the elements of manufacture usually found on ordinary farms (Tesch and Pettersson 1995:30). These findings could help explain the observed disruption of silver influx to Svealand between the demise of Birka and the evolution of Sigtuna from purely political centre to emporium in the 990s.

⁷² First hoards deposited after Finnboda are dated to after 991 on the basis of Otto-Adelheid pennies (cf. Chapter 1.2, footnote 2).

4.3.2 Sigtuna

The concentration of hoards in Sigtuna (Figure 4.6) is clearly associated with the town itself and underlines its central role in long distance trade. The remaining deposits found outside the town predate Sigtuna, but are located in proximity of waterways leading towards Uppsala and further on to Gästrikland and as such can be associated with Fyrisleden.

Judging by dendrochronology, Sigtuna was established c. 980, most likely by King Erik Segersäll who resided in the largest plot overlooking 130-140 much smaller regular plots built almost simultaneously (Zachrisson 1998:128, 151-152). Archaeological evidence suggest that Sigtuna in the first years of its existence was not established as a direct mercantile successor of Birka, but it was conceived as a political and social centre, of exclusive character, where the king could forge political alliances through donations of plots surrounding the royal demesne to chosen noble families (Zachrisson 1998:152). Zachrisson believes that the beginnings of Sigtuna are linked to the spread of Christianity, which allowed the king to create alliances through traditional gifts, but in the context of the new faith which proved so successful elsewhere. Sigtuna would have offered a focal place for the emerging Christian community in the Mälaren area, which would also begin to commemorate their deceased by erecting and carving runestones (Zachrisson 1998:128, 132). Certainly after the collapse of Birka its Christian mission, renewed by bishop Unni in 935/6 (*AoB* B1CH60(62)-62(64)), required a new centre, for which Sigtuna seems a logical candidate. If this was the case, it left little evidence in the written sources. Even though Erik Segersäll was the first of Swedish monarchs known to have adopted Christianity (in Denmark), Adam of Bremen states that he relapsed into paganism after his return to Sweden (*AoB* B2CH38(36)), and quoting his friend king Svein, even suggests that 'being a pagan, he was intensely hostile to Christians' (*AoB* B2CH35(33)). Erik's successor Olaf Skötkonung, after a failed attempt to destroy the pagan temple in Uppsala, did not establish the church and episcopal see in Sigtuna, but was forced to do it in Skara, Västergötland (*AoB* B2CH56). The first bishop whom

Adam associates with Sigtuna is Adalward in c. 1060-66, who nevertheless soon after arrival was forced to flee back to Skara (*AoB* B4CH29).

Regardless of the early role of Sigtuna in the Christianisation process, it certainly was the seat of rulers whose ambitions and contacts reached beyond Uppland. Sigtuna emerged from the events of 970s which led to the collapse of Birka: the dynastic dispute and attempts to overthrow Danish influence, if not domination, which culminated in the 980s with the battle Fyrisvellir. Erik, who after the battle emerged with the cognomen Victorious, and his successors Olaf Skötkonung and Anund Jacob are the first Swedish kings who were no longer mentioned only on the margins of Christian missions, but were portrayed as taking an active part in regional politics and dynastic disputes in Denmark and Norway (*AoB* B2CH30(28), 35(33), 39(37), 52(50), 61(59)). After Harald Bluetooth's death in exile in 987 the following years in Denmark were chaotic and Adam of Bremen suggests that Erik joined the fight and even occupied Denmark (*AoB* B2CH28), although this is not substantiated in any other source (Duczko 2000:30). What seems more certain is that after the loss of Birka Erik's efforts were focused at home on the creation of Sigtuna, a centre of power and the seat of his successors. The relative stability of the 990s, which saw the resurgence of hoarding, helped to realise their ambitions and intentions, epitomised by establishing a mint in Sigtuna in 995 which produced coins bearing the title of king of Sigtuna and later of *rex sveorum*, 'king of Svear' (Lindkvist 2003:224).

4.3.3 Stockholm

The statistically most intensive concentration of Svealandic hoards comes from the area of modern-day Stockholm (Figure 4.7), although it is quite difficult to explain the character of activity there in the Viking Age. The archaeological material is confined to a small number of finds, usually residual in contexts from later periods, most likely due to Stockholm's urban growth from the 13th century and scarce opportunities for modern excavations in the historic heart of the city. The only *in situ* remains of a possible Viking-Age settlement I am aware of,

were discovered during 1994-1995 excavations in Gamla Stan at Storkyrkobrinken in the form of a hearth and remains of a wooden structure (Söderlund 2012). Within the concentration there are a number of runestones and Viking-Age burials, which indicate the area was certainly inhabited during the Viking Age, however the nature of this occupation is hard to determine.

Regardless of the nature of the Viking-Age settlement, the Stockholm area commands the only direct and uninterrupted waterway leading from the open Baltic into Mälaren. There is no doubt that the high concentration of hoards found here is associated with an important communication and trade route linking Svealand's interior with the rest of the Baltic zone. Interestingly, the majority of hoards within the Stockholm concentration are rather late. None of them can be dated to the 9th century, and with one exception (Bägerstad, CatNo541) all were deposited after Birka had been abandoned. This implies that the commercial aspect of the eastern access to Mälaren gained importance only relatively late in the Viking Age and the bulk of the long-distance communication (at least that involving silver) was undertaken earlier via the portage at Södertälje.

4.3.4 Uppsala

A small group of hoards lies to the south of Gamla Uppsala (Figure4.8), on the outskirts of present-day Uppsala. Although Gamla Uppsala lost the central position it held in the 6th century, it remained an important ritual centre and a powerful political symbol until the 13th century (Duczko 2000:14). Paradoxically, despite its symbolic and political importance no hoards and only handful of Viking-Age coins were found in Gamla Uppsala itself. It seems that it stayed out of the view of strangers (Duczko 2000:16) unable to provide economic wealth in the way that Birka and Sigtuna did. A few hoards located to the south are not consistent chronologically and individual finds are associated with small concentrations of Viking-Age settlements,⁷³ none of

⁷³ Översävja (CatNo523) was most likely deposited within a contemporary settlement.

which produced any extraordinary finds or imports. The nature of the concentration is therefore elusive, but the deposits are located near the River Fyris and the communication route of Fyrisleden, at a junction with Långhundraleden, an even older communication route with the Baltic (Ambrosiani 1961; Jonsson 2008:19-20).

4.3.5 Norrtälje

Probably the most surprising of all hoard concentrations in Svealand, due to the paucity of archaeological evidence for Viking-Age activity in the area, is one observed to the north of the modern-day Norrtälje (Figure 4.9). A handful of Viking-Age settlements and cemeteries are confined to the south-western part of the concentration. Some indirect evidence of a more regular settlement pattern is provided by the distribution of runestones and several cemeteries dated no closer than the Late Iron Age. The density of silver finds confined in this relatively small area - comparable with Birka and Sigtuna - would indicate that some form of a central place existed here. There is, however, no evidence in the archaeological record or written sources for a contemporary emporium or any other form of a central place. On the other hand we have seen in Gotland that the presence of an emporium was not indispensable for hoard concentrations. This parallel may be taken further since Norrtäljeviken, which in the Viking Age incorporated the present-day Gillfjärden, Brosjön and Bottenfjärden, provided unimpeded access to the open sea and offered plenty of suitable anchorage. Moreover, the area is located half way between Birka and Åland, which makes it very well suited to participate in the northernmost branch of the long-distance trade route leading from the East via the Gulf of Finland. This connection is strengthened by the chronology of hoarding at Norrtälje which with only one exception (Hårnacka, CatNo526) ceases at the time of Birka's demise when the Oriental silver all but stopped flowing into the Baltic zone, a pattern which is also reflected by the hoarding in Åland (Talvio 1982:247; Talvio 2002:88-97, 131-137).

4.3.6 Eskilstuna

The next concentration is most likely associated with a trade centre at modern-day Eskilstuna (Figure 4.10). Archaeological excavations produced evidence for occupation, trade and metalworking here in the late Viking Age, dating from the 11th century (Callmer 1994:76; Appelgren 2010), which agrees with the chronology of hoards.

Eskilstuna is associated with Saint Eskil, who made the village of Tuna (hence today's Eskilstuna) his missionary diocese, and who, according to tradition, was stoned to death c. 1080 in the neighbouring Strängnäs, where he attempted to disrupt a pagan ritual. The only near-contemporary source on Saint Eskil is the legend of Saint Canute of Denmark, written c. 1122 by Ailnoth of Canterbury (Schmid 1953). Judging by the missions of Anskar, Unni and Adalward, it would seem logical that Eskil chose for his seat a place similar to Birka or Sigtuna: a well-connected mercantile and political centre. Eskilstuna lies between Mälaren and Hjälmaren and was strategically positioned to take advantage of the communication route leading to Skara and Västergötland, which was of key importance for Olaf Skötkonung.

4.3.7 Mörkö

The second concentration in Södermanland is centred on the island of Mörkö (Figure 4.11), where the open Baltic meets the calmer waters of Himmerfjärden and Norafjärden leading towards Södertälje portage and Mälaren, it could almost certainly be associated with Fyrisleden. Archaeological material other than the hoards and datable to the Viking Age is very sparse here. There are no known settlements, only two cemeteries have evidence which attributes them to the period, and more dense occupation is only implied by runestones.

However, on the island of Mörkö there is village of Tegneby. According to W. Duczko (2000:26-29) Harald Bluetooth's control over Denmark and other territories was exercised through 'a system of personal agents, high ranking servants with the title 'thegn'', who lived in estates

called 'Thegneby'. Their presence in Svealand could, therefore, be seen as the expression of a strong Danish political influence or even overlordship, at least until the 970s *coup d'état* made by Erik Segersäll. Duczko's theory has been challenged by T. Bolton (2009:247-248), who instead attributes the Tegneby estates to Knut, and is much more sceptical about associating them with Danish overlordship on a linguistic basis, since the term may be equally translated as a 'noble' or 'good man'. He also questions the runestone evidence used by Duczko.

I drew on this discussion since the presence of a political centre at Mörkö associated with a high-ranking person, be it indigenous or Danish, would certainly have helped to explain the observed concentration of hoards. However, one faces a number of problems if tempted to follow this argumentation. Firstly, as outlined above, there is little archaeological evidence to confirm any sort of Viking-Age activity in Tegneby at Mörkö – two barrow cemeteries surrounding the village (RAÄ Mörkö 80:1 and 151:1) are undated and may be associated with a nearby Early Iron-Age hillfort (RAÄ Mörkö 144:1). Secondly, neither of the remaining two Tegneby sites in Svealand (Duczko 1995:639) is found anywhere near silver hoard concentrations, implying that their potential political function did not translate into an economic one.

Whether the Mörkö concentration can be associated with such a political centre remains to be seen. What is certain is that nearly all hoards in this cluster are located in close proximity to the coast and Fyrisleden, which implies above all their connection with trade routes.

4.3.8 Nyköping

The concentration of hoards at and to the north-west of present-day Nyköping (Figure 4.12) is not only the most diffused but also very problematic since there is very little archaeological evidence for any activity datable to the Viking Age. The information available to me is confined to a handful of runestones, one cemetery dated to the Viking Age and two dated only generally to the Late Iron Age. The area is located, however, on a sheltered bay of the Baltic at the mouth of the River Nyköping, which led inland via a series of lakes and tributaries towards a diffused

group of hoards between Bettna and Flen. The lack of archaeological data prevents me from drawing conclusions about this concentration, although it is possible that it may have formed in connection with the emergence of Eskilstuna as a trade centre (cf. Figure 4.3).

4.3.9 Concentrations – brief summary

In this section I aimed to outline the background of the observed hoard clusters. The analysis indicates that archaeologically verified emporia (Birka and Sigtuna) were indeed associated with some of the most intensive and dense hoard concentrations, and in other locations there is evidence for specialised craft production and trade (Eskilstuna). The case of Gamla Uppsala and perhaps Mörkö suggest that sites of political and/or religious importance may have stimulated the flow of silver. However, both these concentrations may be easier to explain through their association with well-established trade routes such as the Fyrisleden and Långhundraleden. Location at or near long-distance routes, particularly at nodal or topographically critical points, especially when faced with the paucity of archaeological material other than hoards themselves, seem to provide the best explanation for hoard clusters in the area of Stockholm, Norrtälje and Nyköping.

4.4 Context

Having considered factors which could be responsible for the availability of silver found in hoards, I will now focus on the reasons for their deposition (and non-retrieval) starting with the information on the archaeological context in which hoards were discovered.

The task is somewhat easier than in Gotland and Pomerania since for c. 55% of the analysed finds (albeit comprising only 36 hoards) the descriptions of the circumstances of discovery are available.⁷⁴ Svealand is also unique among my casestudies in comprising the largest proportion

⁷⁴ Whereas in Gotland and Pomerania the proportion was 35%.

of deposits (25%, 16 findspots) which were either discovered during archaeological excavations or whose findspots were surveyed archaeologically after the discovery.

4.4.1 Settlements

Viking-Age settlements in Svealand are quite problematic since no comprehensive survey has ever been published and the main source for Swedish archaeological sites, FMIS database, is difficult to query (cf. Appendix A, A1.1.1). In many cases the presence of a settlement is only indicated by a single or small groups of features which are often undated, particularly in older investigations of sites with few datable objects excavated and before scientific dating was used routinely. The interpretation of radiocarbon analyses in the published material is also problematic as there is a tendency to accept chronologies at a face value of 2 Sigma calibration, without paying much attention to the shape of the calibration probability curve. As a result, the chronology of scientifically dated features is often unnecessarily elongated. When the original results of calibration are not published, it is impossible to verify the proposed chronology.

No synthesis of Viking-Age settlement exists even for the most intensively excavated area of Mälardalen, not to mention the entire Svealand. This has been rather problematic for my investigation. For lack of ready-made solutions, I constructed my database of Svealandic sites datable to the Viking Age on the basis of over 7500 FMIS records and 152 grey-literature excavation reports (Appendix A, A1.1.1). These produced only 436 sites including settlements and burials datable with some certainty to the Viking Age. An additional 160 sites, a sizeable 27% of the potential sample, were in these sources dated to the Late Iron Age (*Yngre järnålder*). At first glance these sites would appear contemporary with the timeframe of the dissertation. However, in practice this designation is problematic for a variety of reasons. First of all, there is no consensus on what is understood by 'Late Iron Age' (cf. footnote 16, Chapter 2.2). Some authors understand it as a period between and including the Migration Period and Viking Age (e.g. Berger 2012:8), whilst others see it only comprising the Vendel and Viking periods (e.g.

Zachrisson 1998; Svedjemo 2014), and only in exceptional circumstances is this explicitly stated. Secondly, authors using the term 'Late Iron Age' hardly ever specify whether they mean that a particular site is dated to the Late Iron Age because it was in constant use during the Migration Period and/or Vendel Period through to the Viking Age, or because it is simply impossible to pinpoint it any closer further. My overall impression is that in the majority of cases when this term is used, it is the latter.

The most widely accepted justification for using this term is that there was an unprecedented stability of settlement during those constituent periods in Central Sweden, particularly in the Mälardalen. The basis for this approach was laid by B. Ambrosiani (1964), but the work of Å. Hyenstrand (1974) was probably most influential. His analysis of the results of a survey of ancient monuments carried out in conjunction with economic mapping of Sweden between 1948 and 1964 suggested that the majority of the Late Iron-Age cemeteries were in more or less continuous use throughout the constituent periods, particularly in the Vendel-Viking Age. The determinations were made almost exclusively on typological grounds, since only 2% of monuments were excavated (Hyenstrand 1974:157). These results combined with the work of Ambrosiani (1964:91), who determined that the historically known ownership boundaries of settlements remained largely the same over the Late Iron Age, has often led to an assumption that in the absence of Late Iron-Age settlement remains, historic villages can indicate the location of these lost settlements, even despite a complete lack of archaeological evidence (e.g. Zachrisson 1998:246-250,348-351). Although in the 1990s changes in the internal spatial organisation of settlements were noted (Andersson 1998:361), this had no great effect on established views.

My results suggest that only 52% (131 of 253) of Svealandic Viking-Age cemeteries with available dating have roots in earlier periods. The same can be observed in settlements where only 55% (98 of 178) of Viking-Age sites have earlier roots, the remainder being founded in the Viking Age.

Furthermore, only 46% (82 of 178) settlements dated to the Viking Age continue into the medieval period and just 18% (32 of 178) beyond it. These findings, in my opinion, confirm recent observations made by Swedish archaeologists,⁷⁵ and further challenge Hyenstrand's statement that:

The burial grounds from the Late Iron Age are mostly situated close to settlements which can be found in medieval records, maps from the 17th century or in modern maps. Thus the burial grounds represent a static settlement structure with continuity from the Late Iron Age, especially the Viking Age (Hyenstrand 1974:158, my underscoring).

Changes in settlement patterns in the Late Iron Age in general and in the Viking Age in particular can also be traced in the association of settlements with the underlying soil types at their location (Table 4.3).

	Clay		Moraine		Sand	
	area/ number	proportion	area/ number	proportion	area/ number	proportion
Soils						
	7898km ²	22.99%	11935km ²	29.75%	1220km ²	4.45%
Settlements						
Migration Period	50	53%	17	18%	11	12%
Vendel Period	60	57%	19	18%	6	6%
Viking Age with earlier roots	42	43%	21	21%	6	6%
Viking Age without earlier roots	30	38%	25	31%	10	13%

Table 4.3 Chronological comparison of association of settlements and main soil types in Svealand.

It is clear that settlements in the earlier stages of the Late Iron Age are predominantly on the most productive, but also the heaviest clay soils. During the Viking Age, although the available

⁷⁵The research of L. Beronius Jörpeland (2010) of the medieval settlements in the Stockholm county proved that the location of medieval houses differs from what archaeologists expected beforehand, often being situated at the edges of the historical village plots.

chronological data is not detailed enough to say exactly when, there is a significant shift of settlements from clay towards moraine, particularly sandy moraine soils, but also towards sandy soils. The process is similar to that observed in Gotland and in Pomerania moraine/sand soils, but far more pronounced, despite Svealand's geology being different from both Gotland and Pomerania. Whereas in these two areas moraine and sandy soils are dominant, in Svealand the two dominant soil types are moraine soils and clays. In the very few instances where detailed archaeological data and exact dating are available, it seems that settlements moved several hundred metres within the Late Iron Age, most likely within the same resource area (Magnus 2002:21), in a fashion similar to that observed on Gotland through archaeological metal-detector surveys (Östergren 1989).

Hyenstrand (1974:160) suggested that some level of colonisation may have taken place in Viking-Age Mälardalen, which was widely accepted by others (e.g. Zachrisson 1998:87), and very rarely contested (cf. Androshchuk 2009:96). In my opinion the above tally seems to show a shift of settlement rather than colonisation, for the colonisation model would have expressed itself in a way similar to what was observed in Gotland, i.e. that soils preferred in earlier periods remained settled with only minor reduction, even when the settlement on previously marginal soils increased. No such thing can be observed in Svealand: here the traditionally occupied clay soils were being steadily abandoned for moraines.

The increase in archaeological excavations of settlements in the last decade, led some Swedish researchers to a similar conclusion that the settlement patterns in Late Iron-Age Sweden, particularly Mälardalen, were more complex and dynamic than predicted by the theoretical models of the 1970s. Despite the lack of publications which would synthesise these new results in Svealand, some excellent regional overviews have been produced (e.g. Göthberg et al. 2014 for the area of Gamla Uppsala, Hamilton 2008 for south-eastern Uppland). Despite being focused mainly on earlier periods when the archaeological sites are more abundant, they

nevertheless provide archaeological evidence for movement of settlements, continuity of settlement from the Roman Iron Age to the Vendel Period, but with few exceptions not to the Viking Age, when the excavated features have a different character (particularly Göthberg et al. 2014:274-277, 303-306; also Hamilton 2007:105; Hamilton 2008:197).

These preliminary results, which will be discussed in more detail in Chapter 4.4.7, show a distinct pattern in the settlement dynamics in Svealand. Admittedly they are based only on a high-level analysis of the available FMIS and grey-literature data, and will certainly have to be verified by dedicated and detailed analyses, for which this dissertation has no place. Nevertheless, I am convinced that recent archaeological data and scientific dating indicate a much more dynamic picture of settlement in the Viking-Age Svealand than generally assumed, and disprove the theory of a static settlement structure in Central Sweden in the Late Iron Age and beyond. I also believe that these findings show a level of discontinuity within the Late Iron Age which erodes the uniformity of the Vendel and Viking periods assumed under the catch-all term 'Late Iron Age'.

For these reasons I was forced to reduce the size of the sample of sites datable to the Viking Age to the initial 436, of which 178 were rural settlements and their distribution and density is presented in Figure 4.13.

Despite Svealand having been subject to the most extensive archaeological investigation of Viking-Age hoards through excavations in all my case study areas, only a maximum 17% (11 of 65) of hoards can be associated with contemporary settlements.⁷⁶ Out of these, 7 were discovered in Birka and Sigtuna, which are primarily associated with long-distance trade, and by no means are representative of standard contemporary rural settlements. The Olhamra hoard (CatNo546) may further reduce such association, since it is quite problematic with regards to its context. It was found in the corner of a presumed Viking-Age building, however, the

⁷⁶ CatNos: 513, 514, 515, 516, 523, 536, 537, 538, 540, 546, 548

contemporaneity of the construction with the hoard is controversial since a radiocarbon sample from the structure's remains provided a medieval date (Zachrisson 1998:340-341).

The majority of hoards are located on the outskirts of areas with highest settlement density. There is a moderate correlation with hoard density as the correlation coefficient between the two datasets is 0.52 (Evans 1996). These results confirm Zachrisson's (1998:9-10) observations that precious metal deposits in Uppland and Gästrikland had a marginal position in relation to the Iron-Age villages. However, the discrepancy may mainly be due to the relatively small number of known settlements datable to the Viking Age: in contemporary Pomerania, about twice the size of Svealand, the number of settlements attributable to the same period reached 8291, over 46 times more. Figure 4.13 also clearly shows almost a complete lack of settlements datable to the Viking Age in the western part of Södermanland. A solution to this problem may be found in Zachrisson's work on runestones in Uppland and Gästrikland which provides strong evidence for their association with ancestral land (Zachrisson 1998:226) and as such they could be used as indirect indicators of areas settled in the later part of the Viking Age, from the late 10th century onward. After combining contemporary runestones with the known Viking-Age settlements I produced a density heat map of 'Viking Age settlement indicators', which has a stronger positive correlation with hoard densities, at 0.62. It becomes stronger yet, at 0.67, when we include contemporary burials. However, in this case it is more correct to talk about indicators of Viking-Age activity, than settlement indicators. These results indicate on the one hand that there is little evidence to associate hoards with settlements themselves, but much stronger evidence for associating them with the agricultural and presumably ritual landscape within which settlements lay.

One's initial overall impression, based on the available evidence, is that hoards in Svealand are only sporadically found in rural settlements. It could be strengthened further when we consider the distances of hoards from nearest known settlements (Figure 4.14). These clearly show that

the vast majority of Svealandic hoards were deposited away from habitation. However one should note that over a quarter (26%) were found relatively near, within 1.5km. This apparent dissociation of settlements and silver hoards is, however, probably skewed by the fragmentary picture of Viking-Age settlement. When we consider the distances to settlement indicators (Figure 4.15), it transpires that 63% (41 of 65) of hoards lie within 2km. I would therefore risk a suggestion that although the majority of hoards cannot be associated with individual settlements, the place of their deposition was generally located relatively close, presumably within the resource area of an individual farm.

4.4.2 Burials and cemeteries

Burials are the most plentiful source of archaeological resource in Central Sweden where they usually take a form of stone constructions and barrows, and for the most part are still visible in the landscape. Despite the problems with chronology, I have identified in the case study 253 burials datable to the Viking Age. Their density is presented in Figure 4.16. It appears that there is a strong correlation of the distribution of hoards with the correlation coefficient of 0.64 (Evans 1996). However, only one hoard (Toresunds-Sundby, CatNo506) was found within a contemporary cemetery, one (Önnestand/Önsta, CatNo522) in an undated barrow belonging to a cemetery dated only broadly to the Iron Age, and two in earlier cemeteries from the Migration and Vendel Periods.⁷⁷ When we look at the distances from hoards and settlements to the nearest contemporary cemeteries (Figure 4.17), it becomes clear that the majority of hoards were deposited away from cemeteries: instead, settlements tend to be located in their proximity. It appears, therefore, that the correlation of hoards with cemeteries is only apparent and caused by proximity of the latter to settlements.

⁷⁷ CatNos: 525, 532

4.4.3 Watery environment

The next group of hoards for which the archaeological context can be established comprises deposits found in bodies of water and waterlogged terrain. It is generally accepted that the deposition in the watery environment is associated with ritual behaviour. The sacred character of bodies of water in Norse mythology is well recognised (Lund 2008:59), and a contemporary example of veneration of the watery environment in the Svealandic context is provided by Adam of Bremen in his description of the temple in Uppsala (*AoB* B4 Scholion 138(134)).

There are, however only two hoards in the case study which were discovered in peat bogs and marshes.⁷⁸ Two more can also be associated with a watery environment. The hoard from Hårnacka (CatNo526) was discovered through metal-detecting in 1984 and 1985, spread over an area of c. 40x35m which in the Viking Age would have been on the shore and possibly within Gillfjärden, then connected to the Baltic via Norrtäljeviken. The other deposit came from Kullsta (CatNo527), near the boundary between the villages of Kullsta and Eneby, which according to 18th- and 19th-century cartographic evidence was then still located in a wetland area (Zachrisson 1998:268). Additionally a deposit from Broby (CatNo498) was retrieved on two occasions from a small river, which may imply that the deposit may have been placed in the water. However, it is quite likely that the silver may have been originally deposited on dry land, but was eroded by the watercourse near the time of discovery (there is no evidence of water erosion on the objects), which makes the association of this deposit with the watery environment dubious.

4.4.4 Crevices

Svealand produced a small group of four hoards (6%) unique for this case study area, comprising deposits found in rock crevices.⁷⁹ It is generally accepted that deposition in caves and rock

⁷⁸ CatNos: 484, 486

⁷⁹ CatNos: 487, 499, 535, 542, 545

crevices is indicative of the irreversibility of deposition, and often such places can be linked to cultic practices (Müller-Karpe 1958:32; Stein 1976:29; Mogielnicka-Urban 1997:19). R. Bradley's research of the archaeology and ethnography of natural places in the landscape indicates that crevices formed in rocks and boulders by cold weather were the focus of ritual behaviour of the Saami (Bradley 2000:3-6). Rock fissures, caves, springs and the (sea)shore, may have been considered by past pagan societies as places where heaven, hell and the present come closest together so that sacred powers manifest themselves most strongly, facilitating communication with the supernatural (Bradley 2000:27-30). The potential physical irreversibility of silver deposits placed in crevices (two were only found when rocks were blasted with dynamite during land clearance), similar to those found in the watery environment, is underlined by their intentional irreversibility: none of them was found in a container or any indication of such.

