Nachrichten aus Niedersachsens Urgeschichte	Band	Seite	Stuttgart 2012
NNU	81	3 – 80	Konrad Theiss Verlag

The Anglo-Frisian Sceatta Hoard of "Kloster Barthe", Gem. Hesel, Ldkr. Leer, East Frisia from 1838: Catalogue and Comment

By

Wybrand Op den Velde and Rolf Bärenfänger

with 28 figures, 5 tables and 40 plates

Titel:
Der Anglo-Friesische Sceatta Hortfund aus dem „Kloster Barthe", Gem. Hesel, Ldkr. Leer, Ostfriesland, von 1838: Katalog und Kommentar

Zusammenfassung: Auch heute noch ist der im Jahre 1838 geborgene Sceatta-Hort vom „Kloster Barthe" sowohl der größte frühmittelalterliche Münzschatz Niedersachsens als auch der umfänglichste Sceattafund überhaupt. Er umfasste etwa 800 Silbermünzen, von denen noch 752 im Ostfriesischen Landesmuseum in Emden erhalten sind. Erst in den vergangenen 50 Jahren hat es mehrere Anläufe zu einer systematischen Erfassung und Auswertung gegeben, die jedoch unvollendet geblieben sind. Neben ungeklärten Urheberrechten sind dafür wohl vor allem sowohl die große Anzahl der Münzen als auch ihre schier unüberschaubaren Varietäten verantwortlich zu machen. Bis auf wenige numismatische Spezialisten hat daher die archäologische Fachwelt nur peripher von diesem für die Landes- und Wirtschaftsgeschichte so bedeutenden Fundkomplex Kenntnis nehmen können. Er soll an dieser Stelle nunmehr vollständig und kommentiert vorgelegt werden. Sämtliche Münzen werden im Maßstab 2:1 und farbig abgebildet und auch die übrigen, in alle Welt verstreuten Stücke, die mutmaßlich zu diesem Schatz gehören, werden herangezogen.
Insgesamt lassen sich 798 Münzen mit Gewichten zwischen 0,82 bis 1,54 g dem Hortfund zuordnen. Sie gehören ausschließlich zur Serie E, gewöhnlich als Porcupine/Standard Sceattas bezeichnet, und wurden während der sog. zweiten Phase zwischen ca. 720 und 740 geschlagen. Nur wenige Stücke entstammen der ersten Phase (ca. 695 bis 715/720). Da sämtliche Unterarten der in der zweiten Phase produzierten Münzen vorhanden sind, muss die Niederlegung an deren Ende, also zwischen 730 und 740 erfolgt sein.
Die umfangreiche Betrachtung der Prägestempel ergibt, dass trotz der zunächst verwirrenden Vielfalt zahlreiche Duplikate existieren oder wenigstens einseitig gemeinsame Prägestempel nachweisbar sind. Nur wenige der Münzen sind in den Umlauf gelangt, der größte Teil ist als prägefrisch zu bezeichnen. Die drei Porcupine-Untergruppen des Barther Hortes zeigen ein typisch friesisches Zusammenstellungsverhältnis. Als Herstellungsorte können deshalb große Münzstätten in der friesischen Marsch (Terpengebiet), in der Region der großen Flüsse und wohl bei Domburg vermutet werden. Das Aufkommen der friesischen Porcupine-Varianten ist dabei als Reflex auf die politischen Machtveränderungen im Norden und Süden der Niederlande nach dem Tode König Radbods (719) zu verstehen, als sich der fränkische Einfluss nach Norden ausweitete.
In anderen Sceattahorten enthaltene Münztypen, etwa englische Prägungen, sind im Barther Fund nicht enthalten. Dies könnte für eine bewusste Selektion von Porcupines sprechen, weil anderen Sorten misstraut worden ist. Damit kann über den Besitzer des Schatzes spekuliert werden, bei dem es sich um einen reisenden Kaufmann gehandelt haben kann, der eher Kontakte in den Norden gepflegt hat und wusste, dass seine Kunden nur Porcupines akzeptieren würden. Im Weiteren ist nach der Bedeutung des Fundes im Kontext der regionalen Siedlungsgeschichte zu fragen.

Schlüsselworte: Niedersachsen, Ostfriesland, Sceatta, frühmittelalterliche Münzen

Abstract: Even today, the sceatta hoard of "Kloster Barthe" discovered in 1838, is the largest early medieval coin treasure from Lower Saxony, as well as the most sizeable sceatta find ever. It consisted of about 800 silver coins, of which there are still 752 present in the Ostfriesisches Landesmuseum in Emden. In the past fifty years, there were several attempts at a systematic recording and examination, which however have remained unfinished. Apart from unresolved copyrights especially the large number of coins and also their almost unclassifiable varieties must be held responsible for this. Consequently, only a few specialists from the numismatic and archaeological field have been only marginally aware of this find, which is so important for national and economic history. What follows is a thorough presentation with commentary. The coins are shown on a scale of 2:1 and are reproduced in colour, also the additional pieces, which presumably belong to this treasure and are now scattered far and wide, have been added.
In total, 798 coins with weights of between 0.82 to 1.54 g may be attributed to the hoard. They belong exclusively to Series E, usually designated as porcupine/standard sceattas, and were almost all struck during the so-called secondary phase, between c. 720 and 740. Only few pieces originate from the primary phase (c. 695 until 715/720). As all the known varieties produced in

the secondary phase are represented in the hoard, the concealment must have taken place at the end of that phase, i.e. between 730 and 740.
Careful examination of the coin designs proved that, in spite of the confusing high number of dies used, there are many die-duplicate and die-linked specimens present in the hoard. Only few of the coins have circulated for long enough to show signs of wear. The majority may be considered almost mint state. The porcupine subgroups in the Barthe hoard show a typical Frisian ratio. As their places of production, large mints in the Frisian terpen area and others in the region of the big rivers and especially near Domburg may be presumed. The emergence of Frisian porcupine varieties is to be understood as a result of the political power changes between the north and south of the Netherlands after the death of King Radbod (719) with increased Frankish dominance in Friesland.
Other sceatta types that were in circulation, such as English types, are absent in the Barthe hoard. This may speak for a deliberate selection of porcupines by the owner, because other types were not trusted. If so, one may wonder whether the owner of the treasure was not a travelling salesman, who had served his contacts in the north and knew that his customers would prefer porcupines. In what follows, the meaning of the find is discussed in the context of regional settlement history.

Keywords: Lower Saxony, East Frisia, Sceatta, early medieval coinage

The circumstances of the discovery

In May 1838 a lot of sceattas were found near Kloster Barthe in East Frisia on the Geest (rich loamy soil) of Hesel, Ldkr. Leer. "Kloster Barthe" is the name of a settlement of the Norbertine monastic order in East Frisia dating however only from the late 12th century. Extensive excavations at this abandoned site account for the discovery of former buildings and different building phases (Bärenfänger 1997). Both places were already mentioned in the early Werden land register, Barthe as Birgithi and Hesel as Hasla. While in Hesel it was possible to document a variety of early medieval settlement remains (Bärenfänger 1998, 45 ff.), the monastery excavations provided no corresponding information. The question of the exact location of Birgithi is therefore still open, so that a connection between the coin find and an early settlement is still speculative.

In the earlier modern period, the monastery and the grounds around it – the area of the present-day Hesel forest – had to struggle against strong sand drifts and dune formation, which must be regarded as a consequence of intensive agricultural use. The terrain changed its shape repeatedly until the plantations and reforestation in the 19th century brought the sand drifts to a standstill. In the period of the 1830s, the construction of the first paved roads toward Hesel began. The stones were extracted in the domain of Kloster Barthe by day labourers (Wessels 1998, 241. Bärenfänger 2004). It is very likely that the coins have been found during these large scale diggings. About the exact circumstances of the find nothing is recorded. As the locality of the find „at Kloster Barthe" has been handed down. There is no indication whether the coins were found in a container. However, their excellent condition suggests that they were possibly hidden in a jar.

The news of the coin find must have reached Emden quickly. In the proceedings of the Gesellschaft für bildende Kunst und väterländische Altertümer zu Emden [Emder Society for Fine Art and National Antiquities] of 16 May 1838 is recorded that coins were presented, which were entirely unknown to those present: "Beim Kloster Barthe sind eine große Zahl solcher und ähnlicher Münzen gefunden worden, und es sollten einige für die Emder Sammlung angekauft worden" [A great number of such and similar coins has been found near Kloster Barthe, and some of them will be purchased for the Emden collection].

There is no record of how the coins finally ended up in Emden, neither by whom they were purchased nor whether others have fallen into other hands. Recent inspections of the "Emden Protocols" provided no further information (kind oral communication by Dr. Glimme and Dr. Jahn, Ostfriesisches Landesmuseum Emden). But it seems certain, that the numismatist Hermann Grote from Hannover was involved and that he intended to make an assessment and evaluation of the find.

Some time later, Grote offered his correspondents Barth, Posern, and Promber some coins: „...In Ostfriesland ist ein Fund gemacht von merowingischen Silbermünzen (Lelewel Taf. 3 Fig. 20–23), ich habe davon erhalten und schicke hierneben..." [... In East Friesland Merovingian silver coins have been found (Ref.), I acquired some of them and I send you herewith...] *(fig. 1)*. The hoard consisted of sceattas and Grote acquired a part of them and started to exchange several of them for other collectable coins (Berghaus 1952). Regrettably, there are no pictures or casts of these coins, nor even a brief description.

The present location of the coins

The main part of this hoard is kept in the Ostfriesisches Landesmuseum in Emden. In 1952 this museum had 756 coins from the hoard (Berghaus 1952, 17). However, during an inventory in 1988 only 752 coins were counted (Berger, Stoess 1988, 120 ff.). Apparently after 1952 four coins have been mislaid or were lost.

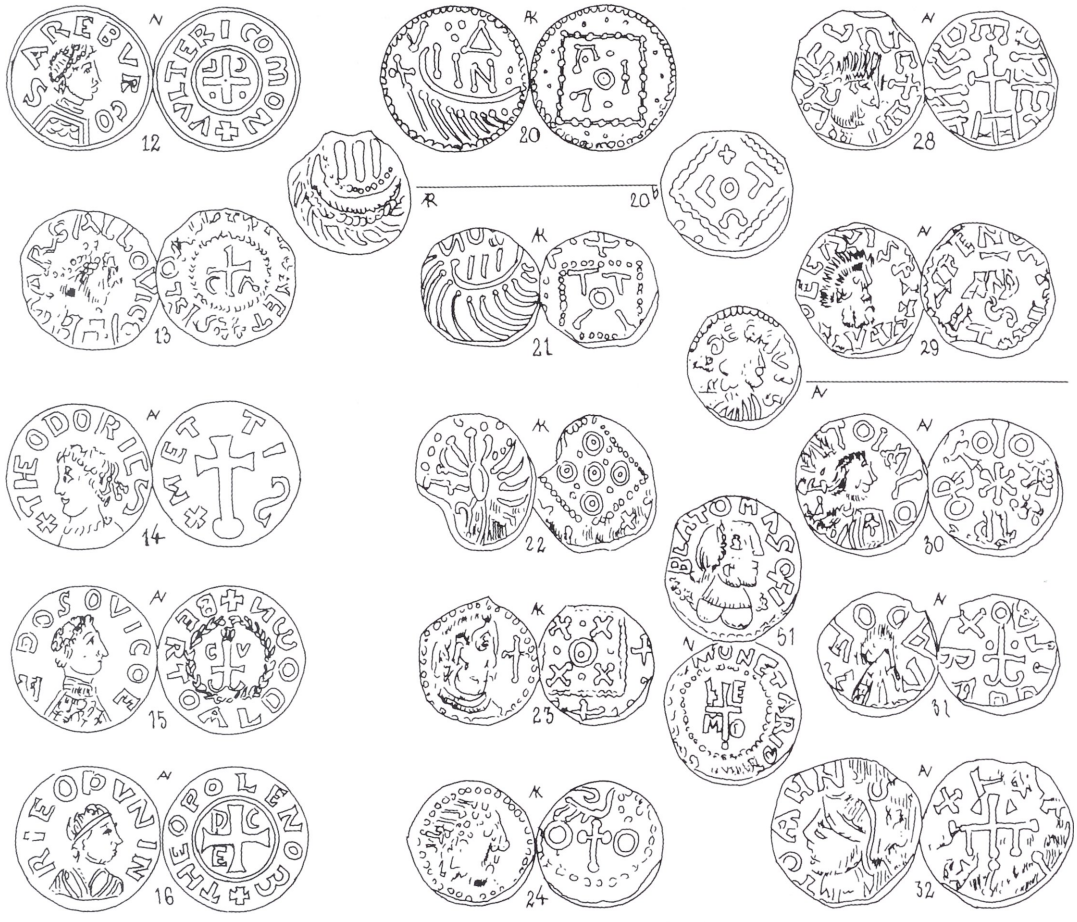


Fig. 1 A part of Plate III from LELEWEL (1835) to which Hermann Grote refers. Nrs. 20–22 are porcupine sceattas, Nr. 20 of the VICO Variety, 20b of Variety C, 21 Variety A and Nr. 22 is a poor, blundered engraving of a 'plumed bird' type of Variety L (see *figure 8* for these varieties). Nr. 23 is a sceat of Series G BMC Type 3a, probably struck at Quentovic in northern France. Although a contemporary of the secondary-phase porcupines it is questionable if such a coin has been present in the Kloster Barthe hoard, but this is not impossible.