4.4.5 Markers, runestones and boundaries

The largest group of hoards whose circumstances of discovery provide an indication of their context are deposits found under or near large stones or rocky outcrops, comprising 22% (14 of 65) of Svealandic hoards.⁸⁰ It is likely that such relatively easily identifiable features were used as convenient markers facilitating the discovery of the hiding spot, as we have seen in Pomerania.

However, it is not impossible that some hoards found near stone markers may have been associated with ritual and symbolic activities. An indication of such behaviour is suggested by a deposit from Toresunds-Sundby (CatNo506) discovered during excavations in a Viking-Age cemetery in 2005 (Sundberg 2007). The silver was found around a so-called 'grave-like structure', comprising a large stone (c. 0.7m tall), around which burnt bones were found alongside numerous finds of ritual character including a possible amulet in the form of a

⁸⁰ CatNos: 485, 489, 491, 493, 500, 505, 509, 510, 517, 531, 534, 544

miniature blade. Another example is Härminge deposit (CatNo485), discovered by a large stone on the beach of Lake Mosjön. By the time of its discovery in 1890 the lake had undergone two stages of drainage, in the 1850s and 1880s, reducing its area by 2500 hectares (Aspling et al. 1922). It is, therefore, very likely that this hoard was intended to be deposited permanently in a watery environment. Probably a similar interpretation can be applied to a deposit from Spånga (CatNo491), found between two large stones at the edge of a bog within a basin of Lake Stora Rudsjön. These examples allow perceiving some of the silver finds associated with stone markers as deposits placed in the environment which may be associated with ritual practices (cf. Chapter 4.4.4). The liminal character of these locations chimes with the possible interpretation of Svealandic deposits associated with stone markers as an expression of behaviour associated with the symbolic creation, maintaining and protection of boundaries of the allodial land as suggested by the research of Zachrisson (1998, cf. Chapter 2.4.4). I will expand on this possibility in Chapter 4.6.2 following the regression analysis.

4.4.6 Proximity to waterways and the coast

The comparison of distances to nearest lakes and rivers (Figure 4.18) indicates that settlements and hoards both tend to be located near sources of water (34% of hoards and 35% of settlements were found within 1km). When we consider only the major rivers (scoring 4 and more in the Strahler classification) and major lakes associated with them, which are more likely to have served as thoroughfares for transport and trade as we have seen in Pomerania, the difference between these two categories, unlike in Pomerania, is negligible in the low distance bands (Figure 4.19): within 1km it is just 3% and within 2km 1%. Moreover, the overwhelming majority of hoards (69%) and rural settlements (75%) were located at distances of over 5km from major waterways. This reflects the fact that major rivers do not occur in the heartland of Svealand, but rather in the western and south-western parts of the case study. In those areas the proportion of hoards deposited within 1km of major rivers is nearly 44% (7 of 16 findspots)

as opposed to the overall average of 11%, indicating the importance of these communication routes for hoard deposition in the Svealandic periphery.

The distances from the coastline c. 900 AD (Figure 4.20), including Lake Mälaren which was a brackish inlet of the Baltic in the Viking Age, show a strong relationship between hoards and the coast. In comparison, rural settlements appear to stay away from the coastline. The coast, which for the most part was immediately accessible to large fleets of large ships, made any nearby undefended settlements more vulnerable to waterborne attacks and raids, in a way similar to that observed at Pomeranian rivers. Similar to Pomerania, although admittedly the evidence is not as strong, there is an indication that in the later stages of the Viking Age, probably at the time of centralisation of power by the Swedish kings, enough security was provided to tease settlements out towards the coast. Although there is little exact dating available to trace these changes in the settlement material accurately, it appears that settlements with earlier roots were found on average (median) 3.4km from the coast, whereas settlements established in the Viking Age were located at 2.5km.

The reasons for the close proximity of hoards to the seashore combined with the general dissociation of settlements from the coastal zone may not be immediately clear. But we should not forget that shores of the major waterways and the sea were despite all the dangers easiest to access from the regional and long-distance trade routes linking the Baltic emporia and central places and also that a fair amount of trading may have been undertaken directly from ships. It is not impossible that merchants after concluding a successful transaction and acquiring large amounts of silver, in the face of a perilous journey home, may have decided to protect some of their capital by burying it in the belief that they will return there on the next trading expedition in the near future. During the next enterprise they could, therefore, avoid the danger of transporting their capital back again, and simply 'withdraw' the hoarded silver and use it in a new set of market transactions. It can be expected that such deposits would be placed outside

the densely populated areas, limiting the likelihood of unwanted attention and, most likely, marked out in a generally alien environment. I will return to this intriguing possibility in Chapter 4.6.2.

4.4.7 Soils

Another issue that I would like to raise in this section is the association of Svealandic hoards with different soil types. As we have seen, because of the geology of Central Sweden where sandy soils comprise only a small proportion of the area, it was necessary to compare the dominant moraine soils with the second largest group of clay soils. The results of the analysis for settlements have been presented in Table 4.3. For convenience I present below a summary of these findings supplemented by information on density per 100km² and the results of the analogous analysis undertaken for Svealandic hoards (Table 4.4).

	Clay			Moraine			Percentage difference in density (moraine/sand)
	area/ number	proportion	density/ 100km ²	area/ number	proportion	density/ 100km ²	
Soils							
	7898km ²	24%		11935km ²	36%		
Settlements							
Migration Period	50	53%	0.63	17	18%	0.14	127%
Vendel Period	60	57%	0.76	19	18%	0.16	130%
Viking Age	72	40%	0.91	46	26%	0.39	80%
Hoards							
Viking Age (all)	21	32%	0.27	23	35%	0.19	35%
Viking Age (exact location)	8	32%	0.10	11	44%	0.09	11%

Table 4.4 Comparison of association of site/find types and main soil types in Svealand.

Comparison with hoards shows clearly that despite Viking-Age settlements being predominantly located on the richest, but also heaviest clay soils, contemporary hoards are significantly more likely to be deposited in the more available and generally better draining, but traditionally far less exploited moraine, particularly sandy moraine soils. Having considered similar results from Gotland and Pomerania it is possible to suggest that the most intensive hoard deposition in the Viking-Age Svealand was focused on newly colonised lands in previously marginal areas.

	Traditional			Marginal			Percentage difference in density (traditional /marginal)
	area/ number	proportion	density/ 100km ²	area/ number	proportion	density/ 100km ²	
Soils							
	8245km ²	25%		16886km ²	51%		
Settlements							
Migration Period	55	58%	0.67	38	40%	0.23	98%
Vendel Period	63	59%	0.76	42	40%	0.25	101%
Viking Age	77	43%	0.93	96	54%	0.57	48%
Hoards							
Viking Age (all)	22	34%	0.27	43	66%	0.25	8%
Viking Age (exact location)	7	28%	0.08	18	72%	0.11	32%

Table 4.5 Comparison of association of site types with traditional and marginal soils in Svealand.

Clay and moraine soils in Svealand, like moraine and sandy in Gotland, comprise together just 60% of all soils available within the case study. By applying a method devised for Gotland (Chapter 2.4.9) it is possible to propose a more holistic approach where less common soils types with recorded evidence of Viking-Age activity are included (Table 4.5). The new comparison shows first of all that the variety of soils used in the earlier periods was much greater than implied by the initial analysis of the main soil types. Nevertheless, the preference for traditional

soils is clear throughout the Migration and Vendel periods, particularly when the density of settlements is considered. Secondly, by the Viking Age the overall weight of settlement patterns moves visibly towards previously marginal soils, almost reversing the proportion of the Migration Period. Although the occupation of marginal soils was far more pronounced than in the other two case studies, it appears that it was more dispersed than in the traditional core of predominantly clay soils. Thirdly, just as in Gotland and Pomerania, Svealandic hoards display the most strongly pronounced preference for marginal soils, particularly clear among hoards whose exact location is known, with density c. 32% higher (percentage difference) than on traditional soils.

The above analysis indicates that the traditionally cultivated soils were gradually abandoned for the previously less exploited lands: the proportion of Viking-Age settlements is 11 percentage points higher on marginal, than on traditional soils. But that the occupation in the liminal areas was significantly more dispersed: the density of settlements on marginal soils in the Viking Age was c. 48% lower (percentage difference) than on traditional soils despite a reduction from c. 101% percentage difference in the Vendel Period. The movement towards marginal soils is much more pronounced within Viking-Age hoards which dominate on marginal soils. Also their density is up to 32% higher on marginal than on traditional soils in cases where the exact findspot is known. Overall, it appears that Svealandic hoards are related to settlement dynamics but, statistically speaking, they seem to lead the process of shifting to the marginal lands.

4.4.8 Modern land use, and data bias

In Svealand 54% of hoards were found within the modern agricultural landscape and 26% within areas of modern urban fabric and infrastructure (cf. Appendix A, A1.3.3). It can be, therefore, argued that in these areas the impact on archaeological features and artefacts was highest, resulting in the highest concentrations of discoveries. On the other hand, the impact of urban expansion may be responsible for the paucity of *in situ* archaeological remains (e.g. in

Stockholm). However, 53% of Viking Age settlements were discovered within the modern agricultural landscape and 37% in the urban fabric. The similarities between ratios of discovery of hoards and contemporary settlements may, therefore, indicate that patterns of the observed hoard (and settlement) concentrations are influenced by a data bias. However, the economically most desirable areas offering good soils, communication and strategic location, have been subject to the highest impact from farming and urbanisation for exactly the same reasons as when they were exploited in the Viking Age. Overall, I agree with Zachrisson who determined that hoard distributions in Central Sweden are representative of the past (1998:75-79) and would argue that although the influence of the data bias cannot be ignored, the observed patterns were not determined by it. This statement holds less true for contemporary settlements. When compared to the distribution of the Viking-Age runestones, known settlements datable to the period are poorly represented in western Södermanland, and western and easternmost parts of Uppland. The combination of these two categories of archaeological data as – however imperfect – indicators of Viking-Age settlement (Chapter 4.4.1) makes this problem manageable for the purpose of the following analyses.

4.5 Regression analysis

In Svealand I used the same regression modelling method as in Pomerania and Gotland (cf. Appendix A, A2.4) in order to determine what combination of the proposed explanatory variables discussed above can best explain factors behind the observed spatial patterns of hoard deposition.

The dependent variable (i.e. density of hoards) was analysed in a model space defined by 55 hexagonal polygons with a diagonal of 40km, which corresponds to the 20km-search radius used in the kernel density estimation. The tested explanatory variables included:

- number of Viking-Age settlements (setcount)

- distance from the nearest Viking-Age settlement (setdistS);
- number of Viking-Age cemeteries (burcount);
- distance from the nearest Viking-Age cemetery (burdistS);
- number of Late Iron-Age cemeteries (bLIAcount);
- distance from the nearest Late Iron-Age cemetery (bLIAdistS);
- distance from the nearest archaeologically confirmed central place active in the Viking Age (ncpdist) as defined at the beginning of the chapter, including emporia of Birka and Sigtuna, the religious centre at Gamla Uppsala, royal residence at Adelsö, and the trade centre in Eskilstuna;
- number of central places (ncpcount)
- number of Viking-Age runestones (runcount)
- distance from the nearest Viking-Age runestone (rundistC);
- number of Viking-Age settlement indicators, i.e. settlements and runestones (setindcount);
- distance from the nearest Viking-Age settlement indicator (setinddistC);
- number of indicators of Viking-Age activity (settlements, runestones and burials) (occindcount);
- distance from the nearest Viking-Age activity indicator (occinddistC);
- distance from the nearest major river (rmdistS);
- distance from nearest body of water (any river or lake) (radistC);
- distance from coastline at c. 900AD (including Lake Mälaren) (coadistC);
- area occupied by modern forests (forestarea);
- area under modern agricultural use (agriareaS);
- area of modern urban fabric and transport infrastructure (urbareaC);
- area occupied by moraine soils (morarea);
- area occupied by sandy soils (sandareaS);

- area occupied by clay soils (clayareaS);
- area occupied by traditional soils (tradareaS);
- area occupied by marginal soils (margarea);
- categorical variable describing whether a hexagon is associated with the coastline (coastal)

Model Svealand (mod40.3) equation:					
glm(formula = hoardno ~ setinddistC + coadistC + ncpcount + setindcount + margarea, family = poisson, data = hex40a)					
Deviance Residuals:					
Min	1 st quartile	Median	3 rd quartile	Max	
-2.78875	-0.67096	-0.23478	-0.09503	2.54262	
Coefficients:					
	Estimate	Std. Error	z value	Pr(> z)	
(Intercept)	-0.37647	0.80277	-0.469	0.639096	
setinddistC	-0.91667	0.292831	-3.130	0.001746	**
coadistC	-0.33781	0.189945	-1.778	0.075331	.
ncpcount	0.512862	0.199967	2.565	0.010326	*
setindcount	0.012184	0.00347	3.511	0.000446	***
margarea	0.004431	0.001346	3.292	0.000996	***
Significance codes:	*** 0.001	** 0.01	* 0.05	. 0.1	
(Dispersion parameter for Poisson family taken to be 1)					
Null deviance: 183.750 on 54 degrees of freedom					
Residual deviance: 49.364 on 49 degrees of freedom					
AIC (Akaike information criterion): 112.16					
Pearson's chi-squared test (χ^2): 0.4585665					

Table 4.6 Summary of the Svealandic GLM regression model calculated in RStudio

Calculations based on the above variables produced a series of fitting models, with the most successful summarised in Table 4.6. The model comprised a set of statistically highly significant explanatory variables, with significance well below 0.1, which means that their confidence level ranged from over 90% to nearly 100%. The AIC score of 112.16 was the lowest of all tested models, and indicates a good relative quality of the model for a given set of data. The Pearson's chi-squared test (χ^2) returned p-value of 0.49, meaning that the model is correctly specified. In the half normal plot (Figure 4.21) the simulated envelopes contain all of the absolute Pearson residuals, which confirms that the model is correctly specified and no significant outliers are present. However, the plot highlighted hexagon 20 located in the area of the concentration at Mörkö as a borderline case. The most likely reason for this situation is that the equation was hard pushed to fit this area without the relevant data on a contemporary central place. This may provide an indirect validation of the possible role of Tegneby (Chapter 4.3.7) in facilitating the influx of silver as a central place, however without relevant, and as yet unavailable, archaeological data it still remains a conjecture. Finally, the results of the Moran's I analysis on the model's Pearson residuals indicate that the model is correctly specified in the spatial sense (Figure 4.22).

The model confirms the results of spatial and contextual analysis discussed above. As in Pomerania the model rejected variables describing the extent of modern agriculture and urbanisation which implies that the potential bias discussed above had no statistically significant influence on the observed hoard concentrations. The model suggests that the formation and intensity of hoard concentrations is statistically most significantly influenced by the association with areas with the highest density of Viking-Age settlement indicators (setindcount) and to a lesser degree by proximity to them (sentinddistC). These results are not as explicit as in Gotland or Pomerania, but in my opinion suggest the correlation of silver deposits with the productive landscape, and perhaps with the marginal parts of this landscape. This is because just a small number of Svealandic hoards were found within contemporary rural settlements themselves

and the majority of settlement indicators comprise runestones which arguably in Central Sweden can be associated with boundaries of allodial lands. Similarly to Gotland and Pomerania the possible association with farmland rather than settlements is reinforced by highly significant correlation with marginal soils (margarea). Our spatial analysis of hoard distributions highlighted the association of a number of clusters with contemporary political, economic and/or religious centres including emporia at Birka and Sigtuna. This association has been picked up by the regression model since the presence of a central place (ncpcount) was a statistically significant factor for the formation of the said hoard concentrations. However, in Svealand this association is clearly not as strong as it was in Pomerania, and is reflected by the comparatively lower significance of this correlation, lower in fact by an order of magnitude (cf. Table 3.4). The presence of an emporium was not indispensable for the inflow of silver and eventually for hoarding to occur, as we have seen in Gotland where it was facilitated by relatively open access to the coast focused at a number of harbours and landing places. Unfortunately in Svealand no research similar to the Gotlandic survey of Carlsson (1999; 2008) has been undertaken. However, the importance of accessibility to the coast, which would have been particularly important for the concentrations at Stockholm, Norrtälje and potentially Mörkö, has been highlighted in our regression model (coadistC).

4.6 Reasons for (non-)retrieval of silver

4.6.1 'No data' hoards, soil chemistry and silver weight

The structure of Svealandic hoards grouped on the basis of the absence/presence and the type of a receptacle places it somewhere between what has been observed in Gotland and Pomerania. Only c. 30% of Svealandic hoards were deposited in containers, including pottery and metal receptacles but also organic and suspected organic. In some, protection measures were employed: the hoard from Näs (CatNo533) was found in a copper cauldron covered with a

stone disc and wrapped in birch bark, the second hoard from the excavations at Sigtuna-kv. Professorn 1 (II, CatNo538) was found wrapped in linen and placed in a wooden chest, and in Thuleparken (CatNo489) the silver was deposited in an oblong lead vessel which in turn was inserted into a leather bag. For a further 8% of hoards there is sufficient information to establish that they were deposited without any kind of container. This leaves c. 62% of hoards which have no information if any kind of container was present or not (Figure 4.23).

Some of these may have originally been deposited in organic containers which did not survive. The comparison of pH and TAWC in different categories of hoards with the overall mean of all deposits (Table 4.6) confirms observations made in Gotland and Pomerania: that hoards discovered in organic containers were deposited in relatively humid and acidic soils whereas hoards for which the presence of a container can be suspected were discovered in the least acidic and driest soils. By applying the respective soil chemistry cut-off values to the 'No data' category, only 7 Svealandic deposits (11% of all hoards or 18% of 'No data') may have originally been deposited in containers (Figure 4.24). The proportion of such hoards is higher than in Pomerania and Gotland, at least partially inflated by the relatively small size of the sample,⁸¹ but is still not high enough to claim that the majority of containerless hoards were originally placed in containers which simply did not survive.

Container type	Mean pH	Mean TAWC
All finds	5.545	54.213
Organic	5.423	54.023
Suspected organic	5.678	49.240
Pottery	5.482	46.791
None	5.535	61.413
No data	5.465	58.727

Table 4.7 Comparison of soil chemistry in Svealandic hoards grouped by the type of a container

⁸¹ The number of 'No data' hoards which could be reclassified based on the soil chemistry data was similar in Pomerania (6 deposits) and certainly lower than in Gotland (16 deposits).

The chronological structure of Svealandic hoards expressed as a proportion of all hoard discoveries by quarter-century indicates that from the beginning of the 20th century the proportion of 'No data' hoards is generally lower than the median average. This impression is also visible in the years after the mid-20th century when we apply a 95% confidence level to the calculated median (Figure 4.25).⁸² However, one has to be aware that 65 Svealandic hoards translate to very small numbers of discoveries per quarter-century, and in the period 1950-1974 it is based on just two, and after 2000 four discoveries. If only periods with the number of discoveries comparable to Pomerania were included, it is only in the last quarter of the last century that the proportion of 'No data' hoards is significantly lower than the overall median (and only by 4%). Moreover, even in this period associated with the vested archaeological interest in silver hoards, the proportion of contained discoveries is lower than in the period 1850-1874 (Figure 4.26). Furthermore, just as in Pomerania and Gotland, even the earliest finds from Svealand, if found in containers, were reported as such, e.g. the detailed description of the protection of the aforementioned hoard from Näs, discovered in 1704. The statistical comparison of silver weight distribution (Figure 4.27, cf. Appendix A, A2.5) also implies a closer similarity between interquartile ranges of 'No data' and 'None' category, rather than contained hoards, not as pronounced as on Gotland, but still clearer than in Pomerania. Although, admittedly, in Svealand my theory does not find as strong confirmation as in Pomerania and Gotland, I believe that the information presented provides sufficient evidence that the majority of deposits from the 'No data' group, except for those reclassified as a result of the soil chemistry analysis, were deposited without a receptacle and without the aim of retrieval.

Combining data on the presence/absence of containers – taking into account hoards reclassified by the soil chemistry analysis – with the calculated weight of silver resulted in exactly the same

⁸² Given the low number of Svealandic hoards per decade resulting in an almost binary structure, I had no other choice but to calculate the median average and the confidence level based on proportions per quarter-century (cf. footnote 43 in Chapter 2.7.1).

pattern as in Gotland and Pomerania: smaller hoards are significantly more likely to be deposited without containers, whereas larger deposits tend to be placed in containers. The ‘tipping point’ at which hoards become deposited more often in containers falls in Svealand at approximately 400g (Figure 4.28).

The 400g cut-off is equivalent to approximately 2 marks of weighed silver (e.g. Edvinsson and Franzén 2015:384). In Gotland the weight of the majority of contained hoards was equal to three marks of weighed silver and by references in the *Guta Lag* it was possible to suggest that they acted as a ‘portable but standardised medium for the payment of social obligations’ (Bradley 1987:358).

With regard to Svealand such a correlation is much harder to prove for several reasons. Firstly, *Guta Lag* is probably almost a century earlier than the laws of Uppland (*Upplandslagen*), the main legal document for the heartland of early-medieval Sweden, written down in the late 13th century and ratified by King Birger in 1296 (Peel 2009:xxxix; Brink 2013:436). This makes the argument that *Upplandslagen* reflect the legal situation in the Viking Age over 250 years earlier weaker.⁸³ Although the preamble claims that some of the laws were authored by ‘a pagan in pagan times’, nowhere does it stipulate which of these laws were retained in the final version (Holmbäck and Wessén 1933:7). Secondly, the financial penalties listed in *Upplandslagen* are stipulated in counted rather than weighed silver. This situation is similar to Gotland, however *Guta Lag* provides a hint of an ‘exchange rate’ of four marks of counted silver to one mark of weighed silver (Peel 2009:198). No such hints are available for Uppland. In fact, R. Edvinsson and B. Franzén (2015:387) show that this relationship changed quite dramatically over time and by the end of the 13th century when *Upplandslagen* were codified, the ‘exchange rate’ may have been anywhere between 3 and 4.5 marks of counted silver to one mark of weighed silver.

⁸³ Whereas for *Guta Lag* J. Peel is able to do so quite convincingly (2009:xxiv-xxv).

Most penalties codified in *Upplandslagen* for accidental homicide, serious injury, theft, robbery and forgery, and even for suspicion of extramarital sex start at 6/7 marks of counted silver (*Ärvdabalken* V; *Manhelgdsbalken* II, V-VII, X, XX, XXIV, XXIX, XXXIV, XLVIII; *Köpmålabalken* I). This is equivalent to between 1.5 and 2.33 marks weighed silver depending which ‘exchange rate’ one would apply. With the above discussion in mind, it is not impossible that at least some of Svealandic savings hoards were kept for payments of social obligations.

4.6.2 Discussion

By cross-referencing the presence/absence of a container and the weight of hoarded silver with the interpretative categories outlined in Chapter 4.4 it is possible to propose an estimation of the balance between the economic and extra-economic reasons for deposition of Svealandic hoards (Figure 4.29). However, the problem with low overall number of finds is even more pronounced when they are divided between contextual categories. The following conclusions, therefore, need to be treated with caution.

I will begin my discussion with hoards found in the settlement context, including the emporia of Birka and Sigtuna, since they comprise the majority of archaeologically excavated examples. Svealandic settlement finds are dominated by hoards deposited in containers,⁸⁴ which would have facilitated their reversibility. In 6 cases they were deposited near or within contemporary buildings so as to be accessed with relative ease and replenished when needed. It could be argued that these finds are more likely to represent economic aspects of hoarding and could be perceived as savings. The reasons for their non-retrieval are most likely due to dramatic events and some calamity befalling the owner(s) – nearly all of Birka hoards⁸⁵ and Sigtuna-kv.

⁸⁴ CatNos: 513, 514, 516, 523, 537, 538, 548

⁸⁵ Except for Birka III (CatNo515), whose context is unclear. It was found in 1991 in layers disturbed by H. Stolpe’s 19th-century excavations.

Professorn 1 (II, CatNo538) were found in layers of intensive burning and associated with destruction horizons.

However, the majority of hoards associated with dramatic events in Svealand were contained, but weighed below 400g and I would be inclined to see them as haphazard collections of wealth hidden in the face of danger as emergency hoards. A good example is the Birka IV hoard (CatNo516), excavated in 1991 within a demolition layer associated with a burnt-down house. The hoard was originally deposited in an organic container, a small wooden box or a purse, and besides silver comprised personal possessions and mercantile paraphernalia such as beads, weights and a possible seal. To all intents and purposes this collection of wealth and personal belongings was abandoned in connection with a fire, which turned them into amorphous lumps not recognised and retrieved when the area was cleared and rebuilt.

Svealandic results provide another piece of evidence to confirm similar observations made in Pomerania and in Gotland: large contained hoards most likely represent unclaimed savings, and their smaller contained versions were more likely emergency deposits to be retrieved in the future, but unclaimed due to some tragic fate befalling the owner(s).

Not all Svealandic settlement deposits were contained. Just over a third of them were small and found without a container or any indication of such. It could be argued that they may have been small volumes of 'petty cash' kept in sight within dwellings for regular expenses, left behind for whatever reason. Archaeologically any traces of a container would be unlikely to survive. However, the only archaeologically investigated example of such deposits I am aware of comes from Olhamra (CatNo546), where a small collection of Oriental coins was found in the corner of a presumed Viking-Age building (Zachrisson 1989:340-341), although their contemporaneity is questionable. Even if the deposit was associated with earlier stages of the building, which may have been reused in the medieval period, the evidence for such containerless deposition elsewhere is scarce. In fact, 85% of small containerless deposits in Gotland (168 deposits) and

89% in Pomerania (41 deposits) were found beyond contemporary settlements or their immediate vicinity. Coins in the Olhamra hoard were spread within a shallow pit located towards a corner of a building whose final phase was approximately 200 years later than the *tpq* of the hoard. In my opinion the Olhamra deposit should be associated with extra-economical practices as a placed deposit belonging to the sphere of foundation offerings. Two other placed deposits from the settlement context were found in similar circumstances: well-excavated finds from Sigtuna kv. Humlegården (CatNo536) and Hjulsta (CatNo540) were spread within levelling layers prior to the construction of contemporary dwelling structures. The interpretation of small containerless deposits as placed deposits, made in the character of offerings of personal possessions for ritual or symbolic 'transactions' is, therefore, well evidenced archaeologically in Svealand and confirms the observations made in Gotland and Pomerania.

This interpretation is confirmed by the type of finds recovered from crevices, which have strong archaeological and ethnographic association with cultic practices (Chapter 4.4.4): all these deposits were made intentionally irreversible through the lack of a container and 75% of them were small and containerless. The same proportion of placed deposits can be observed among the Svealandic deposits made within cemeteries, near or within stone settings of earlier burials. The well-excavated hoard from Toresunds-Sundby (CatNo506) indicates that deposition of hoards within cemeteries was of ritual character, presumably a form of ancestral cult, and a way of building a symbolic relationship with ancestors laid to rest within a cemetery (Zachrisson 1998:264), presumably serving to legitimise one's claim to ancestral land. One hoard found in the context of burials, Sundveda (CatNo532), was deposited in a suspected organic container within the mound of a Vendel-Period burial overlooking a nearby Viking-Age settlement. Since burial barrows are visible markers within the landscape even today, this example confirms observations made in Pomerania and Gotland: burials served a parallel function as places where

one's savings may have been hidden away from the prying eyes of neighbours⁸⁶ and facilitated relatively easy identification of the findspot. Of course the added benefits of a symbolic ancestral protection cannot be dismissed.

The predomination of placed deposits in cemeteries and particularly in rock crevices clearly resembles the pattern of deposits placed in watery environments in Gotland and in Pomerania. In Svealand deposition in the watery environment is also dominated by containerless finds (75%). Veneration of the watery environment is well attested in Norse culture and in contemporary sources. Adam of Bremen provides a tantalising insight into the meaning of bodies of water and – indirectly – into hoard deposition:

[At Uppsala] There is also a spring at which the pagans are accustomed to make their sacrifices, and into it to plunge a live man. And if he is not found, the people's wish will be granted (*AoB* B4 Scholion 138(134)).

The fragment suggests that the outcome of a divination was considered fortuitous only when the body could not be retrieved. This belief was held not only by Norse societies. Pausanias, a Greek geographer of the 2nd century, tells a story of people living at Lake Ino where during a festival the inhabitants used to throw loaves of bread into the lake – if they were 'taken' by the water it was considered a good augury for the person who threw them in (Bradley 2000:24). This hints, I believe, at the importance of the irreversibility of the act, going even beyond the death of the victim at Uppsala, which itself was certainly irreversible. In the context of silver hoards this could mean that the act of making a deposit irreversible physically through deposition in a watery environment and/or symbolically depositing it without a container is a strong indicator of the ritual aspect of hoarding.

In Svealand the majority of containerless deposits found in the watery environment belonged to the smaller variety, i.e. placed deposits, supporting their posited association with ritual.

⁸⁶ See Samuel Pepys' preoccupation when retrieving buried gold under cover of darkness (Chapter 2.7.1).

Somewhat surprisingly one deposit discovered in Eketorp (CatNo484) in an area previously occupied by a marsh was found in a wooden chest, which would imply intention of retrieval. On the other hand deposition in a watery environment is indicative of association with ritual, as is its composition including a number of objects potentially imbued with ritual meaning: a figurine of a bearded man with a sword, coiled snake pendant, Thor's hammerlet, and a miniature chair/throne (Graner 2007:85-93). C. Fabech (2006:28-29) suggests that the objects were part of a 'temple hoard' adorning idols at a local *hov*, and may have been hidden by a local *goði* in a nearby swamp to rescue them from Christian profanation: the hoard was located near a nunnery in Riseberga, where the archaeological evidence indicates an early conversion. This context suggest an explanation of the paradox of the Eketorp hoard: although deposition in a watery environment may have been deemed most suitable for pagan holy objects, it was not intended as permanent. Instead, as suggested by the container, the hoard was probably meant to be retrieved once the potential threat from the Christians had passed; the presumed *goði* did not know that the Christianity was there to stay.

Similar exceptions suggest that reasons for deposition in other interpretative contexts were equally complex. One such group are hoards found under or near stone markers. Over a third of them had the characteristics of savings and finds from Stortorp (CatNo509) and Lindby (CatNo517) (14% of the group), may have been emergency deposits.⁸⁷ Only one of the contained hoards buried by stone markers was found within 2km of the nearest contemporary settlement and on average (median) they lay c. 4km away. At the same time these deposits were located on average (median) within c. 1km of the nearest runestone. It appears, therefore, that contained hoards found at markers were focused in liminal areas, which strikes a parallel with

⁸⁷ Lindby was curiously found alongside an iron axe. The presence of an axe may be potentially indicative of a struggle in anticipation of which the owner(s) decided to hide the wealth (and why he never retrieved it), but it may also be interpreted as a form of additional, ritual protection of the deposit from falling into the wrong hands. According to Н.Ф. Познанский (after Макаров 1981:262) sharp-edged iron objects such as axes and knives provided magical protection of the deposits and examples of such items are known from the 10th-century silver hoards in Russia e.g. a sword blade was found in one of the hoards from Gnyozdovo and a battle axe rested on the hoard from Musorka (Макаров 1981:263).

Pomerania, meaning that they can be interpreted as savings or 'refugee' emergency hoards of Svealandic populations. Intriguingly, contained hoards associated with markers were also located on average (median) within c. 300m of the coast or major river systems, including the aforementioned hoard from Lindby, deposited opposite the main harbour of Birka. This implies that contained hoards deposited by stone markers can be linked to trade and interpreted as surplus silver hoarded temporarily between trading expeditions (cf. Chapter 4.4.6).

With regards to 21% of placed deposits associated with stone and landscape markers, the intentionally irreversible deposition at places identifiable in the landscape and presumably imbued with social and symbolic meaning could be associated with symbolic aspects of creating and maintaining boundaries. This possibility, explored in more detail in our Gotlandic chapter, is in Svealand supported by the fact that the median distance from marked placed deposits to the nearest settlement was c. 14km. Similarly, they were found 7 times further away from the coast or major rivers than the contained group (2km vs 0.3km), but intriguingly in a similar median distance to runestones which are arguably associated with boundaries where they constituted symbolic gateways to the farm domain (Chapter 4.4.5, cf. 2.4.4). The fringe location of placed deposits found at markers is clearly visible when overlain on the density heat map of Viking-Age settlement indicators (Figure 4.30). Without exception all of them are on the very edges of the densely settled areas. In contrast only one of the contained group lies in a similar position, but this is only due to the relative paucity of settlement data in the south-western Södermanland.

Unfortunately for 42% (27 of 65) of Svealandic hoards the information on context of deposition (archaeological or reconstructed from descriptions of discovery) simply does not exist. Still, some conclusions may be drawn from their association with traditionally exploited and marginal soils discussed above. The contained hoards in both areas are located at similar distances to contemporary settlements (median c. 4.5km), however this result is skewed by paucity of hoards

in parts of the case study. Once these are excluded from the statistics⁸⁸ it appears that contained hoards found in traditional soils were on average (median) 0.6km from the nearest settlement, whereas on marginal soils they were on average over 4km away. These somewhat doctored results are, however, confirmed by using a proxy for areas occupied in the Viking Age, i.e. the combination of settlements and runestones: the indicators of Viking-Age settlement were on average 0.6km on traditional, and on marginal soils 1.8km from the nearest contained contextless hoard. This implies the liminal character of marginal soils, as in Gotland and Pomerania. Interestingly and contrary to what was observed in these two case studies, the proportion of savings hoards on marginal soils is higher. Their substantial distance from contemporary settlements would make them inconveniently inaccessible as working accumulations of capital. They were, however, located on average (median) just c. 800m from the coast and riverine communication routes, which may imply their closer association with trade routes in the same capacity as contained hoards deposited by stone markers: surplus silver hoarded temporarily between trading expeditions.

Crucially, however, the otherwise contextless Svealandic hoards have the second highest proportion of placed deposits and thus suggest an association with symbolic and ritual behaviour. As we have seen, throughout the Viking Age settlement patterns shifted quite dramatically from the soils exploited predominantly in previous periods towards more marginal, better draining, mainly sandy and moraine soils. The regression analysis highlighted the importance of hoarding in this process. Collating this with the marginal location of placed deposits in Svealand⁸⁹ allows me, I believe, to invoke the explanation proposed for Gotland, where I argued that small containerless deposits may have been placed to form a bond between the owner and newly colonised lands (cf. Chapter 2.7.2). Contrary to Gotland and Pomerania

⁸⁸ The excluded hoards had no known contemporary settlements within 10km radius.

⁸⁹ Approximately 5km from the nearest contemporary settlement and c. 3km from the nearest settlement indicator.

(Chapters 2.7.2 and 3.6.2), in Svealand the proportion of placed deposits (i.e. small containerless) in marginal soils is lower than in traditionally exploited lands (40% vs 58%) and they are also located closer to contemporary settlements (median average 5km on traditional vs 2.5km on marginal soils) and settlement indicators (3km vs 2km). This problem is undoubtedly compounded, if not caused by the low number of Svealandic finds, particularly when divided into the interpretative contextual categories, aggravated further by an equally small and unevenly distributed sample of known contemporary settlements. But one should not dismiss this anomaly out of hand or rule out a possibility that perhaps it does reflect a situation peculiar to Svealand. Here, placed deposits made in marginal soils are located significantly closer to the coast than their equivalents placed in traditional soils (0.2km vs 0.9km). This could mean that the main 'push' towards the new lands was following the retreating sea and the rich, desirable pasture it offered. The average rate of the post-glacial uplift in central Sweden is still c. 1cm/year (Fjeldskaar et al. 2000:1418). This may not seem much in terms of a vertical drop of the sea level over the course of the Viking Age, but a c. 2m drop would have released land in a belt of several dozen to several hundred metres wide depending on the local topography. The effect was probably magnified by the drying up of waterlogged coastal meadows. In fact within 1 km from the coast marginal soils are nearly 2.5 times more abundant than traditional ones (2746km² vs 1136km²). A similar process can be observed in Gotland, although there it is far less pronounced. Since dispersed settlements were also moving towards the coast throughout the Viking Age (Chapter 4.4.7), the closer proximity of hoards on marginal soils to settlements may not be a problem, but rather represent a dynamic unique to Svealand, resulting from effects of the post-glacial uplift.

5 Composition and patterns of hoard deposition

– a chronological perspective

5.1 Composition

The discussion of hoard concentrations in Chapters 2.3.1, 3.3 and 4.3 highlighted the importance of a chronological dimension for hoarding patterns, especially in Pomerania and in Svealand. As a point of departure for the following discussion I will take the period of the 980s, which in a preceding analysis came across as exceptionally influential: a time of significant political instability recorded by the written sources and the archaeological evidence, a time when events taking place in the latter years of the preceding decade culminated and combined with changes in the supply of silver.

In Svealand the 980s were marked by a possible hiatus in hoard deposition. It followed the abandonment of Birka and preceded the evolution of Sigtuna from a political springboard for the ambitions of Olaf Skötkonung to a centre involved in long-distance trade. A period of political instability associated with Erik Segersäll's challenge to the Danish influence in Svealand, which started in the mid-970s, culminated in 984 with the battle of Fyrisvellir (cf. Chapter 4.3.1). It is unclear if the collapse of Birka was the cause or a result of the political struggle, but it must have aggravated an already unstable situation. The state of affairs in Svealand, as in the rest of the Baltic zone, was undoubtedly compounded by the political instability in contemporary continental Russia. The turmoil caused by the exile of Vladimir from Novgorod in 977 until at least the mid-980s when the prince retook Rus lands in armed conflict must have impacted on the flow of Oriental silver into the Baltic zone.

Contemporaneously, in 983 in the Slavic lands on the southern coast of the Baltic a major uprising against Saxon domination broke out. Sparked in Rethra by the Lutici federation, it soon spread to their western neighbours, the Obodrites, whose leaders swiftly took control of the

rebellion. The events undoubtedly reverberated among the tribes across Pomerania, particularly Wolinians, who were if not part of the Lutici federation than at least their allies (cf. Chapter 3.1.2). The uprising of 983 was the culmination of a string of smaller conflicts in Pomerania which, as we will see (cf. Chapter 5.1.2; Figure 5.1), may have disturbed the established networks of the inflow of Oriental silver. Pomerania, whose territory provided access to the Baltic, was clearly in the crosshairs of the emerging Polish state: the written sources describe Mieszko's fight with Weleti/Lutici and Wolinians already in the late 960s and the battle of Cidini in 972 may have been fought to secure Mieszko's western flank during his push towards the mouth of the Oder. It is possible that Mieszko's campaigns succeeded, at least temporarily, since possible evidence of a Piast presence in Wolin itself is represented by the final phase of the emporium's defences built in the last quarter of the 10th century in a 'hook' technique characteristic of the early Polish state (Stanisławski 2013:104).⁹⁰ According to P. Urbańczyk (2013:69) in the 980s Wolin, however, remained under the strong influence of Danish rulers, followed by Swedish domination until 995, when a Piast claim to Wolin could be traced by the marriage of Svein Forkbeard to the Swedish widow-queen Sventoslava-Sigrid, Bolesław Chrobry's sister. Urbańczyk's observation further underlines the political instability in the region in the closing decades of the 10th century. Even if the first Piasts did not succeed in taking or holding Wolin for long, they never gave up their ambition of securing a connection with the Baltic: in central Pomerania a Piast presence in the 980s is indicated by the substantial rebuilding of the stronghold in Kołobrzeg-Budzistowo in a 'hook' technique. It is also Kołobrzeg, not Wolin where the Piasts established their (short-lived) bishopric in the year 1000.

The lack of written sources makes it impossible to judge if a similar political instability affected Gotland. Nevertheless, the turmoil of the 980s described by the contemporary writers coincided

⁹⁰ This design affords an increased structural integrity of the defences by stabilizing logs that run parallel to the core of an embankment with several layers of regularly interspersed logs whose partially removed boughs constitute hooks used to lock the timbers together.

with significant changes in hoarding patterns, which can be traced in all three case studies in the rate of deposition as well as the internal structure of hoards.

5.1.1 Some methodological remarks and outline of the data used

Before I proceed with the discussion I would like to briefly outline some of its methodological aspects. In the following paragraphs devoted to the analysis of the chronological patterns in hoard composition I draw upon the numismatic aspect of silver deposits, mainly to investigate changes in the age structure of coins. I am not a trained numismatist and I use only the data readily available to me, which comprises Oriental coins (cf. Appendix A, A1.3.4). Naturally, the consideration of European coins would be beneficial, and would allow me to paint a more detailed picture of changes in the composition of hoards after the influx of silver from the East stopped. Unfortunately, the data on the European coinage in the chosen case studies is dispersed and very partial. The CNS series provided most detailed information for Gotland, however finds from only 25 out of 95 Gotlandic parishes were investigated. They comprise only 32 hoards with European money. The most extensive source of data, G. Hatz's catalogue published in 1974, considers only German coins and other components are treated summarily. Moreover, Hatz's lists give information for Svealand and Gotland, but not Pomerania. In Pomerania, the data which can be collated from the available publications, mainly in the PBA series, provides statistically reliable information for only a handful of deposits. The available numismatic data on the European coinage is, therefore, insufficient to undertake the sort of comprehensive and statistically robust analysis I conducted on the Oriental coinage. This significantly impairs making a reliable comparison between the two sets of data.

However, leaving out the European coinage does not impair the ability to make sense of the hoard material. Oriental coins remain present in the deposits until the end of the 10th and into the early decades of the 11th century. This allowed me to trace changes in the age structure and fragmentation of this category of finds even after their influx from the East was dramatically

reduced. Moreover, from the point of view of the intended analysis, Oriental coins have an advantage over European money and other types of silver artefacts. Dirhams can be precisely dated 'as even small fragments can usually be attributed to a ruler and a geographical area, if not to a specific mint and year' (Jankowiak forthcoming). This unique feature facilitated an explanation of the observed compositional changes and deposition patterns of silver hoards also in the later stages of the Viking Age. Secondly, it allowed me to suggest an alternative reading of the established interpretative conventions of silver flow in the Viking Age.

The discussion of the chronology of hoards is based primarily on their *tpqs* provided by the youngest coin in a deposit. S. Brather (1996:85-90) highlighted a number of methodological problems with the use of *tpq* mainly surrounding the long period of circulation of dirhams, which in his opinion makes it methodologically unjustifiable to create phases of importation shorter than two or three decades, and so he recommends phases of 80-100 years. C. Kilger (2007a:210-211) suggests that phasing in short periods of 20-40 years can be used to show changes in the flow of dirhams from the East, although this may be less suitable for determining the period over which the coins were used in the area of deposition. At the same time, the aforementioned finds from Torksey and Westerkief (Chapter 1.2) show that Oriental coins could reach Western Europe and be deposited there within 5 years of minting in Central Asia. In the Baltic zone this process was presumably even faster. Moreover, longer periods certainly capable of showing long-term patterns more reliably are likely to obscure short-lived fluctuations which may be of particular interest, as I experienced by analysing my hoard dataset in periods of 10, 20, 25, 50 and 100 years. Thus aware of the potential problems I nevertheless decided to initially analyse changes in the rate of deposition of hoards by a decade, so as not to lose the aforementioned fidelity. To account for the possibility that the almost complete hoarding hiatus in the north may be exaggerated by the traditional dating of Otto-Adelheid pennies, and also to limit the effect of small samples in short-time periods I decided to analyse the changes in the composition of hoards in 20-year intervals. In order to reduce the influence of very large or unusually composed

hoards,⁹¹ I applied the method used earlier for weight calculations (cf. Appendix A, A2.3), where the proportion of each type of artefact was first calculated separately for each individual hoard; subsequently, these hoard-specific proportions were used to calculate relevant median average values for each artefact category within a chronological interval. The following conclusions are, therefore, based on median calculations. The review of short-term fluctuations observed in the 10- and 20-year periods was then used to identify major changes in the flow of silver into the Baltic zone. In the following discussion accurate information on dating and composition of silver hoards is essential, and so deposits with general dating (e.g. '10th century') were omitted, as were hoards without reliable data on the fragmentation of their components (Table 5.1).

	Hoards with exact <i>tpq</i>	Hoards with reliable fragmentation data suitable for analysis
Gotland	341 (98% of all hoards)	326 (94% of all hoards)
Pomerania	107 (79%)	59 (43%)
Svealand	62 (95%)	46 (71%)

Table 5.1 Suitability of hoards for chronological and composition analyses

5.1.2 Chronological changes in hoards' composition - discussion

The chronological distribution of hoards (Figure 5.1) shows the deposition hiatus of the 980s very clearly in Svealand and Gotland. It most likely signifies underlying problems with access to silver in that decade and corresponds to the political instability described above. In Pomerania the 980s also appear to have been starved of silver since the rate of deposition is low, but it

⁹¹ The most striking example of this problem is presented by a Svealandic hoard found at Östjädra *tpq* 991 (CatNo548) in which Oriental coins comprised an estimated 99% of the hoard by weight. This deposit stands in a stark contrast with the remaining 4 hoards which could be dated to the period 980-999. I believe that there may be two possible explanations for this deposit. The first one is that we may be dealing with a situation where the owner(s) of the deposited silver was one of very few people who were able to maintain contacts with the sources of Eastern silver even after the collapse of Birka. Alternatively this large hoard, deposited within a settlement and in a pottery container may represent personal or family savings where the bulk of silver was formed by old savings of Oriental coins made before 977/8 (the *tpq* of the latest dirham). The German and other European coins comprising Otto-Adelheid pennies, which give the *tpq* for the hoard, were just a minor but final addition. After calculating median component proportions, this unusual deposit ceased to skew the statistic, which became similar to that observed in Pomerania, dominated by German and English coins.

seems that the crisis may have started already in the 960s. It corresponds with the Piast-Pomeranian conflict, which followed on the heels of the first Slav rising in 955.

Analysis of the chronological changes in hoard composition (by silver weight) shows very clearly changes taking place after c. 980 (Figures 5.2-5.4). Until then hoards from all three case studies are clearly dominated by Oriental coins and the presence of minted silver of different origins is negligible. In the 980s-990s⁹² various types of European coins began to arrive in large numbers and eventually dominated the hoards' composition. A slight departure from this pattern can be observed in Gotland where in the 980s-990s about a third of coins were still of Oriental origin. This may suggest that Gotland was digging deeper into the existing stock of coins, or that it maintained contacts with sources of Oriental silver for longer than other parts of the Baltic zone, or – most likely – both. The numismatic data available to me (cf. Appendix A, A1.3.4) shows that new dirhams were still arriving in Gotland until the end of the 10th century and even the early years of the 11th, although in very small numbers. Analysis of the age structure of coins in Viking-Age hoards clearly shows that the importation of late dirham issues was of little consequence from the 980s, when the aging of the existing stock accelerated rapidly (Figure 5.5). Interestingly, in the 980s the proportion of non-minted silver, i.e. ornaments, rods, ingots and particularly hacksilver in all three case studies rises significantly (Figures 5.2-5.4). First signs of this process can be traced to 970s, which could suggest underlying problems with access to minted silver and the introduction of ornaments and scrap on a large scale to make up the stock. This observation was first made by B. Hårdh (1996:16) who asserted that the appearance of hacksilver in hoards 'shows that the need for a means of payment was greater than the supply of coins'. Another striking feature of the 980-999 period is that the fragmentation of coins drops significantly with the introduction of European money in all case study areas (Figures 5.6-5.8). This may be caused by the fact that European coins were on average half the weight of their Oriental counterparts,

⁹² Mainly 990s, subject to the preferred dating of Otto-Adelheid pennies (cf. footnote 2, Chapter 1.2).

which means that they did not have to be fragmented to the same degree in order to obtain the same intended weight. This, however, could not have been the sole factor since the proportion of fragmented dirhams in hoards from this period was 47 times higher than fragmented European money (median 71% vs 1.5% of fragments by weight respectively). This means that European coins arrived and remained whole in the period following their first major influx.

Curiously, the same process of the arrival of new silver stock in the form of complete coins can be observed at the beginning of the 10th century with the introduction of Samanid dirhams after the first 'silver crisis' of the last quarter of the 9th century (Malmer 1966:212-218; Noonan 1985). T. Noonan's analysis of the age structure of dirham hoards in Russia, Poland and Sweden shows that after 875 the proportion of newly minted dirhams declined despite continuing coin production implied by the comparative studies of coin hoards in the Middle East (Noonan 1985:44-48; Kilger 2007a:232). In his view the shortage of new Abbasid coins, which previously dominated hoards in the Baltic zone, was a result of a break in the established distributional network for silver dirhams beyond the Caliphate. The crisis only abated at the beginning of the 10th century with the arrival of silver newly coined by Samanid emirs in Central Asia (Noonan 1985:48-49). The change of sources also triggered changes in the character of contacts between the Caliphate and Eastern Europe which now took place through the kingdom of the Volga Bulgars in present-day Russia (Kilger 2007a:239-240), described by Ibn Fadlan (Lunde and Stone 2012:1-58). The theory of a silver crisis has recently been questioned by C. Kilger (2007a:232-235), however in my opinion the near-absence absence of hoarding in my case studies in the last quarter of the 9th century (Figure 5.1) seems to confirm the traditional view, although admittedly the crisis may not have been as severe as it is generally assumed. This is particularly true for Gotland where silver deposition continued throughout the late 9th century although the number of hoards deposited on the island in this period gradually drops. Simultaneously, from the 880s the median age of coins rises, but only marginally meaning that some new silver was

still arriving to replenish the stock, but not in numbers sufficient to maintain the numbers of hoards deposited in the previous decades (Figure 5.5, cf. Figure 5.1).

Returning to the question of fragmentation, in all three regional case studies hoards show a significant decrease in fragmentation at the moment of arrival of Samanid coinage, compared to the previous and the following decades (Figures 5.2-5.4). This process is even more clearly visible when represented as a proportion of the total weight of coins within broad coin types (Figures 5.6-5.8). After the early peak in silver hoarding in the 860s,⁹³ by the end of the 870s when arguably the 'silver crisis' occurred, the proportion of fragmented Abbasid coins was falling. Moreover, new Samanid coins arrive almost exclusively whole, and – even more intriguingly – so do the Abbasid coins from the very end of the 9th century found in a handful of Gotlandic hoards. These results are congruent with the observations made recently by M. Jankowiak (forthcoming) based on the average weight of dirham fragments in Gotland and mainland Sweden. Traditionally, the phenomenon of silver fragmentation is understood as an expression of the intensity of circulation (Kiersnowski 1956; Tabaczyński 1958), where the inflow of minted silver leads to an increase in economic complexity reflected in a greater fragmentation of coins, which in turn satisfies the demand for small change required in daily transactions (Steuer et al. 2002: 133-41). In other words, the more fragmented the coins the more intensive the circulation and the more developed was the market. Jankowiak's results put this interpretation into question and instead he suggests that coin fragmentation may be a function of distance from sources of silver, however not in the literal spatial sense, but rather seen as increasing with the number of transactions at the successive trade centres, before it arrived to areas where it was deposited. In his opinion 'silver was certainly used and exchanged locally [...]

⁹³ The peak is not very pronounced in Pomerania where instead the majority of silver deposition in the 9th century appears to have taken place between 800 and 819. According to C. Kilger (2007a:215-220), who follows T. Noonan (1986:128-129), the early Pomeranian hoards have a composition characteristic of hoards deposited after 840 in Russia. Therefore, it is very likely that Pomeranian hoards which date to the early 9th century in terms of *tpq* contain coins which remained in circulation for a long time and arrived on the southern Baltic shores relatively late, probably from Russia.

but local economies adapted to such forms of silver as were available' (Jankowiak forthcoming). I am inclined to agree with Jankowiak since patterns exposed by my analysis, at least in the periods when new sources of silver were tapped (i.e. c. 900 and c. 980/990), can be best explained by his hypothesis. By applying Jankowiak's reasoning one can argue that when the general silver crisis ensued in the last quarter of the 9th century and access to silver through traditional channels became restricted (Kilger 2007a:211-228), merchants – predominantly from Gotland⁹⁴ and probably also from Svealand⁹⁵ – were forced to seek silver closer to the source. In their quest for increasingly scarce Abbasid coinage, eventually some entrepreneurial trail-blazers came across new sources of Samanid silver via the North-Russian Rivers and Volga Bulgaria. C. Kilger (2007a:237) believes that new contacts may have been initiated by the Gotlanders, and indeed the earliest hoard with Samanid coinage in my case studies comes from Lingsarve in Gotland (*tpq* 896, CatNo64). However, when we look at the age structure of Oriental coins (Figure 5.5), it seems that instead it may have been Svealand that led the process since the median coin age in Central Sweden at the beginning of the 10th century is about half of what the data indicates in Gotland. The problem with such an interpretation is that the earliest hoard with Samanid coins found in Svealand (Södra Lövtorp, CatNo502) dates to after 916, and the evidence from Birka implies that the arrival of Samanid silver in Svealand's heartland was even later (Gustin 2011; Kilger 2007a:238-239). The most likely explanation of this apparent paradox is that the existing 9th-century stock of coins on Gotland was so abundant that the influx of new coinage never dominated it to the same degree as in Svealand.⁹⁶ But importantly, it appears that the first Samanid influx to Svealand may have bypassed Birka, but not Svealand as a whole. In fact the early 10th-century hoards in Svealand are located in the Norrtälje and Mörkö regions, both of

⁹⁴ CatNos: 67, 103, 173, 202, 213, 228, 248

⁹⁵ CatNo523

⁹⁶ Particularly when we consider that by the end of the 9th century at least some Gotlanders were able to secure immense quantities of Abbasid money, such as the c. 14300 coins found in the Spillings 1999 hoard (CatNo242).

which have unimpeded access to the Baltic but could hardly be farther from Birka.⁹⁷ In Pomerania Samanid silver began to arrive already in the first years of the 10th century (Charstnica *tpq* 904, CatNo409), but in very small quantities.⁹⁸ The flow of new monetary silver grew there gradually but the earliest evidence for it having a palpable influence on the coin stock in circulation can only be seen in the 930s (Figure 5.5).