Earlier, perhaps most notably through the activities of H. Grote, coins from the Kloster Barthe hoard were dispersed and several of them ended in due time in public collections. A number of other specimens were added to the inventory of BERGER and STOESS (1988), *(Table I)*.

The former J. Durkee collection, kept in the Metropolitan Museum of Art, New York since 1899, has four sceattas which could also have been part of the Barthe coins exchanged by Grote. The same may apply to the sceattas in the Copenhagen Museum from the Koch collection, those formerly in the possession of Reichel and Stroganov, nowadays in the collection of the Hermitage Museum in St. Petersburg and two sceattas in Muzeum Narodowe in Warsaw. Several sceattas from the Lockhart collection, now in the British Museum collection, may have the same background. Also uncertain is the origin of the Norden hoard. According to ERBSTEIN and ERBSTEIN (1870): „17 Sceattae, sämmtlich verschiedenen Gepräges, nach art der bei Ruding Pl. 1, Nr. 5-14 abgebildeten, von welchen Nr. 6 u. 12 in je 1 Exemplare und er unter Nr. 7 u. 8 gegebene Typus in 3 Varietäten hier vorliegt. Diese 17 Stücke, sämmtlich ser gut erhalten, sind bei Norden in Ostfriesland nach und nach ausgegraben worden." [17 sceattas, of different designs, of the types illustrated by Ruding Pl. 1 5–14, of which one specimen of 6 and 12, and 3 varieties of 7 and 8 are present. These 17 coins, all very well preserved, have one by one been dug out near Norden in East Friesland.] Norden is situated about 50 km north of the findspot of the Kloster Barthe hoard. It is unclear if there has been a separate small hoard at Norden or if these coins belonged to the Kloster Barthe find *(fig. 2)*.

Photographic evidence

There are two older sets of photographs of the main part of this hoard, which is kept in the Ostfriesisches Landesmuseum, Emden. In the 1970s Dr. D. Hill pre-

definitely from the Barthe Hoard	probably from the Barthe hoard	possibly or perhaps from the Barthe hoard
• 752 sceattas, Ostfriesisches Landesmuseum Emden (before 1952 756 specimens)	• 9 sceattas ex coll. H. Grote, Staatliche Museen zu Berlin (KLUGE 1987. BERGER, STOESS 1988) • 4 sceattas ex coll. Thompson, National Museum Copenhagen (GALSTER 1964) • 13 sceattas, Herzog Anton Ulrich-Museum, Braunschweig (BERGER, STOESS 1988) • 3 sceattas "found at Hanover" (HILL 1977a) present location unknown • 5 sceattas, Manchester Art Gallery (RICHARDSON 1984) • 3 sceattas, LWL-Landesmuseum für Kunst- und Kulturgeschichte, Münster (BERGHAUS 1980)	• 2 sceattas, Museum August Kestner, Hannover (BERGER, STOESS 1988) • 4 sceattas ex coll. Koch, National Museum Copenhagen (GALSTER 1964) • 4 sceattas ex coll. Durkee, The Metropolitan Museum of Art, New York (BRADY 1982) • 2 sceattas, no further information, Muzeum Narodowe Warsaw (MIKOLAJCZYK 1987) • 17 sceattas "excavated near Norden" (BERGER, STOESS 1988, 132 f.) • 21 sceattas, mainly ex coll. Reichel and Stroganov, The State Hermitage Museum, St. Petersburg (POTIN 1999) • 5 sceattas ex coll. Lockhart, The British Museum, London (GANNON in press)
	∑ = 789 total, all included in the plates	∑ = 55 total

Tab. I The present location of the sceattas from the Kloster Barthe hoard.

pared a set of sceatta coin slips from this collection. These coin slips are marked ELM, and have a random sequential numbering from 1 to 752. The second set are photographs taken by Prof. P. Berghaus. These bear the marking OLME, and no sequential numbering, but the number of the photographic negatives. On both sets the weights are recorded.

New colour photographs were taken of the coins at the Ostfriesische Landschaft by R. Bärenfänger and these were used for the plates shown here (see plates). Added are existing and some new photographs (not all in colour) of the coins probably from the Kloster Barthe hoard in other public collections. Of the three specimens described by HILL (1977a), engravings made by Cartier in 1839 are copied on the plates. In a short notice Cartier writes ".. je les dois à l'obligeance du Dr. Grote, éditeur du journal numismatique allemande" [... I owe them to the courtesy of Dr. Grote, editor of the German numismatic journal].

Monetary Circulation in the Early Middle Ages

Introduction

Coinage of the early medieval period in western Europe can be divided into three phases. From c. 500 – 590 gold solidi and tremisses (one third solidus) with Victory were in use. The second phase (c. 590 – 670) on the Continent was dominated by gold tremisses of slightly reduced weight, bearing names of mints and moneyers and a form of cross on the reverse. In England gold coins of comparable weight named thrymsas were in use *(fig. 3)*.

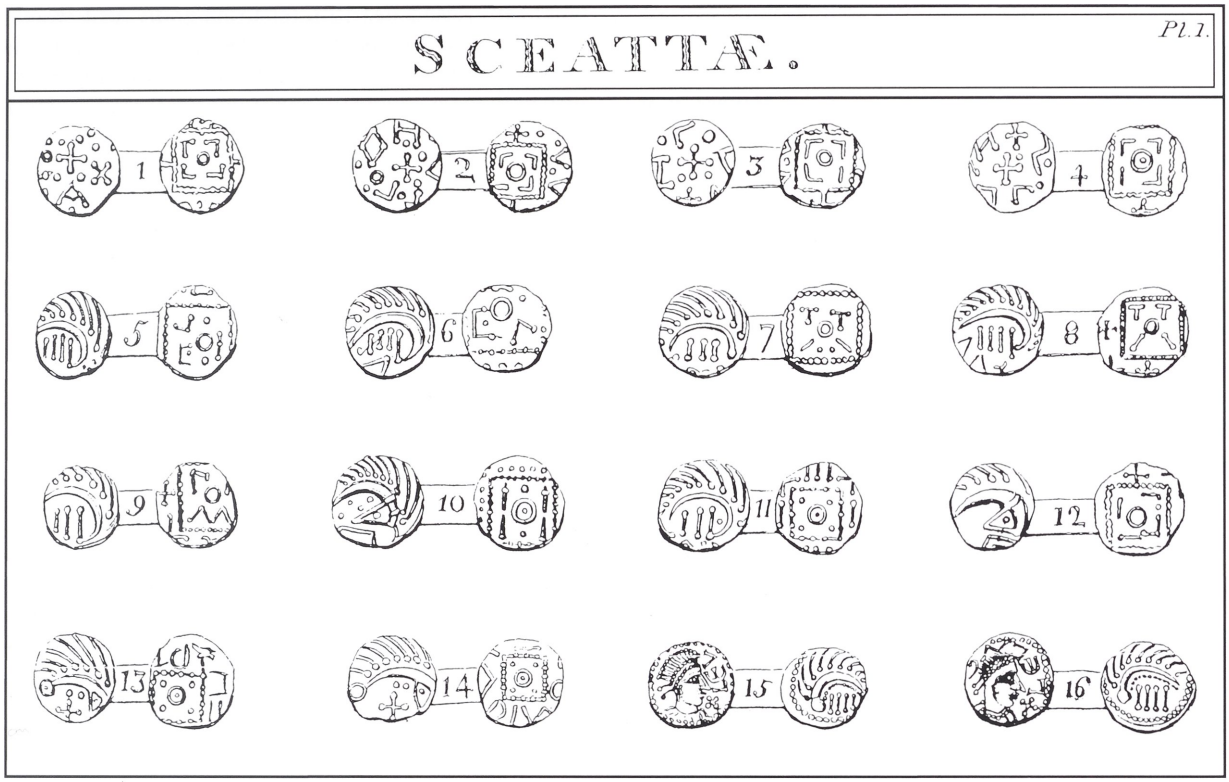


Fig. 2 The coins on Plate 1 in RUDING (1840) with porcupine types said to be similar to those found at Norden.

Fig. 3 From left to right a pseudo-imperial gold solidus with Victory reverse from the 6th century, a continental gold tremissis of the 7th century and an English thrymsa, also 7th century. (DE BELFORT 1892/1895. METCALF 1993a).

Around 670 in Merovingian Gaul as well as in England the gold coinages, which had become severely debased, were replaced by coins of similar weight and module struck in fine silver (GRIERSON, BLACKBURN 1986, 93–95. METCALF 1993a). This major coinage reform thus saw the birth of the silver penny which

became the standard denomination throughout Europe in the Middle Ages *(fig. 4)*. In their earliest form these Merovingian, Frisian and Anglo-Saxon pennies of small and thick module were the only denomination of coin in north-western Europe. They were abundant in northern Gaul, the Low Countries and southern Britain, and they were carried as far afield as Switzerland, Scandinavia, Aquitaine and the French Mediterranean coast. After this monetary reform the scale of the coinage grew substantially. During the first half of the 8th century there was a proliferation of types.

Fig. 4 The first sceattas struck in England c. 675. (Metcalf 1993a).

Many sceat designs are copied or borrowed from earlier popular Roman, Merovingian and even Celtic coin types. However, designs are also drawn from familiar elements of contemporary art (Gannon 2003) and some designs would seem to be original. The majority of the sceattas are uninscribed. Where they do have an intelligible inscription these are personal names, probably those of the monetarii. An exception to this rule are some East Anglian and also Northumbrian sceattas with the names of kings and bishops, and therefore dateable to reigns, and sceattas with the place name London.

The names

What these silver pennies were called undoubtedly varied from place to place. In Latin it was simply denarius. It was a thick and chunky coin with a small flan of c. 1.2 g. Numismatists referred to those from England and the Low Countries as sceattas (singular in English: sceat, in Europe: sceatta) and those from the Merovingian realms as saigas. The term saiga has fallen into disuse, replaced by denier or denarius. The name 'sceatta' would also be better dispensed with, but it has become so entrenched in usage that we have retained it. The term 'sceat' is a modern misnomer based on a misunderstanding of the law of king Æthilbert of Kent where it is used just to refer to an equivalent weight of gold (Grierson, Blackburn 1986, 157). 'Sceatta' is also to be found in the Beowulf poem from the 6th century with the meaning of 'treasure' (Boeles 1951, 366).

Classification

Engravings and descriptions of sceattas have been published from the 17th century onwards and have from time to time appeared in various numismatic handbooks. Among others may be mentioned Ruding (1840) based on collections in England, the description of sceattas found at Domburg by Rethaan-Macaré (1838; 1856) and de Belfort (1892/1895) on continental collections.

In 1887 Keary published the Anglo-Saxon coins in the British Museum (reprinted 1970). He classified some two hundred sceattas into fifty-four types and these Type numbers were widely accepted and used. P.V. Hill (1953) made a further typological survey and expanded the British Museum Catalogue (BMC) classification, adding many new types, numbered 55–76 in continuation of Keary. In 1984 some thirty more types were added by Stewart (1984). The definition of a type, as opposed to a sub-type or variety, is not easily determined.

Rigold (1960/61; 1966) rearranged and grouped the various types in more or less chronological order using capital letters to indicate the Series. His classification into Series instead of types has many advantages. A problem is that many successful types were imitated and copied, sometimes contemporaneously, often in later years and regularly far from the place of production of the original. For Rigold, attribution to a "Series" did not pre-judge whether a coin was official or a copy.

Chronology and dating

Although most English types of sceattas were now accurately described, their chronology remained uncertain. The early students of sceattas and Merovingian deniers had little contact with each other. The first sustained intellectual effort was by Dirks in the 1860s. He studied three important sceatta hoards in the province of Friesland, as well as other Dutch finds, and placed them in a broad historical perspective (Dirks 1870). Sutherland (1942) tackled this problem by mainly following the idea of the affiliation and evolution of the coin designs and placing the types in a particular sequence. Furthermore, Sutherland was the first to provide an essential tool for numismatic research: a list of finds. However, Sutherland's approach, the supposed evolution of the coin designs has proved to be a weak and unreliable basis for establishing the chronology of the sceat types. Rigold (1960/61; 1966), using the evi-

dence of the composition of grave-finds, demonstrated that the English sceat types may be divided in early issues (the primary series) but that most of them were manufactured later (secondary phase).

The current theories about their chronology and the date of issue are largely based on the presumed date of concealment of some 30 hoards, both in England and on the Continent (Grierson, Blackburn 1986, 84. Metcalf, Op den Velde 2009/2010, 125–143). Some of these hoards contained independently dateable coins such as Merovingian deniers with the name of a ruler, the dates of whose reign are known. A dateable archaeological context of a few finds offers additional evidence.

In particular the precise dating of the Nice-Cimiez hoard is important in this respect. The exact date of concealment of this large hoard has been thoroughly disputed in the past decades with a substantial difference of opinion of up to thirty years and with radical consequences for the dating of the various sceatta types, including the porcupines.

Attribution to the place of production

Attribution of sceattas to their place of origin relies on the combined study of style, die-links and metal content, together with the distribution of provenances, in particular stray finds which seem to reflect the local use of money more closely than hoards. Thus, it is assumed that the sceattas were mainly in use in the area of production. However, export of substantial numbers over a long distance as a result of trade relations has to be considered and may confound the distribution patterns.

A major breakthrough was the already mentioned study 'The two primary series of sceattas' by Rigold (1960/61). He traced two chronologically parallel minting traditions during the primary phase in Kent and Essex. Metcalf (1993a. 1993b. 1994) has published the sceattas in the collection of the Ashmolean Museum, Oxford and offers an elaborate and comprehensive discussion of the various issues. He continued this research with an important series of publications in the British Numismatic Journal. Metcalf made special efforts to attribute the numerous types to a distinct place of production and was able to show that most English types are the successive coinages of the various kingdoms of the Heptarchy.

Alloy composition

Most sceattas of the primary phase are of very pure silver, with traces of gold and lead, and with only c. 5 percent of copper. In the course of time a decrease of the silver content took place (Metcalf 1994). Many sceattas from the secondary phase (c. 720–740) are known to exist in a range from high or reasonable silver content to very debased. Eventually the debased coins were swept away and a high silver standard reimposed by the Carolingian reforms (in Gaul) and by king Offa and his contemporaries (in England).

The porcupine/standard sceattas

The design

The coins from the Kloster Barthe hoard are exclusively of the so-called porcupine/standard type (Series E). On the side commonly referred to as the obverse they show a curved line with bristles, from which the coins are conveniently but inaccurately known as "porcupines". Other interpretations suggested are the she-wolf suckling Romulus and Remus, a galley furnished with oars, an insect, a fantastic bird, a helmet and a debased head (Metcalf 1966).

However, Dhénin (1987, 311) pointed out that the "porcupine" design is copied from Celtic bronze coins of the Carnutes *(fig. 5)*. Presumably a group of these

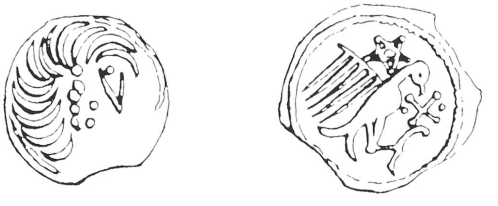


Fig. 5 Celtic bronze coins, prototypes of the "porcupine" design (after Dhénin 1987, 311).

Fig. 6 Prototypes of the reverse design of the porcupine/standard sceattas. Left the reverse of a Roman coin with votive banner, right a sceat of Series C. (Engel, Serrure 1891. Ruding 1850).

had come to light somewhere by chance and they were shown to the die-cutters, who copied them in their own style. Why coins from the Paris basin from many centuries earlier should have been chosen as the model for a new sceat type remains a mystery. The reverse shows a square standard with a degraded copy of the inscription VOT/XX or with a pattern or group of symbols to replace these letters. This design is copied from sceattas of Series A and C, which were, in turn, copied from Roman coins with a military standard inscribed VOT/XX *(fig. 6)*.

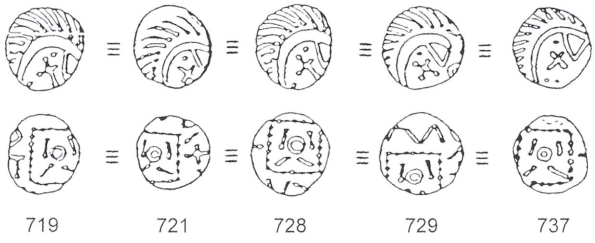


Fig. 7 A group of die-duplicate sceattas (from the Kloster Barthe hoard); the off-centre struck specimens show that the diameter of the dies was larger than the coin flans. The second coin seems to have rather short quills on the obverse, but this is caused by a thin, depressed part of the flan where the die did not touch the metal during striking. (METCALF, OP DEN VELDE 2010).

The porcupine sceattas were struck with dies, which had a considerably larger diameter than the coin flans *(fig. 7)*. Thus in most instances only the central part of the engraved die is imprinted on the coins.

The chronology and date of issue

The 'porcupines' show great variety, both in style and detail. In a pioneering study METCALF (1966) showed that particular obverse and reverse varieties are regularly coupled *(fig. 8)*. However, these varieties are by no means comprehensive. They do not encompass

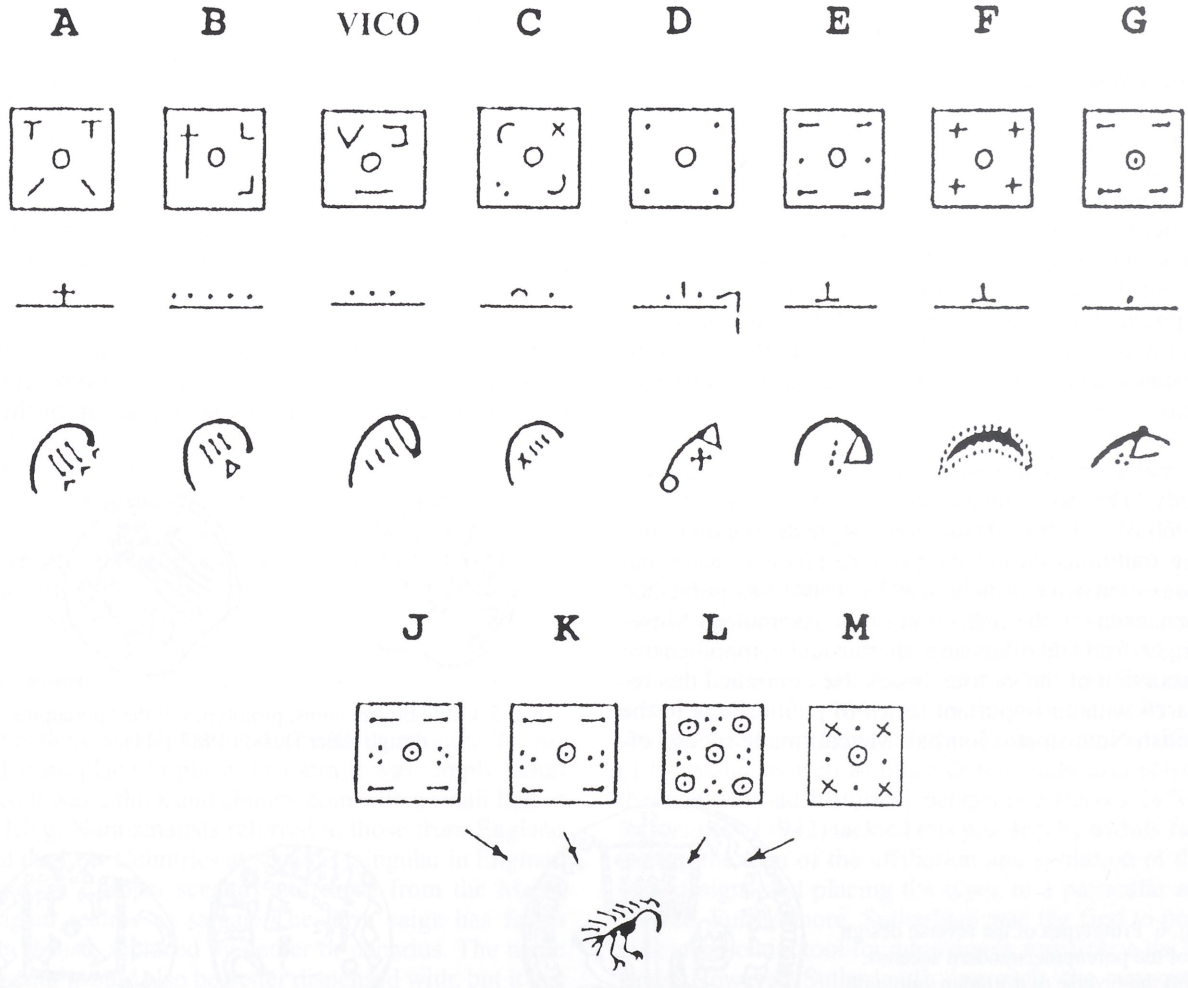


Fig. 8 Diagram of the porcupine/standard sceattas' main varieties. (Adapted after METCALF 1966). The varieties H and I refer to sceattas with non-porcupine obverses and are omitted here. The reverses J, K, L, and M are coupled with the 'plumed bird' obverse variety.

the wide range of specimens that show an amalgam of elements borrowed from different varieties or even unprecedented designs. We now know that there are three consecutive phases, each characterized by its own varieties. These phases are also named after the most important hoards including porcupine sceattas of one of these phases:

Primary or Aston Rowant phase:	c. 695 – c. 715/20
Secondary or Kloster Barthe phase:	c. 720 – c. 740
Tertiary or Franeker phase:	c. 745 – 800?

The porcupines of the primary phase comprise just four distinct and separate varieties (Varieties VICO, G, D and the 'plumed bird' in *figure 9*).

The secondary phase material is at first glance irregular and chaotic, lacking obvious boundaries between the sub-varieties. The tertiary phase is much more surveyable with only three major varieties: B, E, and F *(see fig. 8 and 25)*.

It is already common knowledge that the porcupines were struck over an extended period of time. Their production did not start before c. 695. The study of hoards implies that the many secondary-phase varieties were already in circulation around c. 725. From c. 745 onwards (the beginning of the tertiary phase) far fewer varieties were issued than in the preceding phase and the total volume of coin production declined sharply. In England around c. 750 there was a monetary recession, after which the sceattas were replaced by much thinner and broader silver pennies. At around the same time on the Continent the new Carolingian pennies were introduced. However, in the Netherlands and Scandinavia sceattas remained in production and circulation, perhaps until around 800 or even later (Feveile 2008. Metcalf, Op den Velde 2009/2010). The Carolingian denarii were of purer silver and their average weight was in many cases higher than that of the sceattas. Further research is necessary for an answer to the question whether sceattas circulated at par with the Carolingian pennies, or if their use was restricted to areas where Frankish control was weak.

Fig. 9 Porcupine/standard sceattas from the primary phase (c. 695 – c. 715/20). (Metcalf 1993b).

The places of production of the 'porcupines'

Careful numismatic research has revealed the place of production of most types of sceattas. However, the porcupine/standard series, the most plentiful of all sceatta types, remained for a long time elusive. At first the opinion that they were struck in England dominated. In 1958 P.V. Hill put forward the theory of "spheres of influence", i.e. that different varieties were the currency of different regions. Rigold (1960/61) rejected this and considered the varieties as successive issues. On account of the distribution of finds Metcalf (1966) brought forward the hypothesis that the majority were of Continental origin. Further detailed studies confirmed the general conclusions of Rigold and Metcalf (Metcalf, Op den Velde 2009/10). Although the English : Netherlands single finds ratio of the primary-phase porcupine sceattas suggests at first sight an English origin, as was for a long time the prevailing opinion, this attribution is certainly not tenable, because there is no region in England where the minting could be accommodated.

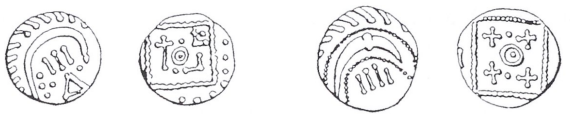
Fig. 10 Continental runic sceattas of Series D (primary phase). (Op den Velde, Metcalf 2003).

Like the runic sceattas of Series D *(fig. 10)* the porcupines were struck in the Netherlands, mainly as an export coinage for the trade with England. But as to where in the Netherlands during the primary phase the only well-substantiated conclusion is that the runic sceattas were produced in Friesland and the primary-phase porcupines were not issued in Friesland.

The sub-varieties of the secondary phase

The porcupine sceattas of the secondary phase include the Varieties A and C in the scheme in *figure 8*. However, the majority of the porcupine sceattas from this period show a bewildering diversity of the basic patterns of Varieties A and C *(fig. 11)*.

Die-linked sceattas *(fig. 12)*, with one of the sides struck with the same die, will in all likelihood have been produced in the same mint and more or less at the



Variety B Variety F

Fig. 11 Secondary-phase porcupine/standard sceattas of Metcalf's Varieties A and C. (Metcalf 1993b, Op den Velde 2009).

same time. However, it is not to be excluded that dies were exchanged between minters or that a moneyer kept a group of dies in his possession for a considerable time. Furthermore, there are numerous secondary-phase porcupine sceattas struck from nearly identical dies. They are commonly present in larger groups of die-identical coins, often from quite different find-spots, which is an indication that they were produced in great quantity. They are probably the output of a large, well organized mint, where larger sets of different, but nearly similar dies were concurrently in use *(fig. 13)*.