All these lines of evidence lead to a conclusion that low fragmentation of coins found in the Baltic-zone hoards at the time when new sources of silver were discovered after the first 'silver crisis' of the late 9th century is a result of direct contacts with these sources, most likely the kingdom of the Volga Bulgars. In the early years of the 10th century Samanid coins which arrived relatively complete on the markets on the Volga (Kilger 2007b:303; Ilisch 1990) were brought back to the Baltic shores through the agency of very few, and perhaps no intermediaries. Therefore, along the way they were not exposed to transactions which would have altered their completeness, and although certainly they were used and exchanged locally, they were eventually deposited as relatively complete objects. Once new networks associated with Volga Bulgars and Samanid silver were established, the number of intermediary stages and trading posts increased, thereby reducing the need for the inhabitants of the Baltic zone to undertake risky travels in search of silver all the way to its source located thousands of kilometres away. In time the growing number of transactions made along trade routes resulted in the increasing proportion of fragments in circulation and eventually in hoards found within the case studies. I believe that similar interpretation can be applied to the influx of European coinage at the end of the 10th century, when the dwindling supply of Samanid coinage set off large-scale importation of European coinage, almost invariably complete in the first years of its influx.

⁹⁷ This impression is confirmed by the fact that the earliest hoard with Samanid coins found in mainland Sweden was deposited in Viken, Hälsingland (*tpq* 906, Rispling 2005:212), over 240km from Birka.

⁹⁸ Here the situation is not dissimilar to that observed in Svealand. The earliest Samanid hoard from Poland was Klukowicze (*tpq* 901, Gupieniec and Kiersnowscy 1965:29-31; Rispling 2005:212) found in eastern Poland, c. 300km from Truso and c. 600km from Wolin.

The possibility that in the initial stages of development the new trade networks were operated by entrepreneurial merchants who tended to go the whole distance themselves, with a segmentation into various stages becoming the pattern of trading only later, was postulated by J. Shepard (2011:133-134) as a feature of the Way from the Varangians to the Greeks. The pattern is well-evidenced in the structure of trade in luxurious goods across the Indian Ocean and signs of similar tendencies were recorded by Ibn Khurradadhbih in his description of Jewish traders, the 'Radhanites' (*Radhaniyya*, Lunde and Stone 2012:111-112). Radhanites operated between the Frankish realm through the lands of the Slavs and Khazars to the Caliphate, and beyond to India and China. According to M. McCormick, Ibn Khurradadhbih may have been describing commercial connections at the early stage of their formation when the trade was conducted by 'pioneers' in a 'rather low volume (...) in a more primitive and risky fashion which involved fewer middlemen and therefore higher profits, from one end of the circuit to the other' (McCormick 2001:690). I believe that the interpretation of the changes in the composition and fragmentation of coins in Baltic-zone hoards presented above fits this model very well.

Slightly more problematic is the question of the fragmentation of non-minted silver objects found in the analysed hoards, which alongside untraceable bars and ingots mostly comprise local types of ornaments. With the exception of the very earliest deposits in Gotland, hacksilver appears in the Baltic zone in larger quantities during and immediately after the crisis of the 980s, although the first signs of its introduction are already noticeable in the 960s-970s, when the flow of Arabic silver began to dwindle (Figures 5.2-5.4). B. Hårdh (1996:84) believes that the degree of fragmentation is an indirect indication of the accessibility to silver. In other words the fragmentation is intensified in areas where the price of silver rises, and the common cause of such rise is the limited availability. As we have seen, this interpretation cannot be successfully applied to the imported coinage, but in my opinion does work well for the local non-minted silver. General silver shortages, such as the critical one observed in the 980s, may have necessitated introduction of predominantly fragmented, locally produced ornaments and ingots

to maintain the liquidity of the established market structures. Once introduced into circulation on a large scale in the 960s/980s hacksilver was to remain there, although its proportion gradually fell towards the end of the Viking Age.

According to C. Kilger (2007b:320) the recognition of hacksilver as accepted means of payment was in the initial phase restricted to specific sites, which served as nodes on the long-distance trade routes. Moreover, it is assumed that transactions in the rural hinterland of the political and economic centres were usually fewer and larger than in the proto-urban and urban centres (Spufford 1988:10; Skre 2011:82). This observation implies that the need for silver fragments was reduced away from sites which could be associated with trade and exchange, such as harbours, and central places including emporia. Evidence supporting the importance of such sites for the fragmentation of silver is provided by a simple statistic comparing median distance from hoards to central places identified in Svealand and Pomerania, and harbour sites as well as sites bearing the evidence of non-ferrous metalworking in Gotland (Table 5.2). It clearly shows that hoards dominated by fragmentary objects (by weight) are not only relatively few, but were also located closer to places where the exchange of silver was more likely to take place more frequently.

Proportion of fragmented objects (coins and hacksilver) by weight	Number of hoards	Median distance to the nearest central place	Median distance to the nearest harbour	Median distance to the nearest workshop
75%-100%	26	9km	8km	0.6km
50%-75%	53	15km	7km	1.6km
0-50%	364	20km	9.5km	2.6km

Table 5.2 Comparison of distances of hoards grouped by the rate of fragmentation from sites associated with silver exchange

5.2 Patterns of deposition

The analysis of the chronological aspects of the political and economic context of hoards and changes in their composition shows two major turning-points in the Viking Age: the arrival of Samanid silver at the beginning of the 10th century and the arrival of European silver in large quantities in the 980s-990s. Both of these events follow major crises which, judging by the intensity of hoard deposition, are indicative of considerable disturbances and possibly collapse of the established long-distance networks linking the Baltic zone with the Orient.

In order to investigate how this combination of economic and political factors influenced hoard concentrations, I undertook kernel density analysis for those hoards which have exact dating and can be assigned to one of three categories: before 900, between 900 and 980, and after 980 (to 1050). Such broad phases, although based on detailed chronological analysis, meet the methodological criteria proposed by S. Brather, and are congruent with silver use periodisation in the Viking Age proposed in a number of historical, archaeological and numismatic overviews (Sawyer 1971:86-119; Spufford 1988:65-73; Noonan 1999; cf. Kilger 2007a:207). Deposits with general dating (e.g. '10th century') were omitted, therefore the shape and sometimes the exact location of concentrations may be slightly different from those shown in Figures 2.3, 3.3 and 4.3.

5.2.1 Svealand

In Svealand hoards datable to c. 800-900 are very few (Figure 5.9). They are located near major waterways, particularly along an eastern branch of Fyrisleden leading from Birka towards Gamla Uppsala via Skarven. It is, however, not possible to determine if Abbasid silver reached the shores of the Mälaren through the straights of Stockholm or from the south via the portage at Södertälje, due to lack of early hoards in these areas. The earliest Viking-Age hoard from Svealand was deposited in Birka (*tpq* 810, CatNo515). Combined with the abundance of other finds of Abbasid coinage recorded as single and grave finds in the emporium (Gustin 2011), and

its political importance and opulence implied by 9th-century written sources, this seems to confirm its crucial role for the initial influx of silver into the Mälaren area. Its importance, however, doesn't seem to be reflected in the spatial distribution of Svealandic hoards, since no statistically significant concentration of silver deposits has formed there, or in fact anywhere else in Svealand. From the hoard distribution pattern alone it would appear that Birka was just one of many stops for silver on its journey along communication routes linking Helgö and Gamla Uppsala, which emerged as important political, economic and ritual centres in the 6th/7th centuries. Their prominence, however, appears to have been lost even before Birka was established in the late 8th century.⁹⁹ It is an interesting paradox apparently not noticed before, and I am unable to offer a comprehensive answer within the scope of this dissertation. It may be suggested, however, that the arrival of Oriental, predominantly Abbasid, silver in Central Sweden – through the agency of Birka, for lack of evidence to the contrary – did not stimulate development of new structures for its redistribution around Mälardalen, but rather revived traditional communication routes linking former power centres. Seeing that Uppsala and Birka in the Viking Age were closely associated with royal power, whether expressed in a practical or symbolic way, this may suggest that the influx of silver in the 9th century was also intimately linked to the kings of Svear. Their power as traditional guarantors of peace and security which previously could be affirmed by their role as leaders of a common cult in Uppsala, had to be legitimised in the Viking Age by the wealth and influence attained by participating in European-Middle Eastern trading networks based on the exchange of silver (Duczko 2000:14-16).

In the following 900-980 period (Figure 5.10) Birka clearly becomes the focus for hoarded silver, whose flow can now be traced in the southern Fyrisleden connection via Mörkö and Södertälje

⁹⁹ J. Callmer (1994:58) believes that 'the claim that Helgö still played some role as a trading place in the 8th century is difficult to support (...) A very small number of relevant finds were discovered near the harbour'. S. Tesch asserts that there was no continuity between Helgö, Birka and Sigtuna. Rather, each of these settlements was 'a child of its time' (Tesch 1989:26). W. Duczko (2000:14) suggests that Uppsala peaked as the political centre in the 6th century, but remained an important political/religious symbol until the 13th century.

portage. It also appears that the eastern link via the area of Stockholm was established in this period. Intriguingly, the former links with Gamla Uppsala, at least measured by the intensity of hoard deposition, appear to have collapsed and the flow of silver was redirected north-west, presumably towards Dalarna and its sources of iron.¹⁰⁰ The period also saw an explosion of hoarding in the Norrtälje area, which most likely was associated with the northernmost branch of a route leading from the Bay of Finland via Åland. Spatial analysis suggests that the influx of Samanid silver from the beginning of the 10th century finally prompted the development of new structures involved in its redistribution, with Birka firmly at the centre. Although the possibility that Norrtälje may have been a potential rival to Birka cannot be ignored, its disappearance coinciding with the demise of the emporium (Figure 5.11) may suggest that both were closely connected.

In the period 980-1050 (Figure 5.11), after the collapse of Birka a major change in hoarding patterns took place. After 980-990 Sigtuna arrived on the map, but despite its political, religious and economic importance, not least expressed by the formation of a royal mint, it does not appear to have rivalled the nodal function of Birka some decades before. Combined with the arrival of a number of other, even more pronounced concentrations, it would suggest that access to silver in the last period became more widespread, decentralised and easier to negotiate. The most prominent of these new portals for the inflow of silver dominated by European coin issues is the area of Stockholm, which most likely profited from the apparent abandonment of the southern section of Fyrisleden. This change may be counter-intuitive since the route via Södertälje offered the most direct connection with the southern Baltic and Germany where the majority of coins came from after 980. One possibility for the abandonment of the southern route could be the postglacial uplift, which would make the portage longer, more time consuming and expensive. It is equally likely that it was surrendered due to political

¹⁰⁰ The earliest Dalarna hoard from Ytternora, *tpq* 916, belongs to this period (Wiséhn 1990:no 79).

pressures and increasing attempts at centralisation of royal power around Sigtuna. In the early 11th century the concentration at Eskilstuna exploded, rivalling that of Sigtuna, which suggests an increasing importance of links with Götaland. The emergence of Eskilstuna and abandonment of the Södertälje portage probably prompted the formation of a new communication route with the southern coast via Bettna, Flen and Nyköping where silver concentrations formed for the first time.

5.2.2 Pomerania

In the earliest period of silver flow the distribution of hoards in Pomerania (Figure 5.12) reflects observations made in Svealand. There are no statistically significant concentrations, although some grouping of hoards can be observed at Ralswiek and Menzlin, which implies their role in the early influx and redistribution of Oriental silver. Perhaps also the Redarian political centre at Neubrandenburg benefited from this early influx through the agency of Menzlin. The distribution of hoards has a very clear skew to the west which further confirms the access of these two early trade centres to the Abbasid silver network but a rather limited role in its redistribution. Elsewhere in Pomerania the early hoards are much dispersed and tend to hug the coast and waterways, presumably mapping the earliest routes probed by merchants dealing in silver trying to infiltrate the Polish part of Pomerania. It is also the time when Truso shows on the silver hoard map, but although it was instrumental to the brief introduction of silver in Prussia (cf. Chapter 3.3.12), it appears to have been of little relevance for Pomerania as a whole.

In the following period dominated by Samanid silver after 900 (Figure 5.13), Ralswiek and Menzlin lose their importance in favour of Wolin which emerges as the unchallenged hub for handling of silver dominating the entire region from the mid-10th century. Concentrations to the east of Szczecin, around Słupsk and Gdańsk appear on the map, but in this period they comprise so few deposits that they can hardly be considered as statistically important. Nevertheless, they signify the ambition of some political, presumably tribal, centres to participate in networks

which successfully tapped into the sources of Central Asian and Volga Bulgar silver that made Wolin 'a most noble' and 'truly the largest of all the cities in Europe' (*AoB* B2CH22(19)).

After 980 (Figure 5.14) the monopoly of Wolin is clearly broken. The centre of hoard concentration moves towards Kamień Pomorski, which is located at the confluence of the Dziwna and Świniec and would have been strategically located to bypass Wolin on an inland route upstream of Rega via Płoty/Resko and Nętno. In combination with the appearance of dense concentrations at Kołobrzeg, Słupsk and the increase in the amount of hoarded silver near Gdańsk, this situation may reflect Piast attempts to bypass the monopoly of Wolin. In all probability the Piasts were unable to secure Wolin, and may have decided to create alternative routes in order to open the flow of silver and goods from the Baltic into their young state. Most likely associated with such policy was the concentration at Bydgoszcz, capable of controlling the traffic from Gdańsk along the Vistula and Brda. Standing out are also concentrations at Szczecin, Stargard and Schwedt, almost certainly associated with the transfer of silver along the Oder. It is interesting that the Neubrandenburg concentration, presumably associated with a Redarian political centre, does reappear after 980, which could reflect the important role it played in the 983 uprising (cf. Chapter 3.1.2). A number of late Viking-Age hoards were dispersed along the watershed between Stargard Szczeciński in the west and Gdańsk in the east. This can conceivably be associated with places where there was portaging between river systems leading towards Wielkopolska in the Piast heartland on the one hand and the Baltic coast on the other. This impression is strengthened by the fact that on average (median) these deposits¹⁰¹ are located over 9km from the nearest major river and over 4km from the nearest stronghold or settlement, but less than 2km from the modelled stronghold territory boundaries. In other words, they appear to have been deposited in a 'no man's land', probably at the limit of any protection these political and military centres may have offered. Dangers posed by the necessity of ditching the

¹⁰¹ CatNos: 391, 394, 400, 403, 404, 411, 461, 472, 474, 475, 476, 483

relative safety of rivers for time-consuming and ambush-prone overland routes,¹⁰² may have prompted some merchants in Pomerania to hide their silver, or proportion thereof, for safekeeping before entering dangerous sections of frequented routes.¹⁰³ That such fears were often well founded is implied by the fact that 60% (7 of 12) of deposits found in such locations can be categorised as emergency or unclaimed savings hoards; perhaps another 25% (3 of 12) fall into the category of placed deposits associable with apotropaic magic.

5.2.3 Gotland

In Gotland the paucity of contemporary written sources makes it impossible to correlate chronological changes in hoard distribution patterns with historical events, nevertheless the picture of deposition in periods linked to arrival of silver from new sources is as changeable as in the case studies discussed above.

In the period dominated by the flow of Abbasid silver c. 800-900 (Figure 5.15), the distribution of silver on Gotland is confined to just three areas where more or less discrete concentrations can be observed (cf. Chapter 2.3.1). The southernmost group seems to be associated with the harbour of Bandlunde and an emerging concentration in Hemse parish extending south to Alva could be associated with the (mythical?) figure of Avair Strabain. A very tentative grouping appears in Grötlingbo parish, perhaps associated with the harbour at Barshalder. This suggests that in the earliest period, southern Gotland may have been supplied already from more than just one harbour site. In the northern part of the island hoards are clearly focused in Othem parish and its harbour site of Slite. The area has not produced the largest number of hoards, but they are highly concentrated and, importantly, include the largest hoard ever found, Spillings (CatNo242). The most numerous, albeit very dispersed hoarding occurs in the central part of the

¹⁰² Dangers of portages were noted by Constantine Porphyrogenitus in his description of Rus slave traders being forced to take overland routes in order to navigate Dnieper rapids on their way to Constantinople (*De Administrando Imperio* 9, Jenkins and Moravcsik 1967:57-63).

¹⁰³ cf. interpretation for some of the Svealandic hoards, Chapters 4.4.6 and 4.6.2.

island and is focused in the area of Roma, in all probability the site of the Gotlandic althing. Hoard distribution may suggest that the political centre of the island was in the earliest period of silver influx supplied via Paviken, and perhaps also Fröjel, although the breadcrumb trail leading inland from this location is not as obvious. Notably, the location of silver deposits may suggest that even in the 9th century Visby may have facilitated the influx of silver, although certainly not as the powerful trading centre it became in the 11th century (cf. Chapter 2.4.7), but more likely as a landing site located within an advantageous topographical setting through which the island's interior could be reached by silver-dealing merchants. The emerging picture implies that, although rather more common compared to Svealand and Pomerania, Oriental silver in the earliest period of its influx was not yet widespread throughout Gotland but rather confined to areas of political importance (heartlands of respective *tredingar*?) which were well connected with the outside world by a number of harbours and landing places.

The practice of silver deposition explodes in Gotland with the introduction of Samanid silver in 900-980 (Figure 5.16) and the metal seems to have become available throughout the island. A hoard concentration at the island's political centre of Roma is still present, albeit it appears that in the 10th century the silver travelled there mainly from the south-west via the agency of the harbour of Fröjel. It also appears that the role of Paviken in the acquisition and redistribution of silver may have diminished, at least on the basis of hoard evidence. In the northern part of the island the monopoly of the inhabitants of the modern-day Othem parish had been broken and new sites such as Vällesviken may have been responsible for a proportion of silver arriving in Lärbro parish. It is possible that other harbours may have been active in the safety of the Klintehamn bay. Unfortunately the archaeological evidence is too meagre to draw firm conclusions. The growing availability of silver is highlighted by the emergence of three new hoard concentrations in Fole, Lokrume and Tingstäde parishes, perhaps in association with the formation of a political centre for the northernmost *tredning* of the island, as suggested by the 'ting-' particle. It is, however, unclear which routes silver took to reach these inland areas. The

majority of the silver deposited in the period 900-980 appears to have concentrated in the southern third of the island in a number of smaller local groups. Bandlunde, just like Slite in the north, still appears to have been strongly involved in redirecting silver from the coast to the more densely inhabited areas inland. However, the deposition of the majority of silver hoards shifted north from earlier concentrations at Alva and Hemse towards an area between Levide, Stånga and Alskog parishes. The apparent prosperity of southern Gotland was certainly boosted by proximity to multiple harbours: Fröjel, Grötlingbo, Hoburgen and a possible but unverified harbour at Botvide.

After 980 (Figure 5.17) the hoarding pattern changes again with the introduction of European silver, although well-established concentrations at Roma and Othem continued to thrive. Intriguingly, it appears that the earlier prominent harbours of Fröjel and Bandlunde lose their importance. Barshalder takes centre stage in the southern part of the island and the Visby connection seems more vigorous in channelling silver towards Roma. A new concentration of hoards arrives on the map between Visby and Paviken in Stenkulma and Eskelhem parishes, however seeing that Paviken was of less importance in the previous period it may be that the southern branch of this connection should be linked with Västergarn which emerged at the beginning of the 11th century as an ultimately failed rival to the future dominance of Visby. The most striking change triggered by the arrival of European silver is a very clearly marked rise to prominence of the north-western part of the island, primarily in Väskinde and Stenkyrka parishes. They were most likely supplied by harbour sites at Överstekvarn and Lickershamn. Interestingly, Stenkyrka as well as another new hoard concentration in Hellvi are traditionally associated with the arrival of Christianity and conversion of the island's important political figures: Ormika and Likkair Snielli. It is probably also not a coincidence that the centre of hoard concentration in Roma moves in this period towards Akebäck, which *Guta Saga* (GS CH3) associates with Botair, builder of the first Gotlandic church (cf. Chapter 2.3.1). Although

Gotlanders were certainly familiar with Christianity before 980, the influx of European Christian coinage may have advanced the acceptance of the new faith by the majority of the population.

5.3 Reasons for hoarding from the chronological perspective

My discussion on the chronological aspects of hoarding has revolved so far almost exclusively around the distribution, concentrations and composition of hoards. I used them as a tool in an attempt to determine the ways in which silver arrived in the respective case studies, where it arrived and how it was redistributed. I understand and accept the argument that the presence and number of hoards does not proportionately reflect the amount of silver circulating on the market (Suchodolski 1971:502-515; 1995:67-71), which makes attempts to trace the journey of silver, mainly coins, via the hoard record alone somewhat speculative. Unfortunately, due to time and word-count limits imposed on this dissertation I was unable to cross-reference my results with finds of stray coins and other silver artefacts. Nevertheless, I am confident that my approach, which employs a variety of statistical methods across three case studies, each being a coherent geographical, historical and cultural entity, provide reliable results. In my opinion, silver must have been present first in order to be deposited, and in Svealand, Gotland and Pomerania, deposited it was – according to the social, political and ritual conditions of each region. The question one should now ask is whether the identified chronological changes affected how and why these deposits were made.

Analysis of the chronological changes in hoards divided to container/weight categories shows some intriguing patterns (Figure 5.18). The first striking feature which appears in all three areas is connected with the first wave of Oriental silver arriving in the Baltic zone. Around the year 800 the silver was deposited almost invariably in the form of placed deposits. Intriguingly, the proportion of placed deposits made in the first years of Samanid silver influx after c. 900 is also higher than in the preceding or following decades. A similar pattern can also be observed in

Svealand and Gotland when European silver arrived in larger quantities after 980. In Pomerania this increase in ritual deposition is most pronounced in the preceding period and may be associated with the fact that European coins arrived there in larger quantities already in the 970s (cf. Figure 5.3). It appears, therefore, that whenever large quantities of silver arrived from new sources, it was more likely to be deposited as placed deposits. What could this pattern mean?

Based on anthropological studies of traditional societies J. Kowalewski (2001:66-67) asserts that the valuation of the world in the Viking Age was expressed in the duality of its perception and division between the inner, inhabited and cultivated *Miðgarðr*, and the outer *Utgarðr*, dominated by hostile beings and monsters. The same dual perception can be traced in Slavic languages where it is derived from the Indo-European cosmogony of the earth conceptualised as an island surrounded by water.¹⁰⁴ Next Kowalewski (2001:75-76, after Kowalski 1999:15-17) suggests that imported silver items constituted elements with highly mediatory character, which allowed them to span the concepts of *orbis interior* and *orbis exterior*. In my opinion this interpretation is applicable to foreign objects found in Viking-Age hoards, especially coins. Because of their mediatory character, inherently 'alien' silver objects appropriated by their new owners through their industry and luck may have seemed particularly suitable for making placed deposits in newly colonised and marginal lands. There the silver, which symbolically linked the tame internal and wild external worlds, helped bridge the gap between the already 'pacified' ancestral lands and new fields reclaimed from the wilderness of *Utgarðr* in addition to linking those new claims personally with the owner(s). Conceivably, silver coins would have retained this quality of an 'alien' object until the arrival of local coinage, but because they were most strikingly 'alien' upon their first arrival, before they became more familiar through regional or local exchange, this may have resulted in relatively higher proportion of placed deposits at the

¹⁰⁴ The Indo-European term quoted by Kowalewski is **opi-sal-a* 'circumnavigated place', which is a compound of **opi-* 'around' and **sel-/sol-* 'abode'. In Slavic languages these terms correspond to Old Czech *sělo* and Polish *sioło* 'village'; Old Slavonic *ob(b)-lъ*, Polish *obły* 'ovoid, circumscribed' (Kowalewski 2001:66).

turn of the 9th and 10th centuries and in the 980s-990s. Although European issues can be distinguished from dirhams immediately by anyone at a first glance, it may be too much to expect that non-specialist and illiterate Vikings and Slavs were able to differentiate between Abbasid and Samanid coins. In my opinion the pattern rather provides another line of evidence to suggest that old networks associated with the flow of Abbasid silver all but collapsed, and new coins brought together with Samanid silver (none of the earliest 10th-century hoards comprises exclusively Samanid coinage) arrived as a completely new entity into many areas, as we have seen in Svealand for example.

Another intriguing pattern is that after 980 the proportion of placed deposits generally falls in all three case studies. It perhaps should be linked with the increasing infiltration by Christian religion, symbolism and condemnation of the pagan way of life evident in the (near)contemporary written sources. The exposure to these ideas would have only increased with the growing influx of West European silver coinage. An exception to this trend is deposition in the 1020s-1030s Svealand, where placed deposits comprise over 60% of hoards. This resurgence of pagan practices may perhaps be seen as a politically driven reaction to the Christianisation efforts of Swedish kings seeking to consolidate their rule with the aid of the successful new faith. King Olaf Skötkonung's attempt to destroy the pagan temple in Uppsala was foiled and eventually he was forced to establish the coveted bishopric in Skara, well over 300km from his political and economic power base of Sigtuna. According to Adam of Bremen (B2CH73(71)) the Christianisation drive intensified during the reign of Olaf's successor, Anund Jakob, after 1022: 'while James [Jakob] reigned Christianity was widely diffused in Sweden'. The defiant attitude of some among the Svear nobility who held on or returned to the old ways under the very nose of the king is exemplified by a placed deposit from Sigtuna kv. Humlegården *tpq* 1024 (CatNo536), most likely deposited as a foundation offering.

The period of 1020s-1030s in Svealand also registered a visible spike in silver deposition (Figure 5.1), particularly among deposits with *tpq* 1027. It is possible that it could reflect unsettled times following the battle of Helgeå in 1026 and the likely subjugation of Sweden by Knut. His overlordship of Svealand is disputed on the grounds that Sigtuna coins describing him as the king of the Svear can be seen as local adaptations of Danish issues (Lindkvist 2003:224). Still a letter of 1027 preserved in the chronicle of John of Worcester calls Knut the 'king of all England and Denmark and the Norwegians and some of the Swedes' (Lawson 2004:66, 97). Moreover, I believe it is not coincidental that one of hoards deposited in 1027 was an emergency deposit found in Sigtuna itself (kv. Professorn 1 (II), CatNo538), buried within the remains of a burned-down house. Moreover, the deposit comprised almost exclusively German coins (95%). There were no Swedish coins, which surprised the numismatists since there was active minting taking place in the town at the time of Anund Jacob (Jonsson 2004a-d). But crucially, 6 out of 8 coins making out the remaining 5% of the deposit were English issues struck in the name of Knut. The early reign of young Anund Jakob was also a period with an increase in ritual/symbolic deposition. Since the *modus operandi* of Danish rulers asserting control over their territories was to exercise it through estates manned by high-ranking personal agents (thegns, cf. Chapter 4.3.7), perhaps the intensification of ritual/symbolic behaviour could be linked to these officials symbolically claiming these new estates (taken from local nobles?) in Knut's name through placed deposits.

I am aware that many scholars consider it risky to associate major spikes in hoarding directly with military operations (cf. Curta and Gandila 2013:46), nevertheless I believe it is not completely implausible to treat them as indirect indicators of times of unrest, uncertainty and crisis. This possibility may be applicable to Pomerania where in the period 940-959 the spike in hoarding is accompanied by a visible increase in the proportion of emergency hoards and unclaimed savings (Figures 5.1 and 5.18), particularly in the years 950-955. Written sources (WoC B3CH44-55; ToM B2CH9-12, 44) describe the year 955 as a time when the culmination of

Hungarian raids on Western Europe coincided with the Slavic uprising instigated by the Obodrite federation, and involving some Pomeranian tribes (cf. Chapter 3.1.2), which can hardly be coincidental. Although hoards which can be associated with these events on the chronological basis are spread across the central and eastern parts of Pomerania, far from the theatre of war, there is a discrete concentration of these deposits around Wolin and further south along the Oder.¹⁰⁵ Can, therefore, this sudden influx of silver be evidence of Hungarian incentives for the Wolinians to open a 'second front' against Otto in the north? Written sources attest military cooperation between Polabian Slavs and Hungarians already from 906 (*WoC* B1CH17). Or do they rather reflect attempts to hide wealth from Saxons exacting tribute after the uprising was suppressed; where best to start retribution than in the wealthiest place in the region? May they as well suggest an intensification of the slave trade, since the supply of captives certainly would have increased as a result of conflict? Regardless of which one of these suggestions one may prefer, the association of short-lived proliferation of hoarding, particularly in the form of unclaimed savings and emergency deposits, with a wider context of historical events in my opinion should not be completely rejected. This hypothesis is supported by the fact that the reaction of hoarding behaviour to the events of the first Slav Uprising was replicated even more explicitly in association with the Great Polabian uprising of 983. Out of four hoards deposited after 975 and before 983¹⁰⁶ three were found in the area of Wolin – the political and economic centre of Wolinians who were close allies of the Lutici involved directly in the revolt – and all these hoards can be classified as emergency deposits.

5.4 Silver hoards before and after the Viking Age

The discussion so far may give the reader the impression that silver arrived in Viking-Age Central and Northern Europe suddenly and disappeared in the year 1050. Although the influx and use

¹⁰⁵ CatNos: 426, 430, 432, 463, 482, 438, 449

¹⁰⁶ CatNos: 372, 422, 437, 453

of silver was so massive in the Viking Age that some scholars refer to it as the 'age of silver' (Kershaw 2014:149), it was not a phenomenon which was exclusive to the period between 800 and 1050. Foreign silver, mainly in the form of coins, was imported and hoarded in the Baltic zone before, mainly in the form of 2nd-century Roman denarii noted almost exclusively in Late Roman and Early Migration Period contexts (Bursche 2002:3), and the custom of hoarding continued after the year 1050 throughout the 11th and into the 12th century.

Due to the limits of this dissertation, I am unable to discuss these hoards in the detail they deserve. Instead, I will focus on chosen aspects of silver hoarding in these periods, with a view to making comparisons with the results of the analysis of hoards datable to c. 800-1050; verifying patterns and hoarding habits identified already in the Viking Age; and suggesting how reasons for deposition of silver in the Baltic zone evolved in the long term.

5.4.1 Data

The following discussion is based on a high-level survey of published and readily available data. The dataset of Roman denarii hoards is based on catalogues by L. Lind (1981) for Gotland and Svealand, and by R. Ciołek (2007) and R. Laser and K. Striżbny (1997) in Pomerania. It comprises one hoard in Svealand, 35 hoards in Gotland and 29 in Pomerania. The weight of silver, if not published, was calculated from the number of denarii coins present in a hoard using the median weight of a denarius at 2.67g.

With regards to hoards deposited after 1050 the data is based on the same sources as the main body of my catalogue for hoards c. 800-1050 (cf. Chapters 2.2, 3.2 and 4.2). For the upper chronological limit for these deposits I assumed the year 1150, by which time the practice of depositing silver as hoards all but disappeared within my case studies. Due to relatively poor and broad dating of a number of hoards (e.g. '11th century') which made them of little use for the intended chronological analysis I excluded 24 deposits in Pomerania, and 2 in Svealand.

Overall, hoards dated to between 1051 and 1150 discussed here comprise 48 finds from Gotland, 33 from Pomerania and 6 from Svealand.

A tabulated summary of these finds and data used in the following analysis is presented in Appendix A, A1.4 and A1.5

5.4.2 Denarii hoards

The only major influx of silver into Central and Northern Europe before the Viking Age took place in the form of predominantly 2nd-century Roman denarii, deposited mainly in the 3rd and 4th centuries. In rare cases denarii were deposited alongside 5th-century solidi, e.g. Frombork *tpq* 430, and possibly Dymnik *tpq* 491 although in the latter case it is not certain if the single denarius belonged to the deposit. Denarii hoards may also contain other, non-monetary items, such as ornaments of bronze, silver and gold. Second-century denarii are the largest group of all Roman coin finds recorded in the central and northern European Barbaricum and it is believed that ‘this stream of silver coinage crossed the Roman frontier (...) as part of tribute payments made by the emperors to *nobiles* or *reguli* — the leaders of *superiores barbarii*’ (Bursche 2002:2). The distribution of denarii hoards within my case studies (Figure 5.19) together with the degree of wear of coins imply that they travelled from the borders of the Roman Empire through Poland to Gotland (Jonsson and Östergren 1992:183) with the most direct route leading through the lands occupied by the Wielbark culture to the east of the Vistula and around the bay of Gdańsk. Only one deposit is known from Svealand, which suggests that this early wave of imported silver was of relatively little importance for the region. Intriguingly, Roman denarii do occasionally appear in the 10th-century Viking-Age hoards, mainly on Gotland.¹⁰⁷ The reasons for their reappearance several centuries later are not satisfactorily explained, but the general consensus is that they probably represent coins encountered by chance which were added to an already

¹⁰⁷ Gotland, CatNos: 47, 160, 168, 201, 318; Pomerania, CatNo405; Svealand CatNo548

existing fortune in silver (Jonsson 2014:546). This possibility is very plausible since c. 70% of Viking-Age deposits with Roman coins can be classified as savings hoards, and on Gotland, where I have detailed Early Iron-Age settlement data courtesy of G. Svedjemo, they were discovered near mid-millennium settlements, on average (median) just 200m from the extant structural remains of *kämpgravs*.

There are two very striking features of these early silver hoards. Firstly, coins and other objects (if present) are almost always complete and fragmentation occurring in extremely rare instances is usually attributed to recent damage (cf. Lind 1981). Secondly, only a handful of these hoards were found in containers, despite having been discovered in similar circumstances and time as the main body of hoards analysed here.¹⁰⁸ Even the application of soil chemistry calculations does not change the picture (Figure 5.20). In fact, the proportion of contained denarii deposits is nine times smaller in Gotland and twice smaller in Pomerania (3% and 27% respectively) when compared to Viking-Age hoards (cf. Figures 2.20, 3.31 and 4.24). The available data also shows that a relationship between the weight of silver in a deposit and the presence/absence of a container can be traced in these early silver hoards, although I have been unable to investigate it in detail. The emerging pattern may be briefly characterised by the fact that none of the contained Roman denarii hoards in Gotland weighed below 1.5kg whereas the median weight of all denarii deposits was in the range of 140g. A similar picture emerges in Pomerania, although it is not as pronounced: the median weight of silver in contained hoards was c. 375g, but only 24g in containerless deposits.

With regards to the context, in Svealand the only deposit of Roman silver was found in a rock crevice without a container (Hede, cf. Appendix A, A1.4), which implies that it was intended as a placed deposit. In Pomerania the descriptive evidence allowing for the reconstruction of the

¹⁰⁸ i.e. between the late 18th century and recent years, but mainly in the 19th and the first half of the 20th century, cf. Appendix A, A1.4.

archaeological context is meagre: the only instance where such data is available is a hoard from Buczek, which was found during peat extraction. Comparatively, the best-quality data is for Gotland, where we can identify one deposit found in a watery environment, five found in *kämpgravs*, i.e. the remains of the most likely contemporary houses, and one possibly within a contemporary settlement, but outside structures. None of these deposits was, however, reported as found in a container or any indication of such. In the case of deposits from Boters and Bjärs, which have some of the most detailed descriptions of the circumstances of discovery, the information suggests they were found under the stone walls of *kämpgravs*. Their recovery without partial dismantling of these substantial structural remains, usually over 1m wide, seems impossible or at least extremely difficult and potentially risky for the structural integrity of the building. Combined with the absence of a container, this situation suggests that silver coin deposits found within contemporary Roman Iron-Age and Migration Period dwellings were generally placed as a form of foundation offerings.

Overall, the results of this brief survey imply that silver in the form of 2nd-century denarii was overwhelmingly used in a symbolic and/or ritual sphere. But occasionally it was deposited in protective receptacles, conceivably with a view to later retrieval. This could mean that Roman silver coinage was at times used in some form of mercantile transactions. This possibility may be reinforced by the fact that a number of Late Roman/Migration Period sites identified as ports of trade, such as Gudme and Lundeberg on Fyn/Funen, Sorte Muld on Bornholm or Upåkra near Lund, produced some dozens of denarii (Bursche 2002:4). According to A. Bursche it is, however, more likely that, if at all, 'the denarii circulated as personal wealth containing tangible and fluctuating value, varying from one transaction to the next. There were no standard values or, even more so, standardised prices; this notion is particular for communities with developed statehood and as such did not exist within Barbarian societies of Northern Europe of the period (...) they served special purposes in a prestige economy, circulated as means of payment in socially or politically motivated transactions such as the payment of tribute, ransom,

bloodmoney, dowry or heirloom. Roman currency may have been used in gift exchange transactions'. Particularly the latter statement would explain why Roman silver found in containers, conceivably hoarded with the intention of retrieval, dominated in Pomerania – particularly its eastern part which was a point of contact between the Dębczyn and Wielbark cultures. The archaeological evidence in the Wielbark culture, where some of the largest and nearly all of the contained Pomeranian denarii hoards were found (4 out of 5), implies a highly hierarchical society dominated by an elite of aristocratic families (Gralak 2012:401). Moreover, the territory of the culture identified partially with Goths and Gepids (Kolendo 2006; Kokowski 2007:47–49 with further literature) was most likely used by Germanic tribes as a transit corridor providing access to the Black Sea coast, where they eventually settled. In such a stratified and varied cultural *milieu* silver may have been particularly useful to show off personal wealth and power, and negotiate political and social relationships through gift exchange. In this context the need for accumulating and preserving silver in the form of (rare) savings hoards was necessary until such time as occasion for its use in social interactions arose. However, we should not forget that the overwhelming majority of 2nd-century denarii deposits found within my case studies were made without containers. In an environment where silver was yet to develop into a widely accepted and useful means of exchange, the main and most suitable use for Roman denarii, being foreign objects whose innate quality was to bridge the known and unknown (cf. Chapter 5.3), may have been deposition in the form of deliberate and permanent deposits placed as offerings to the supernatural.

5.4.3 Silver coin deposits after 1050 (until 1150)

The year 1050 was not the last in which silver deposits were made in the Baltic zone, however after this date some significant changes in hoarding patterns and behaviour took place. The most obvious is the sudden drop in the number of known silver deposits. Although this reduction may partially be exaggerated by the nature of the dataset which was not collected as rigorously as

the main body of my material, across all three case studies the number of the deposits made in the 1050s dropped nearly by half in comparison to the previous decade (Figure 5.21).

Silver deposits persevered longest in Gotland, where they all but disappeared by the end of the 1120s. The deposit from Burge, *tpq* 1143 should perhaps be seen as anomalous, a lone example of hoarding a generation later. Intriguingly, its deposition coincides with the beginning of local minting on the island (Gullbekk 2008:62). In Pomerania hoards appear to have been deposited into the 1110s, with the final deposit found in Malczkowo, *tpq* 1114. Hoards as an archaeologically visible category of finds disappeared first in Svealand where the last deposit can be dated to after 1079 (Venngarn). In many ways the structure and composition of these late hoards resemble Viking-Age hoards deposited after the influx of European silver in the 980s-990s (Figure 5.22). They are still dominated by German coins, but with a wider variety of other European issues in Pomerania and a notable increase of English coins in Gotland in the early 12th century.¹⁰⁹ This could mean that long-distance networks established in the late 10th century still operated up to 100 years later.

The most striking feature of these late hoards is again the proportion of hoards discovered in containers. In all three case study areas it is significantly higher than among the Viking-Age deposits and effectively at the opposite end of the spectrum in comparison with Roman denarii deposits (Figure 5.23). For the first time in Gotland hoards found in containers, or where the presence of a container may be suspected (including soil chemistry calculations), outnumber containerless finds. In Pomerania the proportion of contained hoards rose by over 20% compared to the Viking Age. But the most striking increase can be observed in Svealand, where all hoards may have been deposited in some form of a container. Admittedly, the statistic is influenced by a small sample of hoards, but considering significantly different results the same

¹⁰⁹ The proportion for the second quarter of the 12th century is based on only one hoard from Burge, therefore the high proportion of non-minted items may be not representative.

method of soil chemistry analysis provided in earlier periods within exactly the same geographical extent, I believe the Svealandic container proportions presented in Figure 5.23 are reliable. The use of silver as a medium suitable for traditional pagan offerings and symbolic acts, began to wane gradually since the introduction of European coinage in the 990s (cf. Chapter 5.3), however it visibly decelerated in the 1050s and by the turn of the 12th century placed deposits disappeared completely (Figure 5.24).

Spatial distribution patterns of silver deposited after 1050 also appear to have changed although the changes are not as dramatic. In Pomerania (Figure 5.25) it is clear that Wolin has completely lost its importance most likely as a result of devastating Danish attacks in the 1040s (cf. Chapter 3.3.3). It appears that the earlier-established tribal, political and economic centres of Szczecin, Stargard, Gdańsk and perhaps Słupsk benefited most from its demise. The composition and concentrations of silver deposits imply that the distribution networks established by the end of the Viking Age operated still after 1050. Nevertheless, some mechanisms were responsible for the eventual disappearance of hoards, first as offerings by the end of the 11th century and completely by 1120s. The abandoning of the habit of making silver deposits seems to coincide with the annexation of Pomerania to Poland during the reign of King Władysław Krzywousty (Wrymouth) and his campaigns fought between 1102 and 1122, also traceable in the increased proportion of emergency deposits in this period. The political subjugation of Pomerania to a Christian state is likely to have brought significant changes to the customs of Pomeranian tribes. Particularly the ritual aspect of silver deposition seems to have become obsolete in connection with the advancing Christianisation of the northern Slavic tribes. The process had already begun with the early Piast incursions (e.g. the establishment of an abortive bishopric in Kołobrzeg, cf. Chapter 3.3.8) and may have intensified in the late 11th century, when Pomeranian tribes found themselves under the rule of Prince Henry of the Obodrites who according to Helmold of Bosau (B1CH34) was enthusiastically introducing Christian laws and faith across the region. So enthusiastically, in fact, that it sparked another rebellion, this time led by Rugians. The spiritual

future of Pomeranian tribes had been sealed by the successful and peaceful mission of Otto of Bamberg in the 1120s. Perhaps more importantly, Polish rule may have brought to Pomerania the foundations of, and created an environment suitable for the practical introduction of a monetary economy – the minting of national issues in the heartland of Poland was firmly re-established a generation earlier in 1070s (Suchodolski 1973:13, Table 1) after the crisis in the reign of Mieszko II and Kazimierz Odnowiciel (the Restorer). Political dependency and conceivably close economic relationships with the nearby state, which by and large operated a monetary economy, may have provided Pomeranian economic structures with stimuli, perhaps even made it necessary, to use the imported silver coins (Polish, German and local imitations, Horoszkó 2015:9) in an increasing number and wider variety of transactions. This process would have reduced the need to store them as hoards between the previously rather rare occasions when they could be used.¹¹⁰ It is not impossible that this process paved the way for Pomeranian princes to begin minting their own coins in the 1170s (Horoszkó 2015:9).

In Gotland after 1050 the tripartite division of the island visible earlier in hoarding patterns is still observable and the importance of areas such as Stenkyrka, Eskelhem, Alskog and the southern hoarding hub of Hemse/Fardhem/Levide is still manifest through hoarded silver (Figure 5.26). Despite some evidence for the continuity of silver networks, there are visible changes: the traditional ‘powerhouse’ of the hinterlands of Slite and Barshalder harbours appears to have collapsed, so does the most persistent concentration at Roma, which became the location of the first and only Cistercian monastery on the island, founded in 1164. The changes culminate in the 1120s when the custom of silver deposition dies out completely in Gotland. Its demise appears to have taken place over a generation. It began with a severe reduction of hoarding in the 1090s, when the number of finds is well over four times smaller than in the preceding decade. Although the intensity of this event may be influenced by the long

¹¹⁰ Interestingly, the last Pomeranian savings hoard from Malczkowo, *tpq* 1114, coincides with the conquest of eastern Pomerania by Bolesław Krzywousty in 1115.

chronology of coins which give *tpqs*, it is probably not coincidence that the decline in the number of hoards happens at the same time as the construction of the earliest churches in Eke and Hemse, dated dendrochronologically to 1087-1092 and 1098-1103 respectively (Bråthen 2015). Moreover, around this time placed deposits still prevalent c. 50 years before disappear completely.¹¹¹ In my opinion the coincidence of these events means that silver in Gotland by the end of the 11th century found a new use: to finance the expensive (communally funded?) process of building and maintaining churches. The strain on resources certainly increased in the course of the 12th century when Gotlanders began constructing their churches from stone. By the early 14th century there were c. 90 of them, which could explain the rapidly decreasing enthusiasm for hoarding. In this new reality the economic and symbolic/ritual functions of silver were finally allowed to combine. Now, rather than using silver in pagan forms of worship and symbolic behaviour frowned upon by the consensually accepted Christian faith, the people of Gotland may have applied its metaphysical qualities to the construction of God's houses, resulting in the gradual disappearance of containerless deposits. The concurrent reduction in the number of savings hoards may also mean that expenses triggered by church-building forced Gotlanders to spend their family savings, which may have been the reason for the re-emergence of Oriental coinage in the early 12th century (Figure 5.22), around the time when the first stone churches were constructed. It naturally follows that heightened spending on ecclesiastical infrastructure also increased the amount of silver in circulation, reducing the need for its hoarding and in turn paving the way for the introduction of monetary economy with the emergence of local minting in the 1140s.

In Svealand the interpretation of hoards deposited after 1050 is again made more difficult by the small sample size. Analysis of distribution patterns does not indicate any statistically significant concentrations of hoards, but it does give the impression that Sigtuna lay firmly in the

¹¹¹ The last placed deposit in Gotland is Vastäde, *tpq* 1101.

centre of distribution networks evidenced by hoards (Figure 5.27). In Pomerania and Gotland the custom of making silver deposits was maintained into the 12th century, but in Svealand it disappeared completely in the course of the 1070s by which time the use of silver for ritual and symbolic purposes appears to have been already abandoned. The reasons for this are unclear, but presumably the gradual advance of Christianity may have been responsible for the cessation of the use of silver in placed deposits. Reasons for the complete disappearance of hoards are even harder to determine, particularly since local minting in Sigtuna collapsed already in the 1030s and was not reintroduced in Svealand until the 1180s (Svensson 2014:1). It is, therefore, difficult to apply to Svealand the explanation proposed for Pomerania, unless one assumes that the influx of European, mainly German coins, which clearly dominated the composition of hoards after 1050, was sufficient to meet local demand for frequent transactions which in turn would have rendered storing silver as hoards obsolete. However, the late Svealandic hoards contain a significant proportion of non-minted silver, which combined with the reappearance of dirhams in the latest hoard from Venngarn, *tpq* 1079, may imply some problems with the accessibility to silver in general. This may well have triggered a situation similar to that observed in the 980s after the collapse of Birka and the possibility of a general crisis in the late 11th century is highlighted by a high proportion of deposits which may be classified as emergency hoards.

5.4.4 Brief summary

The above overview of silver deposits made before and after the Viking Age may have raised additional questions, particularly those surrounding the gradual disappearance of silver hoards in the Baltic zone, for which I was unable to provide exhaustive answers within the confines of this thesis.

Nevertheless, I do believe that my analysis offers evidence for the evolution of ways in which silver was used and deposited in the Baltic zone. It seems that during the earliest wave of silver influx, the economic function for 2nd-century Roman denarii was only marginal, if present at all.

It is much more likely that whenever silver was hoarded with the aim of retrieval, the act was motivated by behaviour associated with establishing and reaffirming social and political relations, most likely in the form of gift exchange. However, Roman silver was deposited almost exclusively in the form of unprotected, relatively small deposits made, when the context is known, most likely as personal sacrifices in places offering the most expedient connections with the supernatural (bogs and crevices), or as foundation deposits in contemporary dwellings. When silver reappeared at the beginning of the 9th century after centuries of absence, in the first decades of its influx it was almost invariably still used in the same, ritual capacity. Throughout the Viking Age the symbolic function of silver deposits was gradually decreasing (although the process was not linear) in favour of its applications in the emerging bullion economy. By the 12th century the use of silver in placed deposits appears to have been abandoned completely, partially because of ever increasing use in everyday 'mundane' economic transactions. The growing familiarity with silver available in the Baltic zone for c. 350 years perhaps eventually robbed it of its mediatory qualities spanning between the known and supernatural worlds, a process undoubtedly facilitated by the spread of Christian beliefs and customs, which pushed these worlds further apart. Traditional ritual and symbolic silver deposition had no place in the new world – its accepted function was now confined to exchange, payment of secular penalties or funding the construction of churches. From the 990s silver in the Baltic-zone hoards arrived predominantly in the form of European coins, which due to their smaller size than Oriental dirhams required less fragmentation and could be more easily accepted in their original form, and whose supply was made much easier since its sources were found just hundreds rather than thousands kilometres away. The relative ubiquity of silver in the Baltic zone, available for use in an increasing number and wider variety of transactions, together with close political and economic relationships with states operating or attempting to operate within a monetary economy, would have eventually reduced the need to store silver as

hoards, leading to their eventual disappearance in the course of the late 11th and early 12th centuries.

My discussion of the role and character of silver deposits before and after the Viking Age has served one more, important, function. It has produced another line of evidence in support of the weight/container categorisation of hoards introduced in this work, which partially relies on the hypothesis that the information about the presence or absence of a container is generally independent of the time of discovery. This observation can be most clearly demonstrated in the chronological structure of the most numerous Gotlandic discoveries (Figure 5.28). Despite having been recorded in a similar time frame between the late 18th century and recent years, but mainly in the 19th and the first half of the 20th century, Gotlandic finds display significant differences in the proportion of contained hoards which clearly depend on the time of their deposition, not discovery.

6 Synthesis and conclusions

In this final chapter I combine the various strands of evidence and argumentation presented in individual case study chapters and the chronological overview of hoards. It is my aim to offer here answers to the main questions of the thesis: the hoards' relationship with trade and the light they may shed on the sheer amount of silver in circulation; the nature and function of trade centres and the fact that they may not have been indispensable for a fair amount of trading to occur; the nature of the different societies benefiting from the influx of silver in the Viking Age, with emphasis on the differences between them, and their use of it, with particular reference to the significance of containers and size of deposits as indicators of intention of retrieval.

6.1 Inflow of silver

6.1.1 Brief notes on terminology

I have used terms like 'emporium', 'trade centre' and 'central place' thus far without really explaining what I mean by them, and I believe this a good place to offer an explanation. The Latin term *emporium* derives from Greek *emporion/emporos*, meaning 'trading place, market'/'merchant', based on a stem meaning 'to journey' (Oxford Online Dictionary). In the archaeological literature the use of the term was propagated by the work of R. Hodges (e.g. 1982; 2000; cf. Sherman 2008:152 for full reference list). It has come to denote large, permanent, maritime trading places, but there is a lack of consensus with regard to what archaeological criteria should be met in order to categorise a site as an emporium (Pestell 2011:557-559). Some authors understandably apply the term to a wide variety and scale of Viking-Age sites associated with trade and exchange. These include large 'proto-urban emporia' such as Hedeby, Birka and Wolin; 'large emporia' of international importance, e.g. Gross Strömkendorf (Reric), Janów Pomorski (Truso), Ralswiek, Menzlin; and 'regional emporia' with

international links, e.g. Fröjel, Bandlunde, Kołobrzeg, Gdańsk, Szczecin (Bogucki 2000:273-299); effectively leaving little behind to classify as a non-emporium. In 2007 S. Sindbæk proposed a network perspective for the urbanisation processes in early Viking-Age Scandinavia, in which trade is seen as the result of traffic and exchange between inter-regional 'nodal points' and local markets represented by 'central places'. Although his paper pertained to the 8th and 9th centuries, the model can be extended to the entirety of the Viking Age. In Sindbæk's approach, nodal points are defined as settlements possessing extensive cultural deposits, strong evidence for highly specialised craft production and a generous occurrence of imports (Sindbæk 2007:121, 126). Nodal-point sites had an exclusive role in long-distance trade. They were supported by a layer of central places, sites identified by Sindbæk as permanent trading settlements serving primarily local markets. Another crucial aspect of nodal points is their location at major topographical barriers which 'caused a break of traffic and demanded a trans-shipment and perhaps a temporary storage of goods' (Sindbæk 2007:129). All the characteristics of Sindbæk's nodal points are met in my case studies only by the proto-urban maritime sites of Sigtuna, Birka, Wolin and Truso. In my opinion these sites can without a doubt be called emporia regardless of which categorisation one wishes to follow, and thus in this thesis I reserve the use of the term 'emporium' for these sites only. For other sites with evidence for mercantile exchange, craft production and long-distance connections, such as Ralswiek, Menzlin, Kołobrzeg etc., I use a more neutral term 'trade centre'. This group of sites displayed less intensive, varied and specialised evidence for production and trade (particularly in exotic goods) than emporia. They lack formal proto-urban features, such as regulated plots and formalised streets, which implies less advanced organisation. They are not located at major topographical barriers. Finally, there are a number of local/regional political, and perhaps religious, centres such as strongholds, for which there is little evidence for specialised production and importation of exotic goods, but which nevertheless have evidence for involvement in silver trade (e.g. Nętno, Bacherswall, Glienke). All these three types of site (i.e. emporia, regional trade centres participating in long-

distance exchange, and strongholds involved in silver trade) I collectively put under an overarching term 'central place'. From the hoarding perspective this choice of terminology can be justified by the fact that wherever such sites can be identified in my case studies, they are located at or very near the centre of their respective hoard concentrations. My use of the term 'central place' also differs from Sindbæk's network-based definition: in my opinion regional trade centres were not necessarily subservient to emporia active in their respective regions. As we have seen in Pomerania, trade centres at Kołobrzeg and Gdańsk and even the stronghold complex in Słupsk were capable of, and quite possibly intended to, operate independently from emporia at Wolin and Truso.