In general the figures and symbols on the porcupine sceattas have a round thickening at the end of the lines (pommée), but sometimes the lines have a sharply cut-off broadening (seriffed). This is no doubt a manifestation of the personal style of the die-cutter. There are almost never combinations of seriffed and pommée figures on the same die. Most of the Kloster Barthe coins are in pommée style. A few die-linked coins show that sometimes dies in pommée and seriffed style were used promiscuously *(fig. 14)*. This may suggest that a mint-workshop sometimes used dies engraved by more than one die-cutter.

A minority (c. 5 percent) of the obverses have quills radiating to the right instead of to the left and most of these coins have inferior, untidy designs, clearly the result of sloppy or hasty die-cutting *(fig. 15)*. In general, lateral reversal of a design is an indication of imitation. This is corroborated by the relatively high percentage in sub-variety k *(fig. 19)*. However, there are exceptions to the "rule" that porcupines with quills in the uncommon direction are of inferior workmanship. Two pairs of reverse die-linked porcupines are evidently struck from dies engraved "by the same hand", but the obverses are in mirror image *(fig. 16)*.

The die-linked sceattas indicate that an individual moneyer *(fig. 17)* or mint-workshop often had a stock of sets of obverse and reverse dies, most of them engraved in an identical style, but sometimes manufactured by different die-cutters. Apparently it was only the general aspect of the coin design which mattered and which served as a guarantee for the silver content.

The obverse-reverse ratio of die linkage is not 1:1. It seems that dies for mass production were delivered in sets of three (or four), one obverse die plus two (or three) reverse dies *(fig. 18)*. The upper die – carrying the standard design – received the full blow of the hammer during the striking and therefore wore out much faster than the lower die with the porcupine image.

On the other hand, there are many secondary-phase porcupine sceattas of which only one specimen, or just a die-identical pair has been recovered. In this group, the obverse-reverse die ratio is very close to 1:1. It is very possible that, besides the large, official mints, private or even illegal minting took place on a considerable scale. However, we should not exclude the

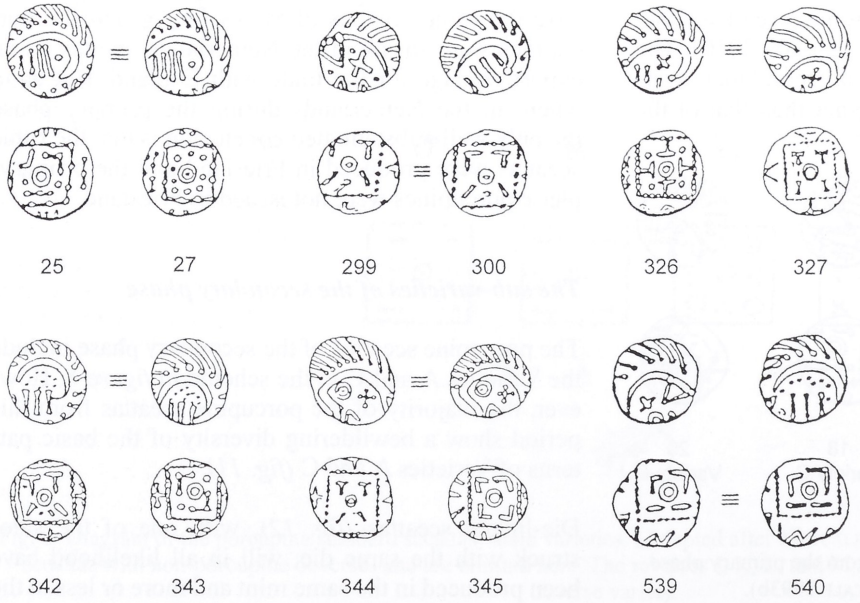


Fig. 12 Die-linked secondary-phase porcupine/standard sceattas coupling apparently unrelated designs on their non-identical side. (Metcalf, Op den Velde 2010).

Fig. 13 A group of secondary-phase porcupine sceattas struck from very similar but non-identical dies. Apparently the output of a large mint. (METCALF, OP DEN VELDE 2009/2010).

possibility that, while some of the larger mint-workshops kept carefully to one distinctive design, others were eclectic, using a medley of dies. Imitations are not by definition of poor quality. Any written information about the regulation of minting of sceattas is virtually lacking. Until now the only reliable source are the coins themselves.

There are more than 1,900 porcupine sceattas dating from the secondary phase available for study (including 765 coins from the Kloster Barthe hoard). Based on similarity of style – the regular combination of a distinctive obverse design with a distinctive reverse and the use of the same style and ornamentation in the reverse margins – they were divided into eight sub-varieties (METCALF, OP DEN VELDE 2009/10, 37–51). Furthermore, die-linkage between the sub-varieties had to be absent. Whether each sub-variety is from a separate workshop is conjectural. And it is more than possible that these sub-varieties are contaminated by imitations of deceptively good quality. Alternatively, coins considered as imitative might be regular issues from late in the secondary phase, when the standards of composition of the designs had declined. The number of specimens in characteristic style that could be assigned to each of the well-defined sub-varieties varied widely, some are quite small.

There remained a very substantial number of secondary porcupine sceattas difficult to assign to one of the eight sub-varieties. They were grouped in a ninth sub-variety k *(fig. 19)*, which comprises over 450 sceattas of poor workmanship without regular coupling of

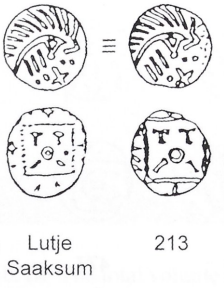


Fig. 14 Two die-linked sceattas with a reverse in different style of die-cutting. (METCALF, OP DEN VELDE 2009/2010).

Fig. 15 Porcupine sceattas with quills to the right. (METCALF, OP DEN VELDE 2009/2010).

Fig. 16 Similar porcupine specimens with bristles to the right and to the left. (METCALF, OP DEN VELDE 2009/2010).

obverse and reverse and clumsy designs. This group shows a paucity of die-identical coins and a low rate of the use of nearly similar dies as compared to the more coherent sub-varieties. It is tempting to think that these are predominantly imitations, perhaps the output of private minting. Besides the larger mints it is possible that local or even travelling silversmiths offered their services to wealthy merchants who wanted to convert their stock of raw silver or old worn or foreign coins into new current coins. As the accidental chance of loss or stray finds was presumably similar to that of the regular sub-varieties, this implies that the average output per die was substantially lower. There are no indications that these imitations were of inferior alloy and in circulation they seem to have mixed freely with the regular issues. Apart from the regular and imitative issues also obvious forgeries were brought into circulation. They had a very low silver content or a silver-plated copper core and were meant to deceive, but their number was relatively small. In the Kloster Barthe hoard no forgeries were identified.

Fig. 17 Statuette of a minter on a pillar of the Church of St. Georges de Bocherville (Normandie) built around 1050. (Redrawn by G. Kronsweide).

The eight regular sub-varieties can be arranged into two main groups *(fig. 11)* which account for more than half of all secondary-phase porcupines. One of these, by far the most plentiful, has a neat symmetrical design within the reverse standard, ToT- / \. The other main group has a reverse design composed of four assorted symbols in the standard, variously arranged around the central annulet. This has been described as a 'mixed grill' of symbols. At first sight these reverse designs seem to be asymmetrical and random. However, in many instances the arrangement becomes symmetrical if one rotates the standard through 45° to become a diamond-shape with the crosslet at the top.

The intriguing conclusion from the study of metrology is that the sub-groups of porcupine sceattas with a 'mixed grill' reverse are distinctly heavier than the sub-groups with a ToT- / \ reverse. Their peak or median value lies at c. 1.27 g instead of c. 1.17 g, a clearly significant difference. Furthermore, there are other differences between these two groups. The flans of the heavier group are more carefully weight-adjusted, i.e. the weight-peak is steeper *(fig. 20)*. The weight distribution of the group of 'imitative' porcupines is intermediate and the peak is flattened *(fig. 29, sub-varieties i–k)*. There is also a rather consistent difference in the shape of the flans. Those of the ToT- / \ group are circular and cut carefully, while those of the 'mixed grill' group are more often oval- or egg-shaped. Another difference has to do with the positioning of the dies during the striking *(see fig. 17)*. The upper die had to be placed with the central part of the design on the coin flan. This central part is indicated by the annulet in the middle of the square on the reverse. With the production of the 'mixed grill' sceattas the minters were less careful in this respect and many of the reverses were struck off-centre *(compare fig. 7 and 13)*.

The first explanation for the different weight histograms of the two main groups that comes to mind is that they are successive, thus representing a decline in weight in the course of time. However, specimens of both groups are already present in dateable hoards and grave-finds from the very beginning of the secondary phase. This implies unequivocally that the ToT- / \ and 'mixed grill' groups were contemporary issues.

The differences in median weight, of about ten milligrams or roughly eight percent, and the technical details are indications that the two main groups are not from the same mint and are strong encouragement to explore the idea that the secondary porcupines were produced independently in two regions.

The single finds of the secondary porcupines are spread over a large part of north-western Europe. They are concentrated in south-east and middle England, the Netherlands and along the river Rhine *(fig. 21)*. The stray losses in Britain are widely dispersed and show no regional concentration. This is a strong argument against an English origin. The single finds in the Netherlands show three areas with a concentration of finds of porcupines with almost empty areas in between. The areas with an abundance of finds are the Frisian terpen area in the north and more to the south the Big Rivers region and near Domburg on the island Walcheren. On the beaches of Domburg and the nearby Westenschouwen 352 secondary-phase porcupine sceattas

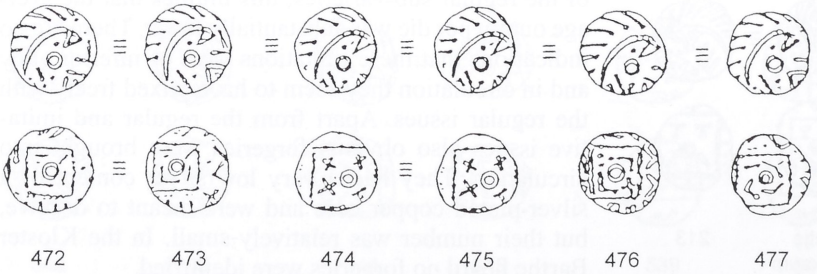


Fig. 18 Obverse die-linked sceattas struck with different but similar reverse dies. (Metcalf, Op den Velde 2009/2010).

	ToT- / \	'mixed grill'
Friesland (north)	57 %	43 %
Big Rivers region (south)	83 %	17 %
Domburg area (south)	77 %	23 %
Kloster Barthe hoard	53 %	47 %

Tab. II Stray-finds distribution of the secondary porcupine varieties in the Netherlands.

were recovered (Op den Velde, Klaassen 2004). The proportions of single finds from these three regions are compared in *table II.*

There is a clear-cut north-south contrast. This certainly indicates that the ToT- / \ group was produced in the south and that the 'mixed grill' group comes from the north, from Friesland. Domburg, from where most of the shipping with England departed and arrived, and which may have been frequented by merchants from many regions, may have been fed from both Friesland and the Big Rivers region, but nevertheless has a characteristically southern distribution. The group of 'imitations' has also a more southern distribution. There is a risk that the statistics are blurred by the inclusion of contemporary copies, but if such copies were made in their home region, they do not greatly affect the argument.

Die-adjustment

On a number of sceatta types the position of the obverse and reverse are carefully positioned as on modern struck coins. This is for example a characteristic of the Danish Wodan/monster sceattas *(fig. 24)* with a die-axis of 0°, 90°, 180° or 270° and precise centralization, indicating that the upper die was located by a square mounting (Hill 1977b). However, all of the porcupine/standard varieties (and also the Frisian sceattas of Series D, *figure 10*) have an arbitrary die-axis. They were struck using round dies and nobody cared about their alignment.

The total volume of the porcupine/standard sceattas

Based on the statistical calculation of the total number of dies used to manufacture a certain variety plus indirect knowledge of the number of coins that could be struck from a die before it became useless, the total number of manufactured coins from that variety can be estimated. The number of die-duplicate and die-linked coins in a homogeneous sample allows estimation of the total number of dies used. Even on a conservative estimate, one reverse die could well be used to produce around 10,000 coins. This exercise gave results shown in *table III* (Metcalf, Op den Velde 2009/10, 112–124, 227).

These are impressive quantities, certainly if we realize that the porcupine sceattas were not the only coin type in use. For the territory of the present Kingdom of the Netherlands during the secondary phase (c. 720 – 740) it implies the striking of c. two million coins or the processing c. 15,000 kg of silver annually. Estimates of the population density in the early Middle Ages vary widely. Studies of cemeteries indicate that the rate of infant mortality was high, the average life-time expectancy for those surviving childhood was around forty years and 60 percent of the population was younger than 25 years. The total number of inhabitants was possibly between 250,000 and 500,000. Using those admittedly very approximate figures, it would seem that in the primary phase there were roughly twenty porcupines for every man, woman and child (and more sceattas of Series D) and in the secondary phase an astonishing hundred. The number of circulating coins underscores that already in the 8th century the economy was thoroughly monetized.

primary phase (*c.* 695 – 715/20)	7.6 million
'stepped cross' variety	0.6 million
secondary phase (*c.* 720 – 740)	
• northern varieties	07.0 million
• southern varieties	20.0 million
• imitations	15.0 million

Tab. III The total volume of porcupine/standard sceattas.

Fig. 19 Secondary-phase porcupines of sub-variety k and rest-group of poorly-made coins with untidy designs. (METCALF, OP DEN VELDE 2009/2010).

The political context of the secondary-phase porcupine sceattas

OP DEN VELDE and METCALF (2003) have shown that during the primary phase the continental runic sceattas (Series D) were minted in Friesland. Concurrently porcupines (of the four parallel primary-phase varieties) were produced in the Big Rivers region and/or at Domburg. Both emissions fulfilled a dual function. They were mainly used for the payment of goods in England which were exported to the Continent. This explains the abundant number of finds of these types all over England. The continental runic type also provided the local currency of the Netherlands. They are the coinage of the notorious Frisian king Radbod.

At the beginning of the eighth century the part of the Netherlands south of the Rhine was under Frankish hegemony. The territory north of the Rhine was more or less independent from Frankish control. The power of Radbod crumbled after c. 710 and he died in 719. The Frankish influence then extended northwards. The regular Frisian mint(s) adapted to the new political circumstances. The production of continental runic sceattas was stopped abruptly. The Frisian mints continued to strike sceattas but instead of Radbod's continental runic type they started to manufacture a Frisian variety (with the diamond-shaped 'mixed grill' reverse) of the Frankish porcupine/standard type. At the same time the official southern mints in the Netherlands continued the manufacture of porcupine sceatta varieties but of a reformed type (with a ToT- / \ reverse) inspired by the primary-phase varieties.

Concurrently there was an output of more irregular and untidy 'imitative' porcupines *(fig. 19)*. Although the two main groups of secondary porcupines did not have the same weight standard, there are no indications that they were on a different ally standard. The relatively high percentage of English stray-finds among the group of 'imitations' hints that some at least of subvarieties i-k were of local English manufacture.

Conclusions

The porcupine sceattas of the secondary phase comprise three main groups. Regular issues were produced in the Frisian terpen area and in the Big Rivers region and possibly also at Domburg. Unofficial imitation

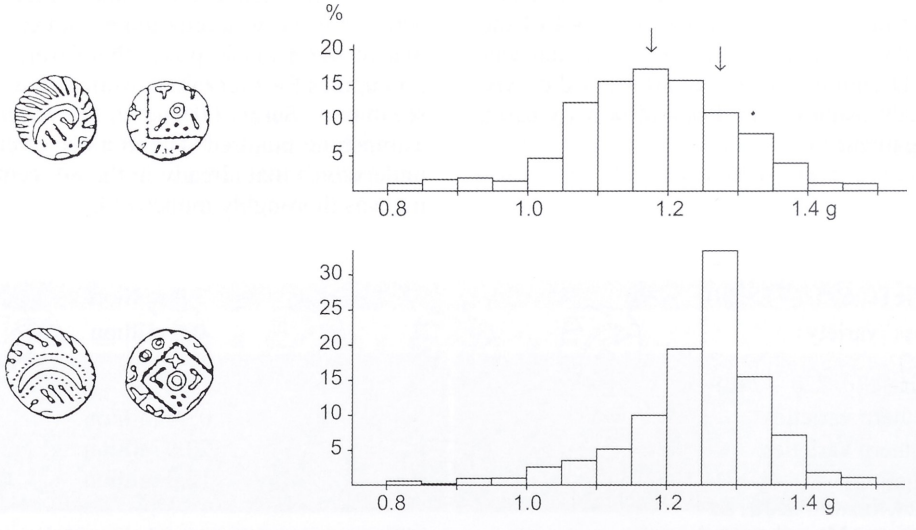


Fig. 20 The histograms of weights of the two large sub-groups of secondary-phase porcupine sceattas.

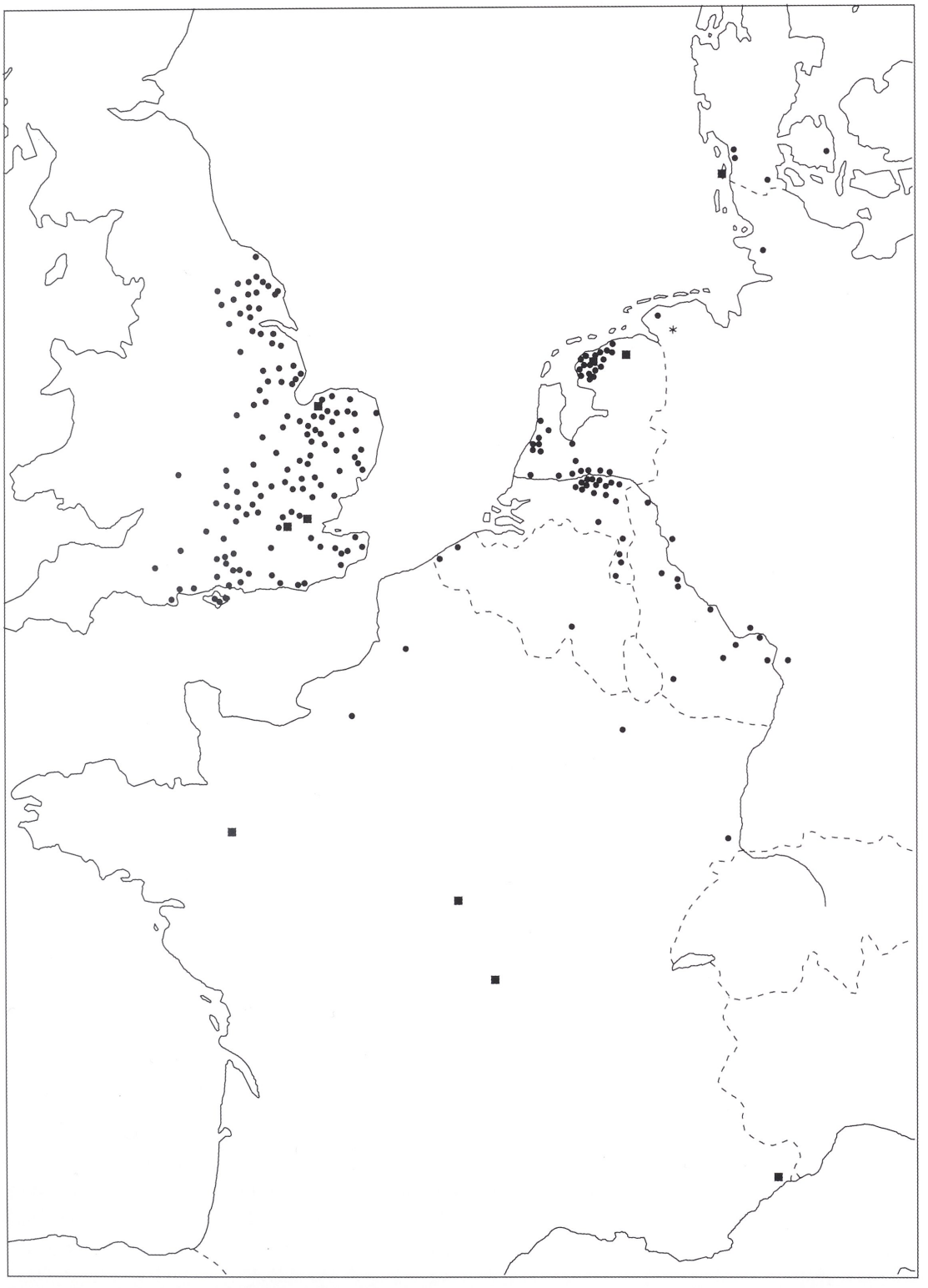


Fig. 21 Map of provenances of secondary-phase porcupine sceattas. Each dot represents the find-spot of one or more coins, squares indicate hoards. This is a newly drawn map for this publication, the data are from METCALF, OP DEN VELDE (2010).

took place on a considerable scale. The replacement of the continental runic type sceattas by a Frisian porcupine variety around 715–720 reflects the changes in political power in the north and the south of the Netherlands in the first quarter of the 8th century.

	number of non-singletons		number
Pair	81	162	
Triplet	31	93	
Chain of four	7	28	
Chain of 5	3		
Chain of 7	1		530-536
Chain of 8	1		322-329
Chain of 9	2		469-477, 501-509
Chain of 19	1		693-711
Chain of 29	1		714-742
Chain of 37	1		655-691
Total		$\sum = 416$	

Tab. IV Die-linked coins in the Kloster Barthe hoard.

The Composition of the Kloster Barthe Hoard

The 798 preserved coins of the Barthe hoard belong exclusively to Series E, commonly named porcupine/standard sceattas. The vast majority are sceattas struck during the secondary phase (c. 720 – 740). A handful are specimens (Nr. 1–24) of varieties manufactured during the primary phase (c. 695 – 715/720). They must have been in circulation for a longer period before they were added to the treasure. On inspection they show clear traces of longer use, such as blurring of details due to wearing. For some of them it is difficult to establish if they are imitations, made at later dates.

There is just one specimen of BMC Type 53, the 'stepped cross' variety *(Nr. 24, fig. 22)*. The reverse shows, instead of the usual standard, a distinctive cruciform design. To judge by the purity of the alloy of the Type, normally 90–94 percent silver, it is of primary date. This type was possibly produced during the final stage of the primary phase. The mint-attribution of Type 53 turned out to be difficult. In spite of its being known predominantly from English finds, there is no English region with an obvious concentration of the type. If it is not English, that points to a mint on the Continent. The scarce finds from the Netherlands could be consistent with a mint in the region of the big rivers, but the evidence is flimsy and the co-existence of two designs in the region would be problematic. Given several finds in France, where finds of porcupine sceattas are very limited, Type 53 is tentatively attributed to northern France or the upper Meuse basin (Metcalf, Op den Velde 2009/2010, 226–239).

Fig. 22 The only coin of the 'stepped cross' variety (BMC Type 53) in the hoard. (Metcalf, Op den Velde 2009).

The Kloster Barthe hoard coins contain many die-duplicates (coins struck from the same pair of dies) and die-linked specimens (one of the sides struck from the same die) *(tab. IV)*. In a freely mixed coin circulation where coins often changed from hand to hand in many small and larger transactions, the chance that die-identical coins stayed together or later were reunited

hoard	number of porcupines		non-singletons	
	primary phase	secondary phase	number	percentage
Aston Rowant	70	0	13	18.6 %
Lutje-Saaksum	1	23	2	8.3 %
"Franceschi parcel"	1	34	2	5.7 %
Hallum	0	13	0	
De Meern	5	114	37	31.1 %
Woodham Walter	9	12	0	
Kloster Barthe	*19*	*770*	*415*	*52.7 %*

Tab. V Non-singleton porcupine sceattas in hoards.