6.1.2 Role of central places in Pomerania and Svealand

The point of departure of my discussion was the distribution of silver hoards within the chosen regions of the Baltic zone. The immediate impression given by maps showing locations of Viking-Age silver deposits in my case studies (Figures 2.3, 3.3, 4.3) is that they are not distributed randomly or evenly, but concentrate in certain areas while being almost completely absent from others.

In Pomerania, hoard concentrations are clearly associated with important regional centres of trade and specialised craft production participating in long-distance trade, such as the best known Menzlin, Ralswiek, Kołobrzeg and Gdańsk, and crucially the emporium of Wolin. The second group of concentrations can be associated with central places in the form of strongholds, being political centres and presumably seats of local elites, including Schwedt, Szczecin, Stargard Szczeciński, Słupsk and possibly Nętno and Bydgoszcz. In this capacity strongholds were capable of offering political control and relative stability which facilitated mercantile activity. An interesting feature of this group is that there is only limited archaeological evidence to associate them firmly with long-distance trade. Probably part of the problem is that all of these sites, maybe with the exception of Szczecin, were subject to limited archaeological investigations and

the quality and quantity of the material cannot be compared with well-excavated sites such as Ralswiek or Wolin. Although the potential for new discoveries of exotic goods cannot be rejected, it seems logical that their role in the redistribution of silver, which arrived through the coastal entrepôts, was secondary to their political and strategic function. Almost without exception these sites are located either at junctions of known regional trade routes (Słupsk, Szczecin, Stargard), or on these routes between watersheds (Nętno). The concentration of hoards around Bydgoszcz strongholds can be associated with a border zone between Pomerania and the early Polish state, strategically positioned to take advantage of and control(?) traffic on the Vistula and between the Rivers Brda and Noteć.

A similar picture can be observed in Svealand. There is a strong indication that well-excavated emporia of Birka and Sigtuna associated with royal power, as well as later, more local and less investigated, trade centres such as Eskilstuna, were facilitating silver circulation and ultimately hoard deposition. But the picture is not as clear as in Pomerania. The existence of hoard concentrations, some equally strong, or even more pronounced (i.e. Norrtälje and Stockholm) in areas where central places are absent from the archaeological record, is harder to explain. The area of Norrtälje, where the archaeological evidence of activity in the Viking Age is extremely scarce, potentially offered plenty of safe anchorage with an easy access to the Baltic. The chronological structure of Norrtälje finds combined with their geographical location suggests that the area participated in the northernmost branch of the long-distance trade route leading from the East via the Gulf of Finland and Åland to Birka. With regard to the Stockholm concentration, the archaeological evidence for Viking-Age settlements is also limited, and there is no archaeological indication that any central place was located in the area. But the Stockholm concentration is located at the only unimpeded entry point into the Mälaren leading ultimately to Birka and Sigtuna. This suggests that another important factor for Svealandic hoard concentrations is proximity to trade routes. In fact, all major concentrations located between Mörkö in the south to Uppsala in the north, lie along a trade route called Fyrisleden linking the

southern Svealandic coast with Uppsala and Vendel via the portage at Södertälje. Similarly, the diffused concentration near Nyköping is located along a system of rivers and lakes leading towards Eskilstuna which emerged in the 11th century. It appears, therefore, that in Svealand and Pomerania hoard concentrations generally formed in areas associated with emporia, regional trade centres with international links, and local/regional political centres such as strongholds.

6.1.3 The Gotlandic alternative

A different picture emerged in Gotland. The archaeological material from a handful of excavated settlements indicates that they had a uniform, all but egalitarian character. Some Gotlandic hoard concentrations can, on the basis of the early-13th-century *Guta Saga*, be tentatively associated with regions – but not individual sites – of some social and presumably political importance. These include a small, but discrete, concentration at Alva parish which can be linked to Avair Strabain whose skilful negotiations brought about a treaty with Sweden; Hellvi parish, where an oratory built by Ormika baptised by the Norwegian king St. Olaf is located; and Stenkyrka parish associated with Likkair Snielli, who was said to have carried most authority at his time (cf. Chapter 2.3.1). One has to be aware that these associations are just an educated speculation and there is little archaeological evidence to allow one to pinpoint actual political central places with any confidence. The only exception may be a concentration of hoards found in the western part of Roma parish, where the Gotlandic althing is believed to have assembled at a site near the medieval monastery of Roma kloster. Unfortunately, archaeological investigations in the area where the assembly is suspected to have congregated have been confined to metal-detector surveys and no excavations to confirm its character have yet been undertaken. The general absence of evidence for centralised political power on Gotland is combined with another peculiarly Gotlandic feature: the abundance of Viking-Age harbours, or

rather landing places, identified by the pioneering research of D. Carlsson (cf. Chapter 2.4.7).¹¹²

In this work I have identified at least eleven such sites which may have been active in the Viking Age. Most are only known from metal-detector surveys, and cartographic and linguistic analyses. Rare excavations at Paviken and Fröjel, and to a lesser degree at Bandlune and Västergarn, provided archaeological evidence for long-distance trade and craft production, however it is impossible to describe any of the Gotlandic harbour sites as large international emporia like Birka or Wolin. Moreover, Gotlandic Viking-Age harbours, which would be the closest parallel to Pomeranian and Svealandic central places, are generally located at the outskirts of hoard concentrations, not at their centres like the continental counterparts. There is also no evidence to link them with any political structures. In Carlsson's (1999:123) opinion, based on his analysis of cadastral maps from the beginning of the 18th century, Gotlandic harbours were in fact divided into a number of small plots which belonged to different farms located inland. In other words, they were most likely owned collectively by (rich?) farmers, and seem to have merely served as 'gateways' which facilitated the flow of silver and other goods to the island's interior, especially regions where the true political powerhouse was located. This observation may also provide an explanation as to why the model of silver distribution is so different in Gotland. In my opinion, the multitude of sites through which silver reached the island – none of which seems to have at any point gained an upper hand like Birka or Wolin who dominated their respective regions – was the result and an expression of a comparatively democratic political structure of Gotlandic society, as suggested by archaeological and written sources. It was probably also influenced by the topography of the island: there were no major rivers that would structure the access to the interior in a way similar to e.g. Pomerania.

The traditional theory among historians is that Gotland was an egalitarian peasant society based on several distinctive features (Siltberg 2012:221-222), such as farms of equal size and no

¹¹² It is not impossible that similar sites existed in other regions along the Baltic coast (e.g. Norrtälje?), unfortunately no similar research has been undertaken outside Gotland.

manors, political autonomy and an autonomous law which, despite nominal submission to the Swedish crown, made no mention of royal power (cf. Peel 1999; 2009). This view has been challenged mainly by scholars from mainland Sweden (see Gustafsson 2013b:42 for references), who argue that Gotlanders lived and acted within a social framework that was profoundly Germanic/Norse and based on social stratification. An archaeological site that is most often used in this argumentation is the Broa/Högbro cemetery in Halla parish which comprised c. 700 graves including rich burials interpreted as implications of a high-status *milieu*. However, a very strong argument against this interpretation was recently put by Gustafsson (2013b:43) who successfully argues that these rich graves dated to Vendel Period do not automatically mean that similar social stratification should be extrapolated onto the Viking Age. Gotlandic burials in the Viking Age were standardised and lacked the more extravagant features in grave design, which, on the Swedish mainland, are generally assumed to have signalled social stratification and hierarchical superiority. Moreover, T. Siltberg provides extensive evidence for an egalitarian mentality of the Gotlanders, the most illustrative, although late, example being the tale of a magnate Takstainarn/Vigen, who was murdered by his co-parishioners when he attempted to make unilateral decisions (Siltberg 2014:222). Furthermore, the analyses of historical land divisions and (admittedly few) settlement sites led K. Jonsson and M. Östergren (1990:146) to conclude that there is no evidence for farms of any special kind or people with a special position in society. As we have seen in the spatial and regression analyses, Gotlandic hoards are distributed throughout areas settled in the Viking Age, which could be taken as an indication that a large section of the population had uniform access to silver (cf. Östergren 1989:26-27; Jonsson and Östergren 1990:146-147). This is obviously not to say that Gotland society did not have members who were 'more equal than others' for various reasons, such as economic resourcefulness or military capability. Nevertheless, the previously highlighted legal requirement for the integrity of land, restrictive inheritance and land purchase rules (*Guta Lag* mainly CH25 and 42), prevented any individual from amassing land and political power. This

situation may have also necessitated an increased need in mercantile or military ventures beyond the island, as in the case of shared inheritance: when male inheritors came of age, one of them was 'to take his scrip and his scales and each have responsibility for himself, if they no longer wish to be together' (*GL* CH20). The abundance of hoards in Gotland suggests that a good proportion of proceeds from such socially forced enterprises returned to the island in the form of silver. Whereas Pomeranian and Svealandic central places, including emporia, were associated with more or less centralised and hierarchical power structures,¹¹³ in Gotland the protection of trade such affiliation would have offered, may have been instead provided by 'the interdependence of groups and communities, rather than coercive power' (Sindbæk 2012:155). I believe, therefore, that Gotlanders simply had no political structures for an emporium-class ports of trade to emerge, and probably no need for them, since clearly the system of decentralised, collectively run harbours and landing sites was able to supply them with extraordinary amounts of silver. The large number and density of these sites on an island located strategically in the middle of the Baltic, with ease of access to long-distance trade in silver, slaves and other high value goods, was facilitated by a more democratic social structure than in those areas where central places developed.

¹¹³ Written sources speak of the association of Birka and Sigtuna with royal power, either directly or through representatives (*VA* CH11, 26-28; *AoB* B4CH31(28)). There is no direct evidence of a royal or princely power in Wolin, but the written sources provide some evidence for self-government (*ToM* B6CH33) and the emporium is considered by scholars a political centre of the Wolinian tribe. Other Pomeranian central places were located at or were themselves strongholds, and political and/or symbolic centres of their respective *civitates* (cf. Chapter 3.4.6). There are, however, the exceptions of Truso and Ralswiek, for which there is no literary and little archaeological evidence to suggest that they accommodated political 'executives'. Nevertheless, both are located approximately 5km from the nearest strongholds, whose elites may have offered protection and thus gained access to commercial goods in exchange. This possibility was proposed by H. Jöns (2005:100) for Menzlin which was also located approximately 5km from the stronghold in Grüttow. Jöns' theory is contested by D. Wehner (2010:258) on the grounds of chronology: the stronghold was established at the end of the 8th century whereas the trading place emerged at the beginning of the 8th century. But as Wehner admits himself, since 'no sign of self-government has been found on the site [Menzlin] so far: the possibility of dependence on authorities beyond the trading place of Menzlin is therefore not at all far-fetched.'

6.1.4 Dynamics of silver inflow as implied by hoard analysis

An important conclusion which can be drawn from the above discussion is that emporia were not indispensable for a large amount of silver influx, and indeed trading, to occur. In Gotland, and perhaps the Norrtälje and Stockholm areas, this also goes for even less developed types of central places. This assertion can be reinforced by my chronological analysis of Pomeranian but particularly Svealandic hoards (cf. Chapter 5.2). It has shown that the initial importation of Samanid silver bypassed Birka entirely. The first Samanid coins known from the emporium itself were discovered in layers dated to the mid-10th century (Gustin 2011:233), whereas the earliest hoards containing Samanid coinage were deposited at least 25 years earlier. Moreover, they were located nowhere near Birka, but in the Norrtälje and Mörkö regions on the open Baltic coast.¹¹⁴ This example shows clearly that the new connections which secured the inflow of Oriental silver from new sources after the crisis of the late 9th century were established independently, without any involvement of the emporium, which itself took about a generation to finally capitalise on the silver flow from Central Asia and Volga Bulgaria. In Pomerania, the evidence is not so striking, but the flourishing of central places in Kołobrzeg, Słupsk and Gdańsk at the time when the flow of Oriental silver faltered and European coinage began to dominate local silver economies, can be taken as deliberate and successful attempts to bypass the monopoly of Wolin, which after 980 was clearly broken (Figure 5.14). Thus, the emporia-scale trading hubs may not have been indispensable to enable the influx of silver; however, the statistically significant concentrations located at Birka, Sigtuna and particularly Wolin, cannot be brushed aside.

So why do we have emporia, one may ask. This is a complex question requiring a dedicated study, but a tentative answer may be found in how these places evolved (cf. Chapters 3.3 and 4.3). Birka seems to have emerged after the collapse of Helgö on the existing route connecting

¹¹⁴ Harka (*tpq* 917, CatNo530) and Önnestand/Önsta (*tpq* 924, CatNo522)

Uppsala with the Baltic. Sigtuna was founded on the same route as Birka, after it collapsed, but it was conceived as a political statement and grew to an emporium only some decades later. Wolin was occupied already in the late 8th/early 9th century, but the earliest evidence for it operating as an emporium comes from the first decades of the 10th century. Truso, although its connection to silver was comparatively short-lived, began as a place where craftsmen and merchants met only seasonally, not unlike Ribe (Feveile 2012:127). And if Birka's example of the adoption of Samanid silver is not unique, it is likely that emporia did not stimulate the creation of new trade routes, but rather capitalised on these connections once they had become established by individual entrepreneurs. It could mean that emporia emerged from more humble forms not dissimilar to the Gotlandic harbours or smaller regional trade centres. Their function as international hubs or nodes was not 'preordained' but seems to have evolved. To answer why and how this happened only at certain places is beyond the scope of this study. But it was certainly a combination of factors, which may include association with power structures offering some form of security, adaptability to changing economic situation, accessibility from the sea and strategic location at major geographic boundaries offering expedient connections to culturally varied regions further inland. Smaller central places (and Gotlandic harbours) for a variety of reasons could not afford the full set of these features, and therefore never grew to have similar importance. But it did not prevent them from gaining access to silver which eventually was deposited nearby.

Not only were the networks which facilitated the importation and redistribution of silver throughout their respective regions not strictly hierarchical and dependent on emporia: they were not static and reacted to political, and above all, economic circumstances, principally at times when major problems with the supply of silver can be identified.

The discussion undertaken in Chapters 5.1 and 5.2 revealed that the first influx of Oriental silver was geographically limited, and different regions reacted differently to its arrival. In Svealand

there is evidence that the inflow of Abbasid dirhams, which were introduced into the region via the agency of Birka demonstrably associated with royal power, took place along existing channels; in Pomerania the tribal mercantile and craft-production centres of Menzlin, Ralswiek and the emporium at Truso played a role similar to Birka, but there is little evidence of structures facilitating its redistribution throughout the region. In Gotland, despite it being habitually different, Abbasid silver inflow appears to have been limited to areas which can be tentatively suspected of association with political structures.

By the end of the 9th century the disruption of contacts in the intermediary links to the monetised areas of the Caliphate stifled the flow of new coins from the East (Kilger 2007a:232). Entrepreneurial merchants opened up new sources of Samanid silver accessed via North Russian rivers and the lands of Volga-Bulgars at the beginning of the 10th century. Intriguingly, the arrival of new silver stock involved in the initial 20 years the importation of mainly complete Samanid coins whose fragmentation by weight did not exceed 10%, after which it gradually increased to exceed 80%. What makes it particularly unusual is that by the mid-9th century until the onset of the 'first silver crisis' the fragmentation of Abbasid coinage reached (and in one case exceeded) 80%. The traditional theory assuming that the increased fragmentation equals more intensive circulation and higher development of market, fails to explain this phenomenon since it would mean that Baltic-zone societies transited from a weighed to a counted silver economy and back again, which cannot be supported by the available evidence. The phenomenon is probably best explained by the theory recently put forward by M. Jankowiak (forthcoming), who suggested that coin fragmentation did not develop in a linear fashion as the economies evolved, but rather increased with the number of transactions at the successive trade centres, before the silver made its way to areas where it was deposited. In this light the observed pattern implies that in the early years of the 10th century Samanid coins which arrived on the markets on the Volga relatively complete were brought back to the Baltic shores through very few, and perhaps no intermediaries, to be eventually deposited as relatively complete objects. The influx of Samanid

and Volga Bulgar coinage over the course of the 10th century provided a new lease of life for some of the earlier trade hubs (e.g. Menzlin, Birka, Slite, Bandlunde), but also heralded the emergence of new areas involved in the distribution of silver (e.g. Fröjel, Wolin, Norrtälje). Problems with access to Samanid silver sources, which culminated in the 980s, were associated with, and perhaps were a significant cause of the dynamic political situation and escalation of tensions in the Baltic zone and Rus. The collapse of the Eastern connection and the silver shortage it triggered necessitated the introduction of predominantly fragmented, locally produced ornaments and ingots to maintain the liquidity of the established market structures cf. Figures 5.1-5.4). In Svealand the disappearance of Oriental silver occurred simultaneously with the collapse of Birka whose prosperity was effectively built on Abbasid and Samanid coinage. The hoarding hiatus of the 980s was brought to an end by the emergence of Sigtuna as a leading new emporium based largely on western sources of silver. Its creation can be associated with attempts of Swedish kings to break from Danish rulers and to establish a centralised power base. In Pomerania, the introduction of silver from Europe coincided with the diminishing importance of Wolin. Its monopoly had been broken by new centres at Kołobrzeg, Gdańsk and Bydgoszcz, which formed most likely in response to the ambitions and needs of the expanding Polish state intent on securing independent access to the sea. In Gotland the changes in the patterns of deposition and composition of hoards in the period 980-999 are less dramatic than in Svealand and Pomerania. This may be the result of the Gotlanders' ability to secure access to Samanid silver for longer than elsewhere in the Baltic. Nevertheless, changes took place, and the introduction of European coins as the main source of silver may have coincided with the introduction of Christianity. New, and statistically very significant concentrations of silver hoards which appeared after 980 in Hellvi and Stenkyrka/Väskinde parishes, can, according to the written sources, be linked with the renowned political figures of Likkair Snielli and Ormika, reportedly among the first Gotlanders to accept the new faith (cf. Chapters 2.3.1 and 5.2.3). The introduction of European silver through more direct connections with its sources in Germany

and Anglo-Saxon England, almost invariably complete in the first years of its influx, could mean that 'simplification of trade was reflected in the simplification of the means of payment' (Jankowiak forthcoming).

The results of spatial analyses were verified statistically by using regression analysis (cf. Chapters 2.5, 3.5 and 4.5). It confirmed the important role that mainland central places of all types, particularly those located in the coastal zone, and in the Gotlandic case the ease of access to multiple 'co-operative' harbours, played in the formation of hoard concentrations, and by implication in the movement of silver, people and goods. In Pomerania regression modelling also indicated that hoard deposition was concentrated near major rivers, which in connection with the statistical importance of central places and strongholds should be perceived as an indicator of regional trade routes facilitating movements of people and goods including silver. Importantly, the analysis has clearly shown in all three case studies that silver was ultimately directed to areas with the highest density of settlements, although not necessarily the settlements themselves – only between 11% and 17% of analysed hoards were found within the identified contemporary settlements of any type, including emporia, which certainly are not representative of regular Viking-Age farms and villages. Intriguingly, in Gotland regression modelling implies that some of the highest concentrations of silver were found in areas which produced evidence for non-ferrous metalworking. Given that only up to 7 hoards can be associated with dedicated workshops, whereas 26 were found in otherwise ordinary settlements, it seems probable that the areas most abundant in silver attracted metalworkers to where work was to be had.

6.2 Reasons for deposition and (non-)retrieval

The first strand of my research highlighted the association of hoards with sites and regions which were involved in the influx of silver and provided conditions suitable for mercantile exchange –

certainly silver had to be available first before it could be deposited. However, the factors summarised above fail to explain why silver was put in the ground and, more importantly, why it was never reclaimed.

6.2.1 Summary of the weight/container method

Traditionally, two opposing perceptions of Viking-Age hoards are put forward: one sees them as collections of valuables deposited deliberately in a place believed to offer protection, with an intention of later retrieval; the other stresses the role of 'irrational' behaviours in every part of human life and perceives hoarding as an expression of symbolic or ritual practices. Such a polarising approach to the interpretation of hoards is rare in modern research and the majority of scholars appreciate that the reasons behind the deposition of hoards were complex. However, they rarely go beyond acknowledging this complexity whilst proceeding with agendas leaning towards one or the other school of thought. I did not find this situation satisfactory and decided to try answer the question whether it is at all possible to say which perception, at least with regards to hoarding, prevailed among the societies handling silver in the Viking-Age Baltic zone.

To this end I developed a method which through analysing the weight of deposited silver and the presence or absence of a container aims at determining if a hoard was buried with the intention of retrieval or was meant as a permanent placed deposit. The central premise of my reasoning is that, for practical reasons, hoards buried with the aim of retrieval were placed in containers. Conversely, I assume that hoards deposited without receptacles are more likely to have been deposited without the aim of retrieval and should, therefore, be associated with ritual and symbolic practices. This approach was promptly faced with a problem since a large proportion of hoard finds in all case studies were reported without information as to whether any kind of container was present or not. For convenience I refer to them as 'no data' deposits. The analysis of the chronology of hoard discoveries showed that the information about the

presence or absence of a container was generally independent of the time of discovery (cf. Figures 2.21, 3.32, 4.25 and particularly 5.28). Moreover, the statistical comparison of silver weight distribution (cf. Figures 2.23, 3.34 and 4.27) showed far greater similarity between the interquartile ranges of 'no data' deposits and deposits reported as made without any container, than with contained finds. Finally, through the analysis of soil conditions at hoard findspots I was able to show that the majority of hoards for which the presence or absence of a container was not specifically reported, were not originally deposited in containers which simply did not survive.

These lines of evidence allowed me to suggest that the majority of deposits recorded without explicit mention of the presence or absence of a container, except those reclassified as a result of soil conditions analysis, were in fact deposited without any receptacle and as such were deposited without the aim of retrieval. I am aware this is a simplification which does not account for the individual circumstances of all silver deposits, but it was a necessary one so that I could create a model which can help understand general trends of hoard deposition, particularly that the exact archaeological context of Viking-Age hoards is rarely known.

This hypothesis was reinforced by comparing the contained and containerless deposits with the weight of silver they contained. The 'tipping point' at which hoards become deposited more often in containers falls in Gotland at approximately 600g, 400g in Svealand and 250g in Pomerania, most likely reflecting the differences in the availability of silver in each region. The analysis has shown in all three case studies that smaller hoards were significantly more likely to be deposited without any containers (cf. Figures 2.25, 3.36 and 4.29): 87% of small containerless hoards in Gotland and Svealand and 93% in Pomerania were found beyond the identified contemporary settlements or their immediate vicinity. They dominated the deposition in a watery environment, where they comprise 75% of deposits found in such circumstances in Pomerania and Gotland. Small containerless deposits also dominated finds discovered in the

context of cemeteries and earlier burials in the Scandinavian *milieu*, arguably associable with cultic practices and ancestral worship. In Gotland they are also the largest group of silver deposits found in abandoned Early Iron-Age structures, most likely associated with some form of ancestor cult (cf. Svedjemo 2014:115), explicitly prohibited by later Christian laws (Peel 2009:9). Furthermore, in Svealand 75% of the deposits found in rock crevices, generally accepted to have associations with cultic practices, were both small and containerless. Deposits made in crevices and in the watery environment were difficult, if not impossible to recover. I concluded, therefore, that most probably these deposits were made as placed deposits, i.e. offerings of possessions used in ritual or symbolic 'transactions', a fulfilment of a sort of a contract made between the worshipper and the gods (Bradley 1987:361). In the context of earlier structures and graves, placed deposits may have been intended as a way of making symbolic connections between the living and their ancestors, and the place itself (Zachrisson 1998:120).

The majority of placed deposits, principally on Gotland, can arguably be linked to symbolic practices associated with land ownership. The importance of the integrity of land and of providing for its legal protection evident in *Guta Lag* suggested that such deposits were symbolically associated with land itself, and particularly with field systems of a given settlement (cf. Chapter 2.6). This hypothesis was confirmed by the results of spatial and regression analysis which have shown that the most intensive hoarding in Viking-Age Gotland, particularly in the form of placed deposits, was focused on newly colonised, most likely recently broken fields in previously marginal soils (cf. Chapters 2.5 and 2.7.2). The process of forging personal bonds with land would have been also important in the established farms as they (as well as new additions) could change hands almost exclusively through inheritance or violence, making the need for symbolic personal connections significant in case of likely disputes. The association of silver deposits with marginal soils was highlighted by spatial and regression analyses also in Pomerania and Svealand. I believe, therefore, that the interpretation proposed for Gotland can also be applied to most placed deposits found in the other two case studies, although some regional

characteristics noted there allowed me to propose complementary explanations (cf. Chapters 3.6.2 and 4.6.2).

The weight/container analysis has shown that large hoards, on the other hand, are far more likely to be discovered in containers. I believe that large volumes of silver protected from accidental dispersion and loss by being placed in often multi-layered receptacles¹¹⁵ are more likely to represent the economic aspects of hoarding and can be perceived as savings hoards. This suggestion was supported by the fact that on Gotland settlement finds are the most numerous group among savings deposits, even though only a very small proportion (12%) of the estimated 1500 Viking-Age settlements have been identified. This could indicate that they were intended to be accessed easily and regularly. Furthermore, of all the hoards found in containers, large ones, i.e. savings hoards, were in Gotland six times more likely to be found in settlements than smaller ones.

The need for regular access to savings is intriguing. Unfortunately we know little about how the silver economy was exercised in Gotland. However, the ‘tipping point’ of 600g above which Gotlandic hoards can be classified as savings hoards corresponds to the standard amount payable in fines to the general assembly for serious crimes codified in the *Guta Lag* (cf. Chapter 2.7.1). Although slightly more problematic, a similar pattern can be observed between the Svealandic savings hoards (at a ‘tipping point’ of 400g) and the laws codified in *Upplandslagen* (cf. Chapter 4.6.1). This could suggest that many of savings hoards acted as a ‘portable but standardised medium for the payment of social obligations’ (Bradley 1987:358), such as compensations, dowries and ransoms. It is not impossible that also Pomeranian savings hoards were connected to Slavic legal/weight systems, but there is no comparable evidence in the written sources to take this suggestion further.

¹¹⁵ e.g. Stojkowo hoard (CatNo459), where silver wrapped in linen was placed in a pottery vessel, which in turn was sealed with a clay cover marked with an arrow indicating correct placement, most likely to ensure that the savings were not tampered with.