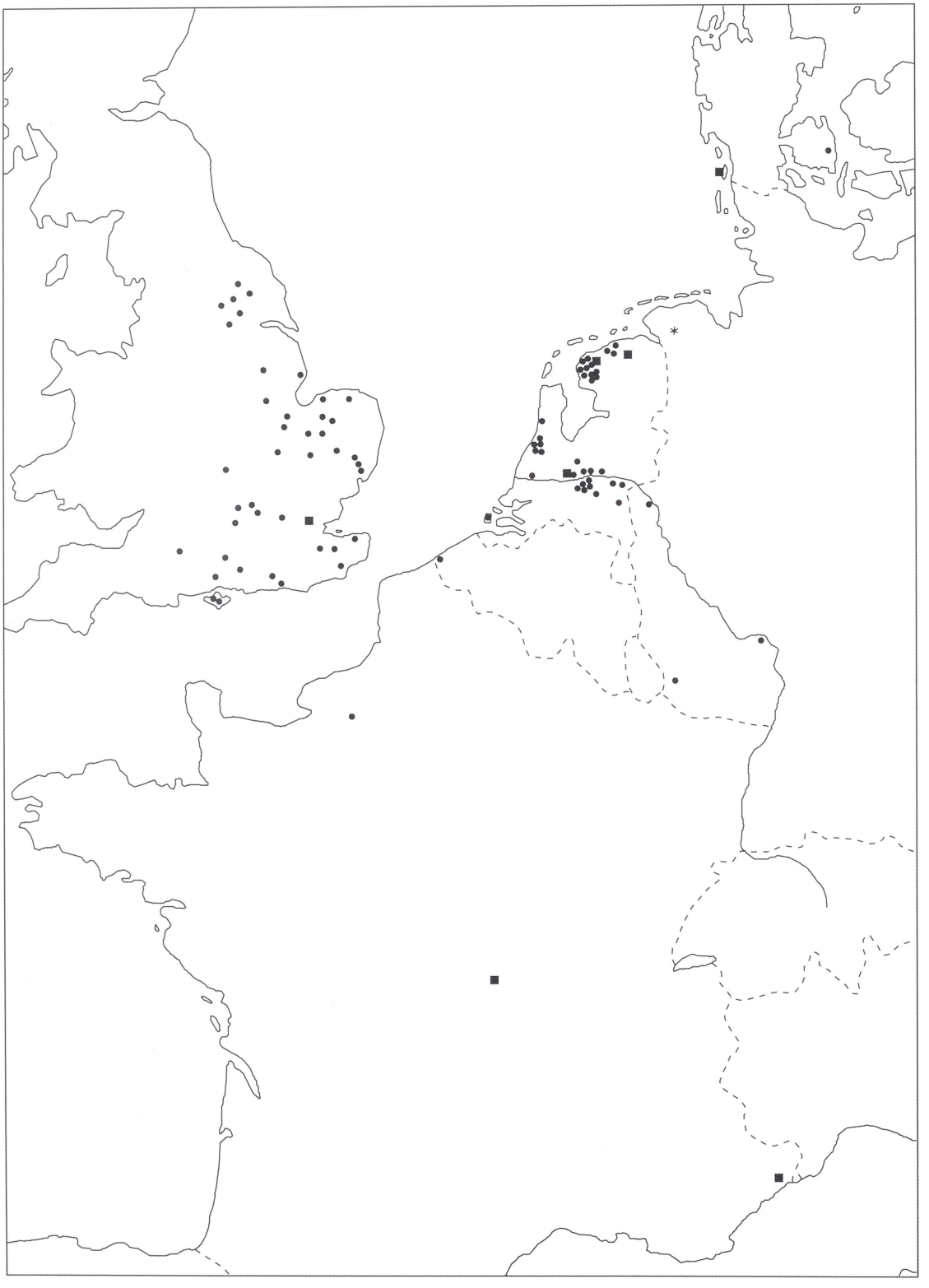


Fig. 23 Map of provenances of coins die-linked to sceattas in the Kloster Barthe hoard. Each dot represents the find-spot of one or more coins, squares indicate hoards (source: Appendix I). Compare with *figure 21*.

is small. On the beach at Domburg between 1647 and 1938, in particular after heavy gales, many antiquities including around a thousand sceattas were recovered. The 314 porcupine/standard sceattas from Domburg

beach include 12 die-linked pairs and 3 die-linked triplets (tertiary-phase porcupine sceattas excluded). So the percentage of non-singletons for the Domburg productive site is 36/314 or 11.5 percent. This seems to be a fair reflection of a randomly well-mixed currency from the 8th century. For the Kloster Barthe hoard, in sharp contrast, the percentage of non-singletons is 416/789 = 52.7 percent *(see tab. V)*.

The long skeins of die-linked sceattas in the Kloster Barthe find indicate that these coins were obtained shortly after they had left the mint. There has been no time for them to become dispersed in circulation. They have to be considered as the most recently struck sceattas in the hoard. This is corroborated by their conservation: they look indeed to be new. The find distribution of die-linked coins offers insight in the dispersion of the coinage. Provenances of specimens from other hoards and stray-finds die-linked to coins of the Kloster-Barthe hoard are given in Appendix I. They are plotted in *figure 23*.

After the description of coins present in the hoard, it is also of interest to discuss what is lacking in it. During the time of production of the 'porcupines' there were other coin types in circulation. The Hallum, De Meern, Franeker and Föhr hoard all contain a few Merovingian deniers struck in the Frankish realm. They made up around five percent of the circulating coins in the Netherlands around 730 *(fig. 24)*.

Also absent in the Kloster Barthe hoard are English sceattas of the primary and secondary phase, which in modest quantities penetrated the coin circulation in the Netherlands. The far from rare Wodan/monster type, a sceatta type manufactured in Denmark, but often found in England and the Netherlands, is not present (Metcalf 2002. Feveile 2008). Also the hexagram type (old names "Herstal" type or "Star of David" type), probably minted in the upper Meuse valley, is absent. This points to a deliberate selection by the owner of the Kloster Barthe hoard who apparently only took porcupines out from the circulating money and perhaps mistrusted other types. Or maybe it was a travelling merchant, going from or to Denmark, knowing that his customers accepted only porcupines.

Fig. 24 Coin types circulating around 740 but absent in the Kloster Barthe hoard. Above Merovingian deniers of Paris (left) and Poitiers (right). Below left a Wodan/monster sceat and right the hexagram type. (Dirks 1870. De Belfort 1892/1895).

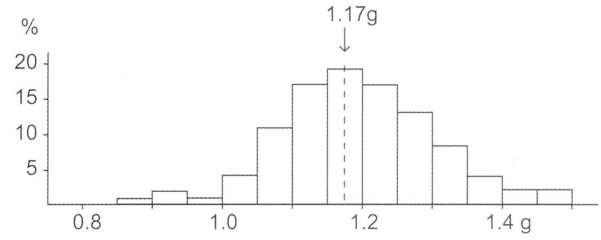


Fig. 25 The histogram of weights of all sceattas in the Kloster Barthe hoard.

The porcupine varieties B, E and F of the tertiary phase, are absent and were doubtless not yet in production at the time of assembly of the Kloster Barthe treasure *(fig. 11)*.

The weights

The degree of conservation of the coins in the Kloster Barthe hoard is very good. Probably because they were kept in a jar, they hardly suffered from corrosion during their long stay in the ground. We presume that their weights are almost unchanged since they were buried. Therefore they are a very suitable sample for metrological analysis.

The weight range is rather broad, from 0.82 to 1.54 g. The histogram *(fig. 25)* shows a characteristic bell-shaped curve with a median value of 1.17 g. The weights in figure 20 make clear that the secondary-phase porcupines have different weight standards. The group with a ToT / \ reverse (sub-varieties b, c, and d, manufactured in the Big Rivers region and Domburg) have a mean weight of 1.17 g, and for the group with a 'mixed grill' reverse (sub-varieties e, f, g, and h) this is 1.24 g. Furthermore, the 'mixed grill' groups are more carefully weight-adjusted, the curve in the histograms is steeper. These histograms are based on samples of coins that were manufactured over a period of some twenty years. It is not improbable that during this time the weight standards and tolerance of deviations fluctuated.

The presence of groups of die-identical coins *(tab. IV)* offers the possibility to see what was in production at a particular date, because they were in all likelihood minted shortly before they were added to the hoard. The histograms of the samples of die-duplicates show a sharp peak but also outliers of 0.91 – 1.54, and 1.08 – 1.48 g *(fig. 26)*. If batches of coins were delivered by the mints by weight and not by number, a variable

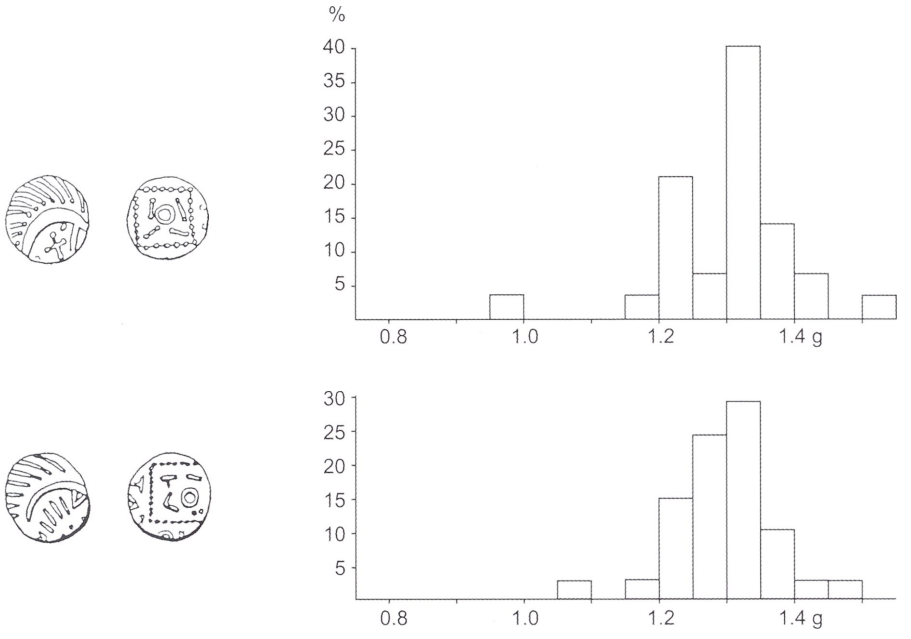


Fig. 26 The histograms of weights of two long chains of die-duplicate sceattas.

weight per coin was not a problem. And if larger monetary transactions were paid by weighing the sum of money, who would care? If this was indeed the common practice, it also explains that sceattas manufactured in two regions, struck on a different weight standard, were accepted and mixed without problems in the circulation of both these regions and abroad.

The large size of the Kloster Barthe hoard also allows us to study the weights of the sub-varieties of the main groups of porcupine sceattas from the secondary phase *(fig. 27; 28)*. The sub-varieties b, c, and d are characterized by a step-wise deviation from the initial design, the sub-varieties e, f, g, and h have a 'mixed grill' reverse in common, combined with different obverse designs (Metcalf, Op den Velde 2009/10, 27–51).

The date of concealment

The date of burial of a coin deposit can be deduced from the latest dateable coin (the terminus post quem). However, none of the specimens in the Kloster Barthe hoard is independently dateable. Because all porcupine varieties and sub-varieties of the secondary phase are present in it and secondary porcupines were still in production, given the presence of chains of die-linked coins, the burial must have taken place in the final years of the secondary phase. Based on the comparison of hoards with independently dateable coins and porcupine sceattas, the secondary phase lasted from c. 720 to c. 740. So the date of concealment will have been somewhere between 730 and c. 740.

Speculations about the owner of the hoard

The value of the Kloster Barthe hoard converted to modern currency is difficult to estimate. In the Lex Frisionum, a collection of law codes compiled c. 790, the normal "wergeld" to be paid to the heirs of a murdered free Frisian man by the perpetrator or his kin (in order to buy off capital punishment) was equivalent to approximately 1.6 g of fine silver in coins (Henstra

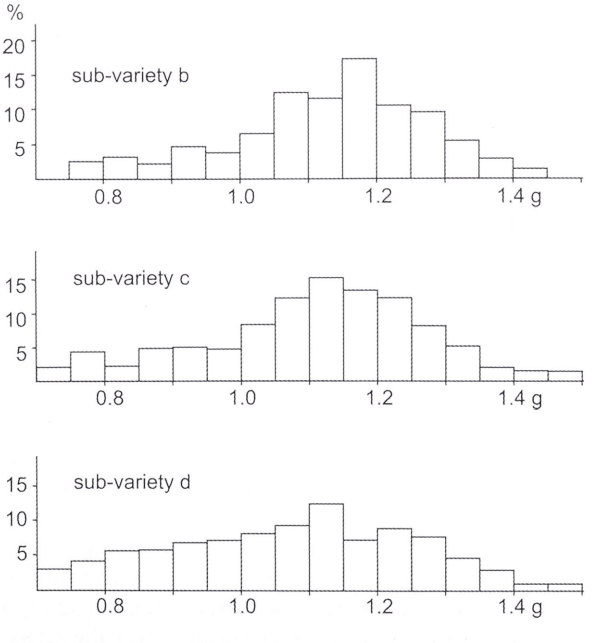


Fig. 27 The histograms of weights of the sub-varieties b–d.

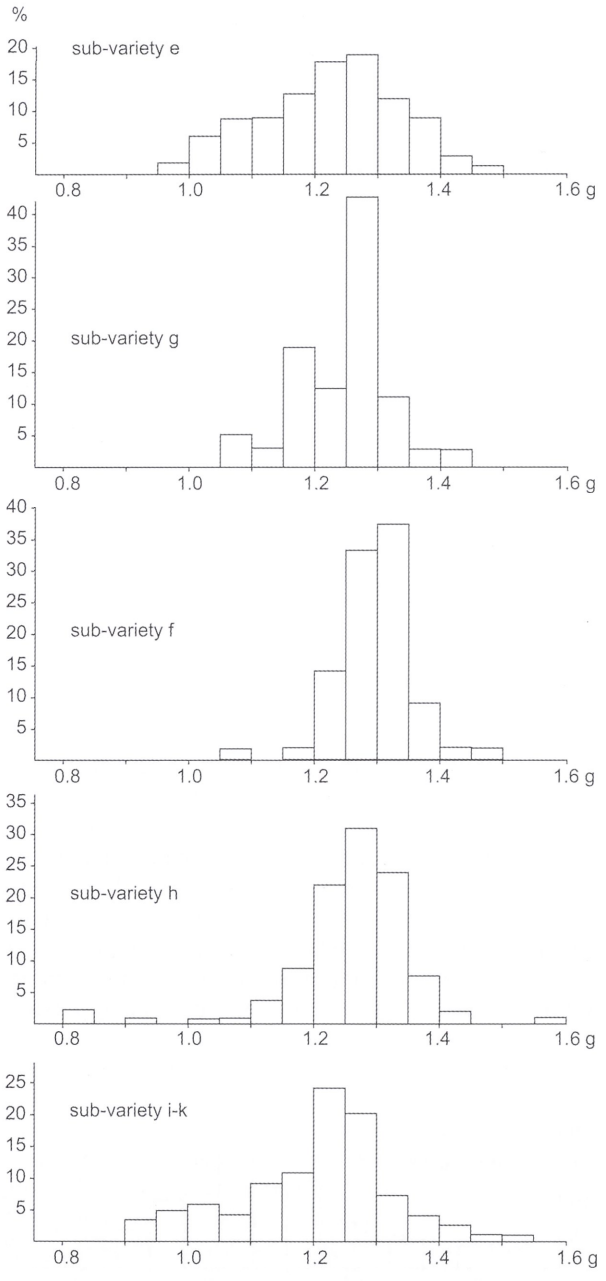


Fig. 28 The histograms of weights of the sub-varieties e–k.

2000, 263). So the hoard seems to represent a considerable sum of money. It is tempting to speculate about the background and its owner.

The accidental loss of such a large sum of money is improbable. Perhaps a local wealthy inhabitant hid his savings in the ground. That the money was probably put away in a container makes this likely. However, in that case the large number of new (die-linked and recently struck) coins in the treasure is difficult to explain. A surplus of money, collected over the years, would more likely contain various older and more recent coin types. Furthermore, in the vicinity of the Kloster Barthe hoard no stray-finds of sceattas are reported, so it is unproven that sceattas were in use there.

Another possibility is that the money buried there belonged to a traveller, who was en route between the north of the Low Countries and Denmark, where Ribe was an important trading place. One can imagine that he had to spend the night in the open field and that he hid his money in the ground to save it from robbery and plunder. However, a leather purse would have been more convenient for a traveller than a breakable ceramic container, unless he used the jar only for the hiding. Natural or violent death or flight for imminent danger must then have prevented recovery of the treasure. This traveller was possibly not a local inhabitant, but more likely a merchant, who had received the money in a few larger transactions with other entrepreneurs, and who had discarded current coin types that he mistrusted. If this supposition is correct, we will probably never know why he travelled overland and not by coastal shipping. It may be assumed that he came from the Frisian terpen area; the number of southern sub-varieties in the hoard is 332 and of northern sub-varieties 295 *(see table II)*. So the porcupine sub-varieties in his possession show a typical Frisian ratio. If he came from the Big Rivers region and had collected his money there, a more southern complexion of his money was to be expected. However, it is also possible that East Frisia was a part of a northern monetary unit and that the hoard was locally assembled. Stray-finds are needed to validate this hypothesis. Still another, although less likely possibility is that the money was deliberately buried as a ritual offering gift with religious background (Van Vilsteren 2000).

The hoard seen in the light of the archaeological context

The question remains, how the hoard fits into the archaeological findings on the early medieval inhabitation of the Hesel region. From an archaeological perspective is a treasure, be it ever so materially valuable, only a means to enlighten an obscure chapter in the history of the settlement. Was there a connection with the assumed settlement Birgithi – mentioned in the Werden land register – from which probably the name Barthe is derived? As said above, the excavations in the area of the monastery have not revealed traces of an old settlement (Bärenfänger 1997) which does not exclude that it may have perhaps been located in the immediate vicinity. A different picture emerged south of Hesel, where settlement remains were found, which should be regarded as remnants of a total of 13 early-medieval farmsteads (Bärenfänger 1998, 45 ff.) Remarkable is the uniformity in the configuration of their houses, with a square storage place, haystack (Ruten-

berg) and wells. In particular the almost identical dimensions of the crop storage with a 45 to 55 m^2 surface area suggests a rather uniform economic strength of each yard. It is also striking that these homesteads were abandoned after at most two generations, to be relocated to their current location near Hesel. This argues for a simultaneous, well planned settlement which initially took place at an unfavourable location and therefore had to be translocated soon thereafter.

The sceatta hoard and certainly the farmstead remains south of present-day's Hesel are concrete evidence of habitation of the Geest (rich loamy soil) region after an interruption of more than 1200 years. The available archaeological and scientific dating suggest that the farms were built in the middle or at the end of the 8th century. They are thus from at least one, possibly two generations later than the supposed date of hiding of the sceatta hoard (between 730 and 740). However, a relationship may still exist: the area of Frisian high Geest for a long time uninhabited was certainly already traversed by trade routes, as the Barthe hoard indicates, if it is interpreted as a merchant's money. At the latest by the middle of the 8th century there must have been a distribution of property in some areas that led to a planned development of the region. It can only be speculated whether merchants, who came in contact with the prosperous farmers in the marsh and Geest edge, have played a role, or even acquired property themselves. In any case the farms in Hesel ensured that the forests were cleared, parcels were planned and suitable agricultural land was developed. Pollen analysis has shown that a transformation to heathland took place. So behind the colonization of this ground could have been a landowner who was involved with the concealment of sceatta hoard. It seems that this area, after a long period of annexation and dispossession, was developed in order to attract foreign settlers and finally provide them with equal parcels of land. The relocation of the settlement, which soon became necessary, shows clearly that this is initially due to insufficient knowledge of the local soil conditions. A „grand" hand of some sort must have been behind these processes, because otherwise it cannot be explained how Werden Abbey, founded by the Frisian missionary Liudger, could acquire the taxable possession of Hasla and Birgithi so quickly. This was in all likelihood only possible if adequate accessibility to the property ownership had been available.

Further understanding of these issues will probably only be possible, when the associated burial fields belonging to the settlement have been discovered, and when their examination offers more detailed information on the local social structure in the 7th and 8th centuries. Meanwhile it remains memorable that it is precisely such a substantial treasure, the largest of the early Middle Ages in Lower Saxony, that stands at the beginning of the re-colonization of the central East Frisian Geest area. The sceattas remain small stones in a large mosaic which certainly does not yet provide a more complete picture of the settlement history.

Comparable finds

The composition of the Lutje-Saaksum hoard of 27 porcupine sceattas (Hill 1955. Hill, Sharples 1973/74) is comparable to that of the Barthe hoard. There is one primary-phase porcupine, the rest are secondary-phase varieties. The ratio southern : northern sub-varieties is 73.7 : 26.3 and differs from the Kloster-Barthe hoard *(compare tab. II)*. The poorly recorded and undated find of 17 sceattas at Norden, all porcupines, may be added to the list of similar finds, although it might have been a part of the Kloster Barthe find. A group of 74 porcupine sceattas, of which the four illustrated specimens fit well into the pattern of the Barthe hoard, were in the possession of the Dutch collector J. Stephanik. His collection was auctioned in 1904; their present whereabouts are unknown (Auction Muller 1904). The origin is uncertain, it might have been (part of) a hoard of which the find-spot is not recorded. According to the brief description in the catalogue, all these sceattas were found in the Dutch province Friesland.

The origin of 35 porcupine sceattas sold in 1966 by the Brussels coin dealer M. Franceschi is equally obscure. The types and their conservation are very similar to the Kloster Barthe hoard coins. Franceschi aquired them from a collector who was understood to have had it for a long time (Metcalf 1969. Berger, Stoess 1988. Metcalf, Op den Velde 2009/2010, 285). In 1949 in an Antwerp sale appeared a small cardboard box containing at least one hundred sceattas. On the box was written "found in Duffel", but further information is lacking and their history after 1949 is unknown. It is not impossible that the Franceschi parcel is a part of this find, but a connection with the Kloster Barthe hoard has been put forward in the past (Berger, Stoess 1988).

During construction work close to the remains of an old Roman castellum near De Meern, west of Utrecht, in an old silted-up tributary of the Old Rhine, 123 sceattas were found, of which 119 were porcupines (Graafstal, Pol 2004. Metcalf, Op den Velde 2009/2010, 287). In general the conservation of these coins is poorer compared to those of the Kloster Barthe and Lutje-Saaksum hoards and the Franceschi and Stephanik parcels. In 2011 a hoard of containing 61 porcupine sceattas was found in the Big Rivers region of the Netherlands at Cothen, 2 km north-west of Wijk-bij-Duurstede (personal communication by A. Pol). We had not yet the possibility to examine these coins.

The Importance of the Kloster Barthe Hoard

This hoard is in the year 2012 still the largest recorded closed depot of sceattas ever found. Other sizeable hoards are the Franeker hoard (1868) of c. 412 sceattas, the Aston Rowant hoard (1971) of at least 380 sceattas, and the Hallum hoard (1860) with at least 223 sceattas, but mainly Wodan-monster types. Only the Nice-Cimiez hoard (1850), almost contemporary with the Kloster Barthe hoard, was larger, over 2,000 coins, mainly Merovingian deniers and some 35 sceattas.

The Kloster Barthe hoard offers a detailed picture of money that was in use in the second quarter of the 8th century. The excellent state of conservation of the coins allows die-comparison, stylistic analysis and technical study of the coins. The metrology, the shape of the flans and the positioning of the dies during the striking give insights into the production process and the tolerance of differences in the minting practise. The relative chronology of the porcupine sub-varieties can be refined by study of the number of non-singletons in each sub-group.

Metrological study of die-duplicate groups indicates that larger monetary transactions were probably made by weight instead of counting the number of coins and that during the secondary phase (c. 720 – c. 740) there was no decrease in the weight standard.

Finally, the distribution pattern of related and die-linked finds give insight into the commercial contacts in western Europe during the 8th century. In particular substantial imports from England to the Netherlands took place. Unfortunately, due to lack of financial resources, an examination of the alloy composition of the coins was not feasible at the time of this publication. A programme of reliable non-destructive metal analyses of a careful selection from the hoard, at least including series of die-duplicates and obvious imitations, is a desideratum for the future.

Acknowledgements

The analysis of the excavations at the deserted monastery "Kloster Barthe" soon led the way to Emden, to inspect the coins of the hoard kept in the Ostfriesisches Landesmuseum. In an enjoyable collaboration spread over many years we have exchanged ideas, back and forth, and collected the necessary information. While the photographic documentation of the coins took place back in 2005, the evaluation dragged on due to other commitments. Meanwhile Gerhard Kronsweide, Ostfriesische Landschaft, never lost sight of the project and he painstakingly designed and created the plates of the coins.

We wish to express our gratitude to the colleagues and friends who helped us by displaying their interest and with their generous practical support. The inventory and photographic evidence prepared by Prof. Dr. Peter Berghaus paved the way for this study. Dr. Helmut Eichhorn, former director of the Ostfriesisches Landesmuseum, Emden, allowed the examination of some of the 752 coins from the hoard which were stored in an ancient vault. His successor in office, Dr. Friedrich Scheele, granted permission to photograph and publish the entire find complex. He also made sure that the coins were given a permanent place in the museum's permanent exhibition. Dr. Hans Peter Glimme and Dr. Wolfgang Jahn, staff members of the Ostfriesisches Landesmusem, searched through the protocols of the Gesellschaft für Bildende Kunst und väterländische Geschichte zu Emden to find out more about the find circumstances and the acquisition of the sceattas in the 19th century. Dr. Peter Ilisch provided additional information and scans of the coins from the Kloster Barthe hoard in the collection of the LWL- Landesmuseum für Kunst und Kulturgeschichte Münster. Photographs of the sceattas from the hoard, kept in the Manchester Art Gallery, were received from Dr. Keith Sugden. Dr. Jens Christian Moesgaard kindly granted permission to include photographs of the Kloster Barthe sceattas kept in the National Museum Copenhagen. Prof. Dr. Wolfgang Leschhorn did so for the coins in the collection of the Herzog Anton Ulrich Museum in Braunschweig and supplied further details. We are indebted to Prof. Dr. Bernd Kluge, Münzkabinett der Staatlichen Museen zu Berlin, for permission to include the sceattas from the collection Grote, acquired by the Museum in 1879.

We thank in particular Prof. Michael Metcalf for his critical reading of the manuscript and his comments and revisions. Finally we express our high recognition for the sisyphean task of finishing the plates of photographs patiently complemented by Gerhard Kronsweide.

References:

Auction F. Muller and Cie. 1904: Collection Stephanik. Amsterdam 1904.

Bärenfänger, R. 1997: Aus der Geschichte der Wüstung „Kloster Barthe", Landkreis Leer, Ostfriesland. Ergebnisse der archäologischen Untersuchungen in den Jahren 1988 bis 1992. Probleme der Küstenforschung im südlichen Nordseegebiet 24, 1997, 9–252.

Bärenfänger, R. 1998: Von der Steinzeit bis zum Mittelalter: Ergebnisse archäologischer Forschung in Hesel. In: Gemeinde Hesel (Hrsg.), Hesel – Wüste Fläche, dürre Wildnis und magere Heidepflanzen. Der Weg eines Bauerndorfes in die Moderne. Weener 1998, 19–72.

Bärenfänger, R. 2004: Der anglo-friesische Sceatta-Hort von Hesel. Archäologie in Niedersachsen 7, 2004, 45–47.

Berger, F., Stoess, C. (Eds.) 1988: Die Fundmünzen der römischen Zeit in Deutschland 7. Niedersachsen und Bremen 1–3. Osnabrück – Aurich – Oldenburg. Berlin 1998.