In Svealand and Pomerania, savings hoards were found within settlements less often, suggesting that there was less need for revisiting them as regularly as in Gotland, or perhaps it was safer to keep them at some distance from dwellings due to a less stable political situation (see below). Intriguingly, the biggest group of savings hoards where the context can be reconstructed, was discovered in these regions beyond contemporary settlements and in association with stone or landscape markers. They were found most often near the coast or major rivers which would have been instrumental for communication along the regional and long-distance trade routes linking Baltic central places. A significant proportion of Pomeranian silver was generally found within or near defended trade centres and strongholds, which were major strategic elements in the landscape and centres of political power providing a degree of protection to the travelling merchants thus facilitating mercantile activity. Moreover, in Pomerania a third of savings hoards was found at mid-distance between the nearest strongholds, probably at the limit of the protection these political and military centres may have offered. It is, therefore, not impossible that many savings hoards may represent surplus silver hoarded temporarily between trading expeditions. Their deposition outside the densely populated areas, limiting the likelihood of unwanted attention and marking them out in a, most likely, alien environment supports this hypothesis.

Intriguingly, in Pomerania and Svealand only 18% of hoards found within settlements, including central places and strongholds, fall into the category of savings deposits. Instead, 55% and 45% of settlement finds respectively belong to the smaller variety of contained hoards.¹¹⁶ They may have been savings of poorer members of the silver-owning society, or savings that were partially claimed, but not replenished again. But since they comprise 56% of Pomeranian and 60% of the Svealandic deposits that one can associate with archaeological evidence of fires, major episodes of destruction, remodelling of ramparts and changes in settlement patterns, I am inclined to see

¹¹⁶ i.e. weighing below 400g in Svealand and 250g in Pomerania.

them as haphazard collections of wealth hidden in the face of danger as emergency hoards. This impression may be reinforced by the fact that in Svealand 90% and Gotland 62% of them were deposited in organic or suspected organic containers, which suggests that they were not meant for long-term storage – hinting at the urgency of their deposition. In Pomerania, however, only a quarter of hoards which could be classified as emergency hoards were found in perishable receptacles, the rest being deposited in more sturdy pottery vessels. This may suggest that Slavs were perhaps more aware that they may be forced to leave their treasures in the ground for an extended period of time. It is an impression supported by written sources describing a familiarity with persistent conflict in Slavic lands (*HoB* B2CH13, cf. Chapter 3.6.2). The interpretation of small contained deposits as emergency hoards can be further supported by the fact that on Gotland, which is a rather well-attested benchmark for hoarding in a stable rural and mercantile society (although certainly not without neighbourly or family feuds, cf. Chapter 2.7.2), such hoards are very rare in general and at settlements in particular.

Cross-referencing hoard weights with the information on the presence/absence of a container and the context of the deposition allowed me, therefore, to make and support the following assumptions:

- **Small containerless** deposits are most likely associated with symbolic and ritual practices (**placed deposits**);
- **Small contained** hoards are most likely representative of haphazard deposition in the face of danger (**emergency hoards**); and
- **Large contained** hoards are most likely savings deposited with the aim of more or less regular access (**savings hoards**).

6.2.2 Composition patterns of contained and containerless deposits

There is evidence that these divisions, which I believe reflect intentions behind hoard deposition, are reflected in the internal structure of hoards. However, due to the nature and relatively low quality of the published information the conclusions presented below should be treated with caution. The main problem I faced, was the low level of detail of analysis and descriptions of the non-minted silver objects present in hoards. Particularly rare is information about the weight of individual items, and in the case of the more amorphous components also the number and degree of fragmentation are often absent. These deficiencies proved very problematic for the analysis I intended. I was forced to settle for less ambitious illustration of the differences in the composition of silver deposits classified through weight/container criteria by analysing just four main categories of components: whole and fragmentary coins, and whole and fragmentary non-minted artefacts. I also narrowed down the number of hoards suitable for this analysis to those with full information on fragmentation and whose reliability of content descriptions scored at least 0.6 in a scale measured between 0 and 1 (cf. Chapter 1.2; Appendix B, B1.3). The following comparison depends, therefore, on 272 hoards from Gotland (78%), 36 from Pomerania (26%) and 34 from Svealand (52%). It is based on the median proportions of the four groups of artefacts, calculated using the method employed in weight calculations (cf. Appendix A, A2.3). From the discussion I also for now exclude the problematic 'grey area' deposits to which I will return later in a dedicated section.

The comparison illustrated in Figure 6.1 shows that the composition 'profile' of each container/weight category is remarkably similar across all three case studies. Rather striking is the fact that placed deposits are on median average comprised almost exclusively of coins, particularly whole specimens, which implies a deliberate selection. The quality of coins as 'alien' objects which could mediate the concepts of *orbis interior* and *orbis exterior* (cf. Chapter 5.3) may have made them particularly suitable for communicating with the supernatural. It is not

impossible that in the ritual context non-minted objects were usually deemed unsuitable for deposition alongside coins, and may have been required to be deposited separately as e.g. ornaments' hoards.¹¹⁷

Emergency hoards across all three case study areas comprise alongside coins, fragmented in a greater proportion, also the more amorphous hacksilver. If we consider that ornaments were either worn or kept safe to be displayed or used as large units of payment on special occasions, this composition of emergency deposits might conceivably reflect what would be expected of the stock of silver used in everyday life and perhaps carried on oneself, and therefore what would most likely be buried in case of danger. Such an interpretation agrees in principle with the traditional view of emergency coin assemblages which are believed to 'represent a snapshot of the coins in circulation at the time of the burial' (Curta and Gandila 2013:47).

In all three case studies savings hoards differ markedly from the two categories discussed above, in that they comprise all four groups of artefacts, importantly whole non-minted objects including ornaments and in Gotland and Svealand comprising predominantly bullion silver in the form of rods, spirals and cast ingots. Intriguingly, the proportion of fragmentary coins in savings hoards is lower than in emergency deposits. This could perhaps reflect a weight-economy equivalent of Copernicus' Law where the owners were keener on keeping units of higher value and limiting the proportion of 'small change' in their savings. This in turn is congruent with the numismatic characteristics of savings hoards which, it is argued, should tend to be selective,

¹¹⁷ In my case studies I identified 54 hoards of silver ornaments datable from the Viking Age until the end of the 12th century: 42 in Gotland (8% of all Gotlandic hoards, cf. Table 2.1), 7 (7%, cf. Table 4.1) in Svealand and 5 (2%, cf. Table 3.1) in Pomerania. Only one was discovered in a pottery vessel (Schwerinsburg, Pomerania; Kiersnowscy 1959:93-94), one may have been deposited in an organic container (Ytlings, Gotland; Stenberger 1947:160-161) and one contained a silver bowl which may have served as a receptacle, although it is uncertain (Kärven, Svealand; Zachrisson 1998:295-297). Although I did not study this category of finds in the same detail as coin hoards, the vast majority of ornaments hoards appear to have been deposited without containers. It is, therefore, very likely that they were not intended to be retrieved, and as such should be seen as placed deposits.

containing high-value and better specimens in preference to low-value ones (Curta and Gandila 2013:47; Grierson 1975:55).

Figure 6.1 also shows that the proportion of whole coins in savings and emergency deposits in Gotland is higher than in Pomerania and Svealand. Admittedly, the sample of Gotlandic hoards is largest and therefore results can be deemed most reliable. But even in Pomerania the analysed sample amounts to about a quarter of a 'population' which allows for robust conclusions to be drawn, particularly since the selection of silver deposits suitable for this analysis was deliberately limited to hoards which have relatively good-quality data. This comparison may, therefore, suggest that in Gotland whole coins were more abundant and widely used in economic transactions than elsewhere in the Baltic zone. This observation may corroborate the hypothesis that Gotlanders established on a much larger scale, and maintained for longer, the more direct access to the sources of silver, particularly in the East, than their contemporaries in Pomerania and Svealand (cf. Chapter 5.1.2; Kilger 2007a:237).

There is another line of evidence provided by the age structure of Oriental coins, which supports my interpretation of contained deposits as savings and emergency hoards. K. Odebäck (2009) investigated 21 Swedish dirham hoards (with a *tpq* 830-925 and including more than 15 coins). Odebäck divided these deposits between active or passive hoards, although some could not be classified as either. In her terminology passive hoards include those with coins over half of which are more than 30-50 years old. By an active hoard she understands a hoard that is dominated by younger coins, which reflects more closely the structure of coin stock around the time of deposition. Odebäck interprets passive hoards as kin-family savings (*släktskatt*), transferred as inheritance and occasionally supplemented by new additions, which corresponds very well with savings hoards in my definition. Active hoards, according to Odebäck, should be seen as family hoards (*familjeskatt*), presumably meaning a nuclear rather than extended family, but she does not elaborate further. In my opinion active deposits could be seen as collections of working

capital, regardless of whether they belonged to a family or an individual. Since they are likely to reflect the silver stock at the time of deposition, Odebäck's active hoards are not too dissimilar from hoards which I define as emergency deposits. To test if Odebäck's passive and active hoards correspond to my savings and emergency hoards, I analysed the structure of coin age in my case studies. However, given the nature of the numismatic data available to me, I included only dirham hoards deposited between c. 800 and 980 for which full numismatic analysis was available. I also excluded hoards with fewer than 3 coins and coinage with dubious dating, including imitative coinage. For each hoard the mean average age of coins was calculated and results were summarised by calculating a median for each interpretative category (cf. Appendix A, A2.3). As a cut-off point in the coin age I took 40 years, which falls in the middle of Odebäck's range (Table 6.1). Due to the nature of my numismatic data the most robust results were found in Gotland. The low number of suitable hoards and coins in Svealand and particularly in Pomerania mean that proportions calculated for these are less reliable, although the similarity to Gotlandic results despite low numbers are in my opinion very telling.

	Median proportion of coins aged:		Number of hoards	Number of coins
	0-40 years	>40 years		
GOTLAND				
Savings hoards	46%	54%	14	4116
Emergency hoards	79%	21%	10	556
Placed deposits	63%	37%	36	1463
‘Grey area’	59%	41%	12	3367
Median average	61%	39%		
SVEALAND				
Savings hoards	37%	63%	5	612
Emergency hoards	83%	17%	2	8
Placed deposits	52%	48%	4	143
‘Grey area’	60%	40%	2	225
Median average	56%	44%		
POMERANIA				
Savings hoards	n/d	n/d	0	0
Emergency hoards	76%	24%	2	108
Placed deposits	56%	44%	1	16
‘Grey area’	n/d	n/d	0	0

Table 6.1 Age structure of dirhams in hoards *tpq* c. 800-980

Table 6.1 shows clearly that only the deposits I define as savings hoards incorporate the majority of coins over the age of 40 years at the time of deposition (or rather the final addition), and therefore only this category can be classified as passive savings. Intriguingly, emergency hoards are clearly dominated by more recent coins, which is what could be expected from deposits made up of silver stock in circulation. Placed deposits are also composed mainly of younger coins, although the structure is much more balanced which may be indicative of some level of deliberate selection posited above. Data problems notwithstanding, there is a significant degree of similarity between savings, emergency and placed deposits across the different case studies. I believe this reinforces my hypothesis that the combination of the information on the weight of silver and the presence/absence of a container can be used with a high degree of certainty as a tool for determining different functions of Viking-Age silver deposits.

6.2.3 'Grey area' deposits

The division of silver deposits by weight/container criteria leaves us with the final group, comprising **large containerless** deposits. This category proved to be a problematic '**grey-area**', in which the absence of a container would imply that deposits were not meant to be retrieved, but their large size and variety of components resembles the characteristics of savings hoards. The archaeological context of these finds is of little help. In Gotland, in cases when the context is known, the largest number of large containerless deposits was found within contemporary settlements which suggests a closer association with more pragmatic reasons for hoarding. But they were also found in the watery environment and remains of earlier abandoned settlements, which were overwhelmingly associated with ritual and symbolism. In this context the absence of a container gives a strong indication that deposits were made intentionally irreversible, which in turn implies their intended permanence. In Pomerania 'grey area' hoards were rare and finds with a known context were found in association with markers, in this case study overwhelmingly linked to savings and emergency deposits (cf. Chapter 3.6.2, Figure 3.36). But again, they were

also found in the watery environment implying that they were intended to be permanent deposits. Also in Svealand attempts to associate 'grey area' hoards with any particular context to help determine their function are of little help. 'Grey area' hoards were found here in the watery environment and crevices, but also in association with markers dominated by contained hoards which were in all probability intended for retrieval. Moreover, even the archaeologically investigated examples of 'grey area' hoards (all from Gotland) are consistently inconclusive. Ekeshogs II (CatNo137) was accidentally discovered while digging a trench for an electric cable, and the published description indicates that all the silver was removed in one fell swoop, so it is not impossible that some organic container was originally present. By the time archaeologists arrived on the site, all the silver was moved to the spoil heap. Consequently the archaeologists were unable to determine if a container may have been present or to identify any archaeological context. Kännungs II (CatNo149) was found during archaeological excavations of a *kämpgrav*, within the outer part of its wall by a large upright stone. No traces of a container were found, and the location within an earlier structure may be connected to ancestor worship. On the other hand the published descriptions are too sparse to determine if any arrangement of finds was present and the deposition of silver by a large, c. 1m high stone can equally be taken as an intentional act aimed at facilitating discovery of the findspot. Small archaeological excavations (8m²) at the site of Stale II hoard (CatNo255) revealed that it was deposited in a shallow, bowl-shaped pit. The excavations were never published and the available descriptions make no mention of a container although it is not entirely impossible that a soft organic receptacle may have been used since the pit is described as being filled with coins. No other archaeological features or layers were identified, which does not help with the interpretation of this find. The last, and the most recent archaeologically excavated 'grey area' hoard from Västergårde (CatNo299) was found by an Early Iron-Age *stenvast*, which may have facilitated the discovery of silver but can also be seen as providing a symbolic connection with the ancestors. The hoard, which is one of the best described examples, was unfortunately disturbed by an animal burrow

which would have erased any traces of a potential organic container or finds arrangement, assuming they were present in the first place. In all these cases the presence of a container cannot be completely rejected, but it cannot be conclusively confirmed either.

The analysis of the internal structure of 'grey area' deposits is also of little help (Figure 6.1). While on the median average they contain whole and fragmentary non-minted silver artefacts most commonly found in savings deposits, the proportion of whole coins in Svealand and Pomerania more closely resembles those found in placed deposits. This impression is reinforced further by the age structure of coins in 'grey area' hoards (Table 6.1) which is closest to the average age structure of all hoards in their respective case studies. It seems, therefore, that grey hoards may be a mixture of other categories, which are difficult to separate. On the one hand the lack of recorded containers is quite telling, and the large size of these deposits could perhaps reflect a combination of several placed deposits made in the same place, e.g. a repeated ritual. But one cannot completely rule out the possibility that given their size some 'grey area' hoards may have been intended for retrieval but we may be dealing with a peculiar combination of rare situations such as Västergårde where it is genuinely not possible to make an informed guess on the presence of a container. This leads us to another issue with 'grey area' hoards, for which we have the lowest level of reliable information. The median of the overall reliability of information of all analysed hoards across all three case studies (including the location, archaeology, description of contents, numismatic analysis, etc. measured in the scale 0-1, cf. Appendix B) was 0.70, with a 95% bootstrap confidence interval between 0.70 and 0.73. Whereas finds which can be categorised as placed deposits, savings and emergency hoards scored on median average 0.70 each, the group of hoards falling into the 'grey area' scored only 0.67. This may not seem much of a difference, but nevertheless falls below the range of the confidence interval and therefore the difference is statistically significant. The quality of data among the finds falling into 'grey area' category is, therefore, poorer than in the remaining three categories. It is possible that at least some of them could be reclassified if more and better quality data was available. It

perhaps could be obtained by dedicated archival research, unfortunately I was unable to undertake such a task within the constraints of this thesis.

We should not forget that the method which I am proposing is intended to determine overall trends in the reasons behind hoard deposition. As can be seen in the catalogue (Appendix B) the composition of individual hoards varies within their respective weight/container classes, e.g. some placed deposits contain small whole objects, and some savings hoards contain only coins. The inconsistencies and biases of the published material only allow us to determine patterns and not to prescribe the exact parameters of composition and deposition, which on occasions may have overridden the 'established' ways of dealing with silver deposits due to individual circumstances and intentions. Still, one could argue that it would be possible to attempt interpreting 'grey area' hoards on the basis of close scrutiny of the overall interpretative context in each individual case and to make a decision if a particular deposit was made for more 'pragmatic' or rather symbolic or ritual motives. But such a method applied to the presently available data carries the danger of imposing one's own preferences and prejudices, and could not be supported by systematic statistical analyses within the confines of the thesis. Therefore, I decided against following such an approach. For now, I reluctantly rest my case and concede that I have little choice but to accept 'grey area' hoards as a truly problematic and inconclusive group of silver deposits which cannot be included in my explanatory framework without additional research.

6.2.4 Regional differences and similarities in the use of silver

Putting 'grey area' problems aside, the division of hoards by the weight of silver and the presence/absence of a container becomes even more telling when it is cross-referenced with the proportion of the total weight of silver within each case study, which I believe is crucial, given the implications of weight economy in the Viking Age (Figure 6.2).

In terms of numbers of finds, Gotland is clearly dominated by placed deposits, possibly linked to ancestral cults but also to the phenomenon of forging a symbolic bond with land, access to which was becoming ever more difficult, impeded additionally by stringent laws on sale, inheritance and division of family estate. Despite comprising 57% of finds, placed deposits contained only 12% of silver by weight. In other words, despite being numerous, deposits made arguably in the ritual/symbolic context were very small. The level to which Pomeranian Slavs embraced the non-economic function of silver was much lower, with just 4% of Pomeranian silver being arguably deposited without the aim of retrieval. Svealand lies somewhere in between: proportionately the amount of silver (by weight) used in ritual and symbolic practices was closer to Gotland, but the number of placed deposits was closer to Pomerania. One tentative explanation for the higher proportions of placed deposits in the Scandinavian *milieu* could be offered by literary sources, namely the *Ynglingasaga* (Monsen and Smith 1990:6). It invokes the so-called 'Odin's law' – which allowed the deceased to take into the afterlife all the wealth one buried in one's lifetime. The practice may have been considered a sound strategy on occasions when kinsmen of the deceased were unable (or unwilling) to furnish the pyre accordingly. This would apply particularly to the more adventurous Viking merchant-warriors likely to meet their death in foreign lands, a situation well documented on contemporary runestones. Despite regional differences, placed deposits had clearly only a marginal impact on the volume of silver in circulation in all three regions. I also believe this statistic indirectly demonstrates the level of availability of silver in different regions by showing how much of it was allowed to 'trickle' into the sphere of 'sacrum': in Gotland nearly 40kg of known silver was deliberately transferred from the economic to the intentionally permanent ritual context, whereas in Svealand and Pomerania it was less than 4kg.

Moreover, one would expect that the majority of hoards deposited with the intention of retrieval, were in all probability retrieved, as noted by P. Grierson (1975:132). It is very interesting that despite all the differences between Pomerania, Svealand and Gotland the

proportion of unclaimed savings by silver weight was not too dissimilar. In Pomerania, such hoards contained 66% of all silver by weight, and comprised 27% of all deposits. In Gotland, the weight of silver in unclaimed savings hoards was 59% but they comprised only 17% of hoard finds. In Svealand, the proportion of the number of savings hoards places it closer to Pomerania, with the amount of silver deposited in them being proportionately the same as in Gotland. In other words, Pomeranian and Svealandic savings hoards contained proportionally about the same amount of silver as on Gotland, but it was deposited in nearly twice as many hoards. Even if we remove from this comparison the record-breaking Gotlandic find from Spillings weighing 67kg (CatNo242), the volume of silver found in Pomeranian and Svealandic deposits would be proportionately just between a fifth and a third more than on Gotland, but still deposited in proportionately twice as many hoards. This could mean that Gotlandic savings hoards were proportionately not necessarily larger (when Spillings is excluded), but rather more likely to have been retrieved by the owner(s) – an observation which should be kept in mind in the context of the third group of deposits: small hoards which were nevertheless deposited in containers. These deposits can be considered as active hoards, accumulations of working capital or savings of the poorer strata of the population, but as it has been shown above (cf. Chapters 2.7.2, 3.6.2, 4.6.2) there are several lines of evidence that suggest that they should be considered as emergency deposits. In this comparison, Pomerania clearly stands out. Its proportion of emergency hoards is over 1.5 times higher than in Svealand and nearly three times higher than in Gotland. The political situation in Pomerania, as indicated by contemporary written sources, was decidedly unstable and dangerous. Numerous archaeological finds of weaponry and the correlation of a number of deposits with events of destruction and/or remodelling of defences of nearby strongholds seem to confirm it. In fact, the universality of strongholds in Pomerania, even if taken alone, suggests a propensity for conflict and endemic political instability, particularly when compared to an almost complete absence of defended sites in Svealand and Gotland (cf. Chapter 3.4.2). Moreover, Pomeranian emergency hoards are located most densely

in marginal, sandy soils, which even today are generally under the cover of forests, whereas contemporaneous settlements are mostly found on traditionally farmed moraine soils. A quote from Helmold's *Chronica Slavorum* (HoB B2CH13) implies a tendency among the Slavs to hide their valuables in secure places in the event of war. Although it is often argued that in case of an attack there is no time to bury treasure, there is no reason why immediate threat should be considered as the sole trigger for such deposits (Wehner 2010:263). It would also make more sense to carry one's wealth to the place of refuge, away from settlements, which were the primary target of aggression and plunder. Considering all these factors I believe that a significant proportion of small contained Pomeranian deposits were most probably emergency hoards deposited in response to conflict and upheaval, and not retrieved as a direct result, just like the majority of unclaimed savings.

In Svealand, the proportion of unclaimed savings and emergency deposits is not as high as in Pomerania, although it is markedly higher than in Gotland. This could indicate that Svealand, at least seen through the prism of hoards, but also indicated by contemporary sources including Rimbert's *Vita Anskarii* (e.g. VA CH19), saw a fair share of political instability which may have prompted the emergency deposition and (involuntary) abandonment of savings. Numerous elements of weaponry in the burial record and particularly the ubiquity of sword finds (Androshchuk 2009:101), confirms the propensity of the Svear for martial activities, also keenly noted by Adam of Bremen (AoB B4CH22(22)).

In Gotland, characterised by a unique stability of land use patterns and a lack of major political and social upheavals, savings hoards, so often associated with settlements or their immediate surroundings, in all probability only failed to be retrieved in exceptional circumstances and deposition in emergency was extremely rare. If we take it as a rather well-attested benchmark for hoarding in a stable rural and mercantile society, it becomes clear that nearly twice as high a proportion of unretrieved savings and over twice as high a proportion of emergency hoards in

Pomerania, and a similar albeit less pronounced situation in Svealand, is hard to explain by just the odd calamity befalling the owners.

The difference between Gotland on the one hand and Svealand and Pomerania on the other could tentatively be illustrated by a chronological breakdown of hoards in these areas (cf. Chapter 5.3, Figure 5.1). On Gotland, hoard deposition is nearly continuous and the rate of the process steady, almost habitual, with on average one hoard being buried each year, suggesting that hoarding was an expression of underlying social and symbolic practices. In contrast, Pomeranian and Svealandic hoards are deposited intermittently, peaking in tight chronological bands, some of which correspond with times of political unrest known from written sources. I am aware that it is risky to associate major spikes in hoarding directly with military operations (Curta and Gandila 2013:46), but it is not implausible to treat them as indicators of times of unrest. For example the peak of 950-955 in Pomerania correlates with Widukind's and Thietmar's descriptions of this period as a time of exceptional uncertainty and upheaval caused by the Slav uprising synchronised with Hungarian raids, which culminated in the battle of Lechfeld. There is a discrete concentration of these deposits around Wolin and further south along the Oder, i.e. in the lands of Pomeranian tribes which may have been involved in the military actions (cf. Chapter 3.1.2). However, the majority of hoards which could be associated with these events on a chronological basis, are located far from the theatre of war. But one should not forget that major conflicts, such as the wholesale uprising of the Polabian and (at least partially) Pomeranian Slavs and recriminations associated with it, must have also meant an increased availability of captives,¹¹⁸ particularly the *Saqaliba* sought after in the Caliphate.¹¹⁹ It is, therefore, most likely not a coincidence that the entire decade, but particularly the years after

¹¹⁸ Widukind's description of the siege of Cocarescemiorum (B3CH52), which offered refuge to the entire local Saxon population, indicates that it was not unusual during the conflict to enslave large numbers of women and children at a stroke (all men, presumably considered too dangerous, were killed).

¹¹⁹ e.g. Ibn Khurradadhbih on exports from the Mediterranean, Muqaddasi on exports from Bulghar, Ibn Hawqal on the trade in eunuchs (Lunde and Stone 2012:115; 169-170; 173-174).

the uprising was quenched, saw a dramatic proliferation in hoarding not only in Pomerania, but also in Gotland and Svealand. Conceivably all areas of the Baltic zone would have capitalised on the likely boom in the slave trade. The vast majority of the silver needed to supply these deposits, unsurprisingly came from the East. In fact, hoards which were most likely deposited at the time and in the aftermath of the uprising (*tpq* 950-959) comprised nearly 20% of all the Oriental coinage (by weight) found in the Viking-Age hoards within my case studies. It is, perhaps, surprising that a subsequent Slav uprising of 983 did not replicate the situation of 950s in the hoard record. Admittedly, there is a group of hoards, found in the area of Wolin – the political and economic centre of Wolinians who were close allies of the Lutici involved directly in the revolt – which can be associated with the events, and all these hoards can be classified as emergency deposits. But the group comprises only a handful of deposits, and more importantly, the 980s appear as a time of an almost complete hoarding hiatus elsewhere in the Baltic zone (Figure 5.1). At first glance, the situation could invalidate my previous claims. However, the reasons behind such diametrically different reactions of hoarding behaviour to political events of a similar magnitude were most likely connected to global problems of access to silver in the 980s. The growing median age of Oriental coins in the Baltic-zone hoards started accelerating already in the 960s, meaning that the influx of silver from the Samanid state and Volga Bulgars had slowed down, and by the 980s all but ceased (Figure 5.5). Until Svealandic, Pomeranian, and to a lesser degree Gotlandic merchants and their regional economies switched to European sources of silver in the 990s,¹²⁰ there simply was little silver available and the few Pomeranian finds were most likely the possessions of poor souls affected by the conflict itself, who never made it back to recover their wealth (cf. Chapter 5.3). The possibility of linking hoarding peaks with political events, however uncertain, is not confined to Pomerania. In Svealand there is a visible spike in silver deposition in the 1020s, particularly among deposits with *tpq* 1027, which

¹²⁰ The single largest spike in hoarding in all three case studies is the peak of 991. This is, however most likely caused by the long chronology of the Otto-Adelheid pennies traditionally dated to 991-1035, which provide *tpqs* for this group of hoards.

could reflect unsettled times following the battle of Helgeå in 1026 and the likely subjugation of Sweden by Knut (cf. Chapter 5.3).

Finally, the brief analysis of silver hoards preceding, and following the Viking Age provides tantalising implications for the evolution of ways in which silver was used and deposited in the Baltic zone (Chapter 5.4.4). During the earliest wave of silver influx the economic function of the 2nd-century Roman denarii was only marginal, if present at all. Roman silver was almost exclusively deposited in the form of unprotected, small placed deposits. When silver reappeared at the beginning of the 9th century after centuries of absence, in the first decades of its influx it was almost invariably used still in the same, ritual capacity. Over time the symbolic function of silver deposits gradually decreased (although the process was not linear), and its use can be more easily associated among the later hoards with the emerging bullion economy. By the beginning of the 12th century the use of silver as placed deposits was abandoned, partly because of the ever increasing applications in everyday 'mundane' economic transactions, and partly through the rising influence of Christian beliefs and customs. Perhaps the increasing availability of silver obtained from nearby European sources, and eventually minted locally, would have ultimately reduced the need to store silver as hoards, leading to their eventual disappearance in the late 11th and early 12th centuries.

6.3 Final remarks

Hoard deposition, and particularly hoard concentrations are inextricably linked with areas which afforded conditions suitable for mercantile exchange and facilitated the flow of silver: primarily through a network of emporia, smaller regional trade hubs and harbours, but also including local power centres, generally situated near the coast and major rivers, i.e. communication routes, and within populated areas - silver hoards certainly required silver and people among whom it could circulate!

My analysis of hoarding patterns and chronological changes in the structure of hoards generally confirmed the established views on how silver economies operated. However, it also proved that exchange networks needn't have been strictly hierarchical, and emporia-scale sites were not indispensable for a fair share of silver influx, and indeed long-distance trade, to occur. Moreover, I was also able to demonstrate that fragmentation of silver, traditionally perceived as a linear development, was in fact fluctuating and depended on the distance from its sources measured in the number of transactions at the successive trade centres. Therefore, it can be seen as an indicator of the complexity of mercantile connections rather than of economy itself, in line with the theory of M. Jankowiak (forthcoming).

But such factors as can be gleaned from the archaeological context, do not in themselves really explain why the things were deposited in the ground and never reclaimed. The method I propose, which uses the information about the presence or absence of a container, cross-referenced with the weight of silver, and supplemented by the archaeological and geoarchaeological data, and also by written sources, can provide an indication as to whether particular hoards were deposited with the aim of retrieval – as savings accessed periodically, or simply for protection in the face of danger – or whether the depositions were meant to be permanent ritual or symbolic offerings, never to be visited again.

Ritual behaviour took a variety of forms, from deposition associated with veneration of the watery environment confirmed in contemporary written sources, through a possible ancestor's cult, to a likely chthonic cult manifesting itself in deposition within rock crevices, and the ancient practice of foundation offerings. Probably the most widespread aspect of extra-economic behaviour perceptible in the hoard material, particularly in Gotland and Svealand, were the depositions in recently occupied land, particularly newly broken fields in previously marginal soils. There the silver deposits were aimed at forging a personal bond between the land and the owner, and offered a layer of potent symbolic protection for the prosperity of one's farm.

Clearly, the deposition and non-retrieval of Viking Age hoards cannot be explained by a single grand theory. We should be aware that contemporary societies assigned to silver an economic as well as a symbolic and ritual value, and for them the distinction between material and immaterial was not as sharp as it is for us today. To paraphrase N. Price (2014:167): they did not believe in the supernatural any more than they believed in a mountain – both were just there, equally relevant and real.

So maybe the fact that nearly 50% of all the hoards analysed here were small containerless placed deposits, implying that ritual deposition was common, should not be all that surprising even in the context of a silver economy. We need to remember that placed deposits comprised only a fraction of the total amount of silver in circulation, since the overwhelming mass of silver by weight was found in hoards deposited in containers, in all probability buried with the idea of retrieval. Clearly, therefore, the impact of ritual practices on the economic sphere was minor; the two modes were not having to compete for resources. In a way, the abundance of ritual deposits skews the picture of hoarding behaviour in the Viking Age – we find such hoards more often because they were never meant to be retrieved, whilst the majority of the contained deposits were in all probability reclaimed by owners and – misleadingly – we are left with only a small proportion of the original number.

6.4 Afterword - limitations and recommendations

The scope of the present study has been to a large extent dictated by the research objectives of the AHRC-funded 'Dirhams for Slaves' project, the duration of my research and word-count limit of the dissertation. It quickly became obvious that if I wanted to successfully complete my thesis within these bounds and answer the research questions outlined in Chapter 1.1, I had to curb my initial ambitions and carefully choose the sources of data I intended to use, the extent and number of case studies I could analyse and the range of analytical methods I could employ. I

trust that in the preceding chapters I have managed to achieve my goals, and provided answers to the main questions of the thesis. But unavoidably my study has highlighted certain shortcomings in the archaeological and numismatic data and implied directions the future research of Viking-Age silver hoards could, and perhaps should, take. In the following paragraphs I present some of the more important and pressing problems and offer possible solutions to overcome them.

6.4.1 Silver deposits

My analysis of the archaeological context of Viking-Age silver deposits was based mainly on a compilation of available published sources. But even this task was not straightforward. Analysis of Pomeranian hoards was based on robust and comprehensive catalogues published in the *Polskie Badania Archeologiczne* series compiled in the late 1950s and 1960s, which treats non-coin objects marginally. Over 50 years later the catalogues are in dire need of updating not only with the more recent discoveries but also with a detailed, modern numismatic and archaeological analysis of older hoards' components. Currently a research team headed by M. Bogucki is doing just that in the series *Frühmittelalterliche Münzfunde aus Polen*, but unfortunately the results of this research were not available for my Pomeranian case study at the time of writing. Despite the ambitious objectives of the project, the title itself highlights the underlying problems with the research approach to silver hoards not just in Poland, but elsewhere in Europe. Research tends to be focused on areas restricted by modern national and administrative boundaries. Although such an approach may be dictated by practical aspects, it does little to put silver deposits within the context of the political and cultural divisions present at the time when hoards were being deposited. Moreover, throughout the history of research of Viking-Age silver deposits there is a palpable division between authors' preference to concentrate on either the non-numismatic (e.g. Stenberger 1947) or the minted components (e.g. Linder 1935; 1936). Particularly the more recent studies of Viking-Age silver hoards are

focused on the numismatic aspect, where data on the size, weight and degree of fragmentation of non-minted silver – so essential to understanding silver economies and attitudes to silver – appear to be of marginal interest. The separation of coins and non-minted objects from Scandinavian hoards in different museums is one illustration of the problem.

In Scandinavian case studies the situation with published sources on silver hoards is in many respects more problematic than in Pomerania. In Gotland since the publication of M. Stenberger's *magnum opus* there has been no comprehensive review and publication of new hoard discoveries, despite the fact that they are made with the frequency of almost one per year! The CNS series published in 1975-1982 was instrumental for updating Gotlandic finds with discoveries made after the early 1950s. But while it provided a much-needed numismatic dimension to Stenberger's work, it unfortunately paid little attention to non-minted components. Moreover, the series was discontinued after analysing finds from only 29 out of 92 Gotlandic parishes. The data on more recent Gotlandic discoveries is scattered between M. Östergren's dissertation of 1989, an impressive but rather unwieldy catalogue of Viking-Age finds by L. Thunmark-Nylén (2000) and a multitude of grey-literature reports which are not publicly accessible. In Svealand, problems surrounding the availability of hoard data were the direst since no comprehensive catalogue of silver deposits from this area has ever been published. Only synthetic overviews are available for a handful of Svealand's component regions, i.e. U. Linder's (1935; 1936) work on hoards from Södermanland, the detailed work on Uppland by T. Zachrisson (1998), and SML lists cataloguing coin finds from Uppland and Närke. Unfortunately, the first two publications do not provide any detailed finds lists or numismatic analyses, and the latter provides only cumulative lists of coins without information on fragmentation or the weight of coinage and only extremely concise information about the non-minted silver.

Another, no less crucial aspect negatively impacting any attempts at analysing Viking-Age hoards is the overwhelming paucity of dedicated excavations. The proportion of excavated hoard findspots is highest in Svealand with c. 25%, but the actual number of these excavations is low, comprising just 16 findspots. Svealand is followed by Gotland (10%, 34 findspots) and Pomerania (4%) with just 5 findspots investigated archaeologically. Moreover, the majority of these excavations are small, often confined to the immediate vicinity of a hoard, and large-scale open-area excavations capable of providing the most robust information on the archaeological context of these finds are exceedingly rare (only in 12 cases the excavated area exceeded 100m²).

This brief overview shows that there is an urgent need for updated and detailed research on hoards. It should target not only the numismatic component, but also non-monetary silver, and aim to reliably determine the date, type, origin, number, degree of fragmentation and weight of all individual components. Such detailed data would be instrumental in reducing dependency on weight calculations and the degree of error they unavoidably introduce. It would allow us to analyse chronological changes in hoards' composition in much greater detail than is presently possible. It would enable a much better characterisation of hoards with regards to the intention for retrieval, and perhaps make it possible to develop a more nuanced classification than the present division between savings, emergency and placed deposits. This research should be supported by dedicated archival work to obtain information on the as yet unpublished discoveries, and to review the earliest available documentary evidence pertaining to the circumstances of discovery and deposition of the known hoards, primarily those belonging to the problematic 'grey area'. The artefactual and archival research should be buttressed by a robust programme of archaeological excavations including environmental sampling and scientific dating strategies, not only at sites of future discoveries, but importantly also at findspots of earlier finds whose locations are known or could be narrowed down by archival research.

An often neglected feature of Viking-Age hoards is a frequent coexistence of bronze artefacts alongside silver. Almost invariably these artefacts are considered to be an indication of settlement activity or destroyed burials. However, it is not entirely impossible that bronze objects may have been at times hoarded with silver. Such a possibility is certainly accepted for hoards of Roman denarii (cf. Chapter 5.4.2; Appendix A, A1.4), but almost never entertained for the Viking-Age deposits. Archaeological excavations of the Spillings hoard (1999, CatNo242) suggest that it is a possibility worth considering. In Spillings, alongside 67kg of silver were deposited 20kg of partially melted bronze ornaments locked in a sturdy chest. Admittedly the bronze was deposited in a separate package, but the silver was also hidden in two parcels. It is, therefore, likely that functionally all three represent one deposit. One should not forget that sources of copper and tin accessible in the Viking Age (and before) are extremely scarce in Scandinavia. The majority of bronze must have been imported, so the metal was undoubtedly quite precious: the 20kg of it found in Spillings came from the east Baltic and possibly Rus lands (Östergren 2009:32), and were kept safe below the floorboards. When freshly cast and patina-free, the metal's appearance is not dramatically different from gold. Being certainly more easily available than gold, but still valuable, it is not impossible that bronze may have been hoarded alongside silver more often than it would appear from the traditional interpretations of the available data. I believe that an investigation of deposits of bronze metalwork in the Viking Age from this perspective could provide us with a much wider and nuanced picture of how contemporary economies operated.

In Chapter 5 I briefly explored hoarding patterns before and after the Viking Age, in this thesis defined as the period between c. 800-1050. This has revealed some long-term trajectories in changes of motivations determining silver deposition: most strikingly the possibility that the use of silver and the reasons for which it was deposited may have evolved – although not in strictly linear fashion – from usage in predominantly ritual and symbolic capacity, to almost exclusively 'mundane' economic applications. It would be of interest to apply the complete range of

analytical methods used in my analysis of Viking-Age hoards, particularly regression analysis, to track changes (if any) in factors associated with the flow and deposition of silver throughout the entire period when it was hoarded, i.e. from deposits of the 2nd-century Roman denarii until the latest hoards buried in the 12th century. The present study was based on silver deposits containing coins which allowed a relatively secure dating within the investigated period. But the inclusion of later hoards would allow us to investigate the less numerous, but equally significant coinless silver deposits, and to determine if their deposition patterns and context differed from coin hoards, why in these cases coins were separated from other artefacts, and whether their composition changed over time and reacted to external economic stimuli in the same way as coin hoards, etc. I identified 54 of these deposits and it is unlikely that this small number (less than 10% of the already investigated sample) would change the conclusions presented above, but analysing them can shed additional light on the ways in which silver was perceived, valued and used in the context of Viking-Age beliefs and economies.

Last but not least, it would be of great interest to investigate how chronological changes in patterns of deposition and composition of hoards may have interacted with deposition patterns and the context of single finds of silver, not only coins but also ornaments, bullion and hacksilver. This would allow us to calibrate my conclusions about the mechanisms of the flow and circulation of silver, at the moment based only on the analysis of hoards.

6.4.2 Secondary data

In my research I have used a number of secondary datasets in order to better understand the archaeological context of Viking-Age silver deposits. The pioneering research of M. Östergren highlighted the necessity of considering Viking-Age hoards with respect to contemporary settlements. Unfortunately, the available data on settlements in all my case studies leaves much to be desired. I encountered major problems when trying to collect data about archaeological sites in the Polish part of Pomerania. Through the complicated and time-consuming process of

editing data held by 'e-Archeo' (Appendix A, A1.2.1) I was able to identify a substantial number of settlements which may be dated to the Viking Age. Unfortunately the source data does not contain the coordinates of the archaeological sites, which made it impossible to locate them any closer than down to the nearest town or village. This problem introduced an unavoidable degree of error to my spatial analysis, which thankfully could be offset by a substantial number of known sites and verified by simultaneously undertaking comparable analysis of the well-located archaeological sites in the German part of Pomerania (listed in LKDMV and BLDAM datasets). Nevertheless, given the opportunity, it would be beneficial to visit the Polish archaeological archives held in Narodowy Instytut Dziedzictwa in Warsaw and there review the physical records (approximately 60,000 within the Pomeranian case study), identify the approximately 27,000 sites dated to the early medieval period, scan, georectify and digitise maps for these entries, and manually enter the relevant data in order to bring it to the level of detail offered by German datasets. Due to time constraints this solution was not feasible for me.

Although these measures would go a long way to improve our understanding of settlement patterns and therefore silver hoarding along the southern coast of the Baltic, it has to be noted that the majority of Pomeranian sites, Polish and German, have been identified through fieldwalking, rather than excavations. The relative paucity of excavations of rural Viking-Age settlements is also a feature of Swedish archaeology, particularly in Gotland where only a handful of contemporary settlements have been investigated in archaeological excavations. In Gotland the majority of settlement sites have been identified as a result of metal-detecting campaigns, although due to high conservation costs iron objects are not routinely recorded or collected and it is possible that some sites, where non-ferrous metalwork was relatively rare, may have escaped scrutiny. But the biggest, and by no means positive, surprise was presented by the Svealandic material. Here, the number of known settlements datable to the Viking Age is almost exactly the same as in Gotland (178 and 180 respectively), despite it covering an area nearly 11 times bigger than Gotland. The scale of this problem becomes very clear when

presented as a density of known settlements sites datable to the Viking Age in each case study: In Pomerania it is 12.30/100km² (excluding strongholds!), in Gotland 5.85/100km², but in Svealand it is just 0.54/100km². Moreover, their distribution in Svealand is uneven and how partial the picture really is can be shown through a comparison with the distribution of the far more plentiful runestones (Figure 6.3, cf. Chapter 4.4.1). This situation has proven particularly problematic for the explanation of hoard concentrations in Södermanland and in the area of Norrtälje. Part of the problem may be due to the problematic chronological classification of many Svealandic sites to the Late Iron Age, which is a demonstrably misleading term (Chapter 4.4.1). Another possible reason may be the uneven state of survey of archaeological remains in different Swedish *län*s (administrative counties) and the extent to which these remains were entered into the Swedish heritage database FMIS (Svedjemo 2014:17), which formed the basis of my dataset. It is possible, therefore, that a review of physical archaeological archives, particularly in those regions where digital databases are poorly supplied, could help develop a more reliable picture of Viking-Age settlement patterns. Perhaps also a programme of extensive fieldwalking surveys in Gotland and Svealand, at least targeted in areas with the lowest density of known settlements, would improve and/or confirm the present, extremely fragmentary, picture.

My research has also highlighted that many, if not most, silver deposits were placed within agricultural landscapes near, but not necessarily in, settlements that were newly established on previously marginal soils. Future research into Viking-Age hoarding would certainly benefit not only from the archaeological excavations at hoard findspots and contemporary settlements, but also from a range of environmental, geoarchaeological and palaeoclimatical analyses, in the vicinity of hoards. This approach would help to determine the environmental context of silver finds and to test my theory, which is based on a high-level analysis of the available geological data. Also collaboration with soil scientists and detailed analysis of soil chemistry and conditions at hoard findspots would be of great help to determine, with a much greater degree of certainty

than is possible with the current data (Appendix A, A1.3.2), which of the otherwise containerless deposits may have been originally deposited in organic containers that did not survive.

But all these solutions are little more than complementary and temporary measures – more archaeological excavations at settlements and hoard findspots are desperately needed. With my background in commercial archaeology I am well aware of the high costs archaeological excavations incur, and for any future project it would be of paramount importance to target them at specific sites which would permit the maximisation of the results within a given budget. I believe that it could be possible to narrow down the number of possible excavation locations by focusing on sites identified through previous and future fieldwalking and metal-detector surveys and at hoard findspots. At these locations one could then undertake an aerial thermography survey conducted through low-level flyovers of drones equipped with high-resolution thermographic cameras. A similar approach has revealed surface and subsurface archaeological features such as stone constructions and large cut features in New Mexico (Casana et al. 2014). Admittedly this method has never been tested in the Gotlandic (and perhaps more generally, in the European) environment, nevertheless it has the potential to revolutionise our knowledge of historic and prehistoric settlement and land use patterns. In the next stage, the number of sites suitable for excavation could be narrowed down further by verification of the results of aerial thermography through the application of geophysical methods such as resistivity, magnetometry and/or ground penetrating radar, depending on the suitability of local geology. At the most promising sites one would then undertake a staged programme of invasive archaeological investigations, beginning with targeted trench evaluation to be extended to full open-area excavations at the most suitable sites.

6.4.3 Geographic extent

My research in the archaeological context of Baltic-zone hoards was necessarily confined to three case studies. It highlighted not only the interconnectedness between these areas but also

clear regional differences, not least the peculiarities of hoard deposition on Gotland, which in most respects stands apart from Pomerania and Svealand. So as to progress our understanding of the silver flow and circulation within the Baltic zone as a whole, and test the results presented in this thesis, future research should also include other areas of the Baltic zone, above all:

- Greater Poland – the heartland of the early Polish state which proved instrumental to the changes in hoarding practices and silver circulation in Pomerania;
- Other Baltic islands, i.e. Bornholm, Öland, Åland, Saaremaa – which judging from the known finds and the example of Gotland may offer alternative explanations as to how silver was perceived and valued by early medieval societies;
- Estonia and Denmark with Skåne, i.e. two opposing points of ingress and egress of silver and other commodities, including slaves, to and from the Baltic zone.

7 Glossary

Bootstrapping. A data-based simulation method for statistical inference, e.g. confidence interval for a median. It relies on random sampling with replacement repeated a large number of times (cf. Appendix A, A2.3).

Boxplot. A graphic way of representing statistical data on a plot in which a rectangle is drawn to represent values falling between the first (Q1) and third (Q3) quartiles, with a line inside to indicate the median value (second quartile, Q2). This area is referred to as the interquartile range (IQR). The lower and upper 25% of data are shown either side of the rectangle as lines, whose termini indicate minimum and maximum values excluding outliers ($Q1 - 1.5 \cdot IQR$ and $Q3 + 1.5 \cdot IQR$, respectively). Outliers are values which fall beyond the minimum and maximum (cf. Figure A7).

Cadastral map. A map defining land ownership. In the present dissertation the term is used mainly to refer to the earliest maps showing land divisions on Gotland, drawn in the scale of 1:8 000 in the years around 1700.

Central place. In this dissertation it is an overarching term used to describe emporia, regional trade centres participating in long-distance exchange, and strongholds involved in silver trade. Almost without exception (the only one being Truso-Janów Pomorski) central places are located at or near centres of hoard concentrations.

Dataset. A collection of data. The term is used here mainly in the sense of a feature dataset in ArcGIS, i.e. a collection of feature classes (point, line or polygon) which share the same spatial reference (coordinate system within a common geographic area) and are stored together.

Emergency hoard. A silver deposit found in a container or suspected organic container whose weight is below 600g in Gotland, 400g in Svealand and 250g in Pomerania (small contained

deposit). Most archaeologically investigated emergency hoards can be linked to dramatic events such as fires, major episodes of destruction, remodelling of ramparts and changes in settlement patterns. They are, therefore, seen as haphazard collections of wealth hidden in the face of danger.

Emporium. The Latin term *emporium* derives from Greek *emporion/emporos*, meaning 'trading place, market'/'merchant', based on a stem meaning 'to journey'. In the archaeological literature it has come to denote large, permanent, maritime trading places. In this dissertation the term is used to denote permanent settlements located within major topographical barriers which possess extensive cultural deposits, strong evidence for highly specialised craft production and a generous occurrence of imports (Truso, Wolin, Birka, Sigtuna). The definition is congruent with 'nodal points' in a network-based model of Viking-Age long-distance trade developed by Sindbæk (2007).

Findspot. A place where an archaeological artefact, or a group of artefacts were found. The term is used here primarily to denote the site of discovery of a silver hoard.

GIS (Geographic Information System). A range of techniques and software using the graphic capabilities of computers for an integrated capture, storage, manipulation, management and analysis of maps, images, sites and finds.

'Grey area' deposit. A silver deposit found without a container or suspected organic container whose weight is above 600g in Gotland, 400g in Svealand and 250g in Pomerania (large containerless deposit). 'Grey area' hoards display a mixture of features characteristic on the one hand of savings hoards and placed deposits on the other. As such their function is problematic, and they are of little use for the proposed interpretative model explaining the reasons behind hoard deposition.

Half-normal plot. In simple terms half-normal plot is a tool that graphically represents the relationship between distributions of real-world data and data simulated using, in this case, a regression model. The technique is used to determine a goodness of fit of a model and to identify outliers, i.e. in practice cases where a model fails to approximate to the real-world data.

Harbour. The term is used mainly in Gotland to denote sheltered locations on the coast, with suitable anchorage for boats, identified by D. Carlsson (1999:151; 2008:21-22). Investigations at these landing places produced artefactual (in a handful of excavated sites also contextual) evidence for permanent or seasonal occupation and exchange. Gotlandic harbours are often found in proximity to cemeteries sited at prominent locations.

Hoard. For purposes of this dissertation at least two silver artefacts discovered at a single place and time as a form of material wealth which was disposed of deliberately for reasons known and important to the hoarder (after von Brunn 1968:236).

In situ. Artefacts found in the original place of deposition.

Interquartile range. A measure of statistical dispersion, being equal to the difference between the first and third quartile, which comprises the central 50% of data. It is the most significant basic robust measure of scale of a dataset, particularly useful for comparison of multiple datasets.

Kämpgrav (Swedish 'giant's grave'). Substantial structural remains of Early Iron Age houses with low dry-stone walls found on Gotland, believed to have been abandoned in mid-millennium.

Marginal soils. Soil types which prior to the Viking Age were only occasionally used for settlement and, presumably, agriculture. In the Viking Age these lands became increasingly

colonised, although most settlements are still found in traditionally used soils (cf. **traditional soils**).

Mean average or arithmetic mean. The sum of a collection of numbers divided by the number of numbers in the collection. Mean average is most suitable for describing data which has normal (or rather Gaussian) distribution, but it is greatly influenced by outliers if a distribution is skewed (cf. **skewness**).

Median average. The value separating the higher half of a data sample from the lower half. In simple terms, it may be thought of as the 'middle' value of a data set. It is, therefore, much less influenced by outliers, and a much more representative way of characterising data which is not normally distributed.

Normal distribution. In simple terms it is an arrangement of values in a data set in which most values cluster in the middle of the range and the rest taper off symmetrically toward either extreme, which graphically is represented by a bell curve.

Outlier. In general, a value which is much larger or smaller than most of the values in a sample, particularly when 1.5 times lower or higher than the lower or upper quartiles of a sample.

Placed deposit. A silver deposit found without a container or suspected organic container whose weight is below 600g in Gotland, 400g in Svealand and 250g in Pomerania (small containerless deposit). In this dissertation the term is used to denote silver deposits made without any intention of retrieval (often in places where it would be physically impossible) associated and likely to be associated with ritual and symbolic practices.

Poisson distribution. Probability distribution used to express the probability of a given number of events occurring in a fixed interval of time and/or space.

Quartile. One the three points that divide data into four equal groups, each group comprising a quarter of the data (cf. **boxplot**).

Raster dataset. A dataset which constitutes a continuous surface formed by a matrix of cells (pixels) organized into rows and columns (grid) where each cell contains a value representing information, e.g. elevation.

Regression analysis. A statistical process for estimating the relationships among variables, namely between a dependent variable (the observations one wants to explain, in this case hoards) and a set of explanatory (independent) variables.

Savings hoard. A silver deposit found in a container or suspected organic container whose weight is above 600g in Gotland, 400g in Svealand and 250g in Pomerania (large contained deposit). Savings hoards are most often found in settlements or near settlements, where they could be accessed regularly. They contain the widest range of silver artefacts and the median age of coins deposited in them is highest, which suggests that in many cases they were collected over a long time (perhaps over generations). In Svealand and Gotland their weight corresponds to that of fines codified in later laws, which implies that they were intended as collections of wealth used in payments of social obligations.

Settlement. In general the term denotes a site or location which produced artefactual and/contextual evidence for habitation. In Gotland the term is used in the sense of the Swedish term 'tomt', i.e. the place where the farm buildings were located.

Silver deposit. See **hoard**.

Skewness. A measure of asymmetry in a statistical distribution about its mean. Skewness can be used to define the extent to which a distribution differs from a normal distribution.

Stenvast. Remains of dry stone enclosure walls found in Gotland, dated mainly to the Early Iron Age.

Tpq. *Terminus post quem*; earliest possible date.

Trade centre. A site with evidence for mercantile exchange, craft production and long-distance connections, but less prominent (quantitatively and qualitatively) than on emporium-scale sites. My use of the term 'trade centre' is similar to Sindbæk's (2007) network-based definition of a 'central place'; however, in my opinion regional trade centres were not necessarily subservient to emporia active in their respective regions.

Traditional soils. Soil types which prior to the Viking Age were used predominantly for settlement and, presumably, agriculture. In the Viking Age these lands were gradually abandoned (cf. **marginal soils**).

Vector dataset. A dataset in which the geographical properties of individual features are represented with points, lines and polygons, described by sets of coordinates.

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ToM, Thietmar of Merseburg *Chronicon* (Warner 2001)

HoB, Helmold of Bosau *Chronica Slavorum* (Popłoński 1862)

VA, Rimbert *Vita Anskari* (Robinson 1921)

AoB, Adam of Bremen *Gesta Hammaburgensis ecclesiae pontificum* (Tschan 1959)

GS, *Guta Saga* (Peel 1999)

GL, *Guta Lag* (Peel 2009)

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