Berghaus, P. 1952: Hermann Grote als Sammler und Gelehrter. Festschrift H. Grote 1802–1895. Münster 1952, 10.

Berghaus, P. 1958: Die ostfriesischen Münzfunde. Jahrbuch der Gesellschaft für bildende Kunst und vaterländische Altertümer zu Emden 38, 1958, 9–73.

Berghaus, P. 1980: Les monnaies mérovingiennes du musée de Munster. In: R. Bastien, H. Huvelin, C. Morrison (Eds.): Mélanges de numismatique d'archéologie et histoire offerts à J. Lafaurie. Paris 1980. 171–173.

Boeles, P.C.J.A. 1951: Friesland tot de elfde eeuw. 's-Gravenhage 1951.

Brady, J.D. 1982: Ancient British, Anglo-Saxon and Norman Coins. American Collections. Sylloge of Coins of the British Isles 30. London 1982.

Cartier, E. 1839: Lettres sur l'histoire monétaire de France VII. Nouvelles considérations sur les monnaies mérovingiennes. Revue Numismatique 1839, 417–419.

De Belfort, A. 1892/1985: Description générale des monnaies mérovingiennes. 5 Vols. Paris 1892 (Reprinted 1985).

Dhénin, M. 1987: Homotypies anachroniques. In: C. Bemont, Chr. Delplace, B. Fischer, K. Gruel, Chr. Peyre, J.-C. Richard (Eds.), Mélanges offerts au docteur J.-B. Colbert de Beaulieu. Paris 1987, 311–314.

Dirks, J. 1870: Les Anglo-Saxons et leurs petit deniers dits sceattas. Revue belge de numismatique 1870, 81–128, 269–320, 387–409, 521–541. (Reprinted as a book).

Engel, A., Serrure, R. 1891: Traité de numismatique du moyen âge 1. Paris 1891.

Erbstein, J., Erbstein, A. 1870: Die Schellhass'sche Münzsammlung. Dresden 1870.

Feveile, C. 2008: Series X and coin circulation in Ribe. Studies in Early Medieval Coinage 1, 2008, 53–68.

Glaster, G. 1964: Ancient British and Anglo-Saxon Coins I. National Museum Copenhagen. Sylloge of Coins of the British Isles 4. London 1964.

Gannon, A. 2003: The Iconography of Early Anglo-Saxon Coinage: Sixth to Eighth Centuries. Oxford 2003, 14–17; 170–181.

Gannon, A. in press: Early Anglo-Saxon Coins and Continental Silver Coins of the North Sea, c. 600 – 780. Anglo-Saxon Coins I. British Museum. Sylloge of Coins of the British Isles 63. London [in press].

Grierson, P., Blackburn, M. 1986: Medieval European Coinage. 1. The early Middle Ages (5th – 10th centuries). Cambridge 1986.

Henstra, D.J. 2000: The Evolution of the Money Standard in Medieval Frisia. A treatise on the history of the systems of money of account in the former Frisia (c. 600 – c. 1500). Thesis, Groningen 2000.

Hill, D. 1977a: The 'Hanover' hoard of porcupine sceattas. Numismatic Chronicle 17, 1977, 137.

Hill, D. 1977b: Die-adjustment in the Wodan/monster series of sceattas. Numismatic Chronicle 17, 1977, 171–172.

Hill P.V. 1953: Uncatalogued sceattas in the national and other collections. Numismatic Chronicle 13, 1953, 92–114.

Keary, C.F. 1887: A Catalogue of English Coins in the British Museum. Anglo-Saxon Series 1. London 1887 (Reprinted London 1974).

Kluge, B. 1987: Anglo-Saxon, Anglo-Norman and Hiberno-Norse Coins. State Museum Berlin. Sylloge of Coins of the British Isles 36. London 1987.

Lelewel, J. 1835: Numismatique du moyen-âge, considérée sous le rapport du type. Paris 1835.

Metcalf, D.M. 1966: A stylistic analyses of the 'porcupine' sceattas. Numismatic Chronicle 6, 1966, 179–205.

Metcalf, D.M 1969: A hoard of "porcupine" sceattas. American Numismatic Society Museum Notes 115, 1969, 101–118.

Metcalf, D.M. 1993a: Thrymsas and Sceattas in the Ashmolean Museum Oxford 1. Thrymsas and primary sceattas. London 1993.

Metcalf, D.M. 1993b: Thrymsas and Sceattas in the Ashmolean Museum Oxford 2. Continental sceattas. London 1993.

Metcalf, D.M. 1994: Thrymsas and Sceattas in the Ashmolean Museum Oxford 3. Secondary Sceattas. London 1994.

Metcalf, D.M. 2002: Single finds of Wodan/monster sceattas in England and their interpretation for monetary history. Nordisk Numismatisk Årsskrift 2002, 109–148.

Metcalf, D.M., Op den Velde, W. 2009/2010: The Monetary Economy of the Netherlands c. 695 – c. 760 and the Trade with England: A Study of the 'Porcupine' Sceattas of Series E. Vol. I, II. Jaarboek voor Munt- en Penningkunde 96, 2009; 97, 2010.

Mikolajczyk, A. 1987: Anglo-Saxon and Later Medieval British Coins. Polish Museums. Sylloge of Coins of the British Isles 37. London 1987.

Op den Velde, W., Metcalf, D.M. 2003: The monetary economy of the Netherlands, c. 690 – c. 715 and the trade with England: a study of the sceattas of Series D. Jaarboek voor Munt- en Penningkunde 90, 2003, 1–209.

Op den Velde, W., Klassen, C. 2004: Sceattas and Merovingian deniers from Domburg and Westenschouwen. Middelburg 2004.

Potin, V.M. 1999: Anglo-Saxon Coins to 1016. Hermitage Museum, St. Petersburg. Sylloge of Coins of the British Isles 50. London 1999.

Rethaan-Macaré, C.A 1838: Verhandeling over de bij Domburg gevondene munten. Middelburg 1838 (reprinted by the Zeeuwsch Genootschap 1992).

Rethaan-Macaré, C.A. 1856: Tweede verhandeling over de bij Domburg gevondene munten. Middelburg 1856 (reprinted by the Zeeuwsch Genootschap 1992).

Richardson, T. 1984: The Manchester Hoard of sceattas and a group of sceattas from Manchester City Art Gallery. In: D. Hill, D.M. Metcalf (Eds.), Sceattas in England and on the Continent. The Seventh Oxford Symposium on Coinage and Monetary History. British Archaeological Reports, British Series 128. Oxford 1984, 217–222.

Rigold, S.E. 1960/1961: The two primary series of sceattas. British Numismatic Journal 30, 1960/1961, 6–33.

Rigold, S.E. 1966: The two primary series of sceattas. Addenda and Corrigenda. British Numismatic Journal 35, 1966, 1–6.

Ruding, R. 1840: Annals of the Coinage of Great Britain and its Dependencies. London 1840.

Stewart, I. 1984: The early English denarial coinage. In: D. Hill, D.M. Metcalf (Eds.), Sceattas in England and on the Continent. The Seventh Oxford Symposium on Coinage and Monetary History. British Archaeological Reports, British Series 128. Oxford 1984, 5–26.

Sutherland, C.V.H 1942: Anglo-Saxon sceattas in England: Their origin, chronology and distribution. Numismatic Chronicle 2, 1942, 42–70.

Van Vilsteren, V.T. 1980: Hidden, but not intended to be recovered. An alternative approach to hoards of medieval coins. Jaarboek voor Munt- en Penningkunde 87, 1980, 51–64.

Wessels, P. 1998: Hesel – Wüste Fläche, dürre Wildnis und magere Heidepflanzen. Der Weg eines Bauerndorfes in die Moderne. In: Gemeinde Hesel (Hrsg.) Hesel – Wüste Fläche, dürre Wildnis und magere Heidepflanzen. Der Weg eines Bauerndorfes in die Moderne. Weener 1998, 73–515.

APPENDIX I: COINS DIE-LINKED TO KLOSTER BARTHE

GERMANY

MAINZ	1
NORDEN?	1?
TRIER	1
XANTEN	1

DENMARK

FÖHR hoard	1
GUDME	1

NETHERLANDS

Northern

BOER (Fr)	1
HALLUM (Fr) hoard	5
JORWERD (Fr)	1
KLOOSTER LIDLUM (Fr)	1
LUTJE SAAKSUM (Gr) hoard	11
MIDLUM (Fr)	1
OOSTERBIERUM (Fr)	1
PEINS (Fr)	1
SCHALSUM (Fr)	1
SLAPPETERP (Fr)	1
WIJNALDUM (Fr)	2

Southern

DE MEERN (U) hoard	50
DOMBURG (Z)	38
HOUTEN (U)	2
KATWIJK (ZH)	1
MAURIK (Gld)	1
OMMEREN (Gld)	1
RIJSWIJK (Gld)	2
WIJK-BIJ-DUURSTEDE (U)	3
IJZENDOORN (Gld)	2

BELGIUM

Flemish coast	1

FRANCE

BAIS hoard	1
NICE-CIMIEZ hoard	5
ROUEN	1

ENGLAND

Northern

BIELBY (ERY)	1
NEWBALD (ERY)	1
OSBALDWICK (NRY)	1
YORK	1
Yorkshire	1

Central

ASTON ROWANT (O) hoard	1
BASSINGBOURNE (C)	1
Bedford (Bd) p.s.	1
BEDFORD-ON-AVON (Wa)	1
BINSEY (O)	1
Cambridgeshire	2
COMPTON (Brk)	1
EWELME (O)	1
LINTON (C)	1
Oxfordshire	1
REMENHAM (Brk)	1
SANDY (Bd)	1
STANTON ST JOHN (O)	1
UPTON (O)	1
WEST WYCOMBE (Bk)	1

East coast

BARHAM (Sf)	1
BASTON (L)	1
DENNINGTON (Sf)	1
DUNNINGTON (Sf)	1

EAST TILBURY (Ess)	1
Essex	4
GREAT GLEMHAM (Sf)	1
GRIMSTON (Nf)	1
HOLME NEXT THE SEA (Nf)	1
KELLING (Nf)	2
LITTLE THURLOW (Sf)	1
MERTON (Nf)	1
SLEAFORD (L)	2
SPALDING (L) p.s.	5
SPORLE (Nf)	1
SCUNTHORPE (L)	1
SUDBOURNE (Sf)	1
THELNETHAM (Sf)	1
TORKSEY (L)	1
WOODHAM WALTER (Ess) hoard	4
WORMEGAY (Nf)	1
South coast	
ALDINGTON (K)	1
AYLESFORD (K)	1
CARISBROOKE (Wt)	3
EASTON (Ha)	1
Hampshire	1
Isle of Wight	1
OLD ROMNEY (K)	1
RECULVER (K)	1
SOUTHAMPTON (Ha)	1
TELSCOMBE (Sx)	1
WEST ASHTON (W)	1

Catalogue

Abbreviations

AUMB	Herzog Anton Ulrich-Museum Braunschweig
BeM	Staatliche Museen zu Berlin
BMC	British Museum Catalogue
CM	National Museum Copenhagen
ELM	Ostfriesisches Landesmuseum Emden
MCAG	Manchester Art Gallery
SCBI	Sylloge of Coins of the British Isles
WLMM	LWL-Landesmuseum für Kunst und Kulturgeschichte, Münster
Corpus	Metcalf and Op den Velde (2010)

Plate 1

Primary Phase Porcupine Types

'Plumed bird' Variety. BMC type 6

1 1.27 g Rev. Var. L. Corpus 0018; ELM 737
2 1.32 g Rev. Var. L. Corpus 0019; ELM 738
3 1.30 g Rev. Var. K. Corpus 0067; MCAG. Richardson (1984) pl 12-3; SCBI 48-152

VICO Varieties

4 1.36 g Variety VICO 1. Corpus 0210; ELM 641
5 1.30 g Variety VICO 1. Corpus 0215; ELM 612
6 1.00 g Variety VICO 1. Corpus 0209; ELM 572
7 1.30 g Variety VICO 1. Corpus 0196; ELM 44
8 1.33 g VICO variety imitation. Corpus 0324; ELM 367
9 1.16 g VICO variety imitation. Corpus 0322; ELM 129
10 1.37 g VICO variety imitation. Corpus 0334; ELM 643
11 1.19 g VICO variety imitation. Corpus 0335; ELM 518

Porcupine/standard type Metcalf variety G

12 1.23 g Variety G1. Corpus 0358; ELM 625
13 1.24 g Variety G1. Corpus 0347; AUMB 162-9
14 0.98 g Variety G1. Corpus 0372; CM SCBI 4-34
15 1.16 g Variety G imitation. Corpus 0619; ELM 129
16 1.33 g Variety G imitation. Corpus 0618; ELM 626
17 1.21 g Variety G imitation. Corpus 0600; ELM 289
18 1.28 g Variety G imitation. Corpus 0599; ELM 288

Porcupine/standard Type Metcalf Variety D

19 1.23 g Corpus 0699; ELM 481
20 1.37 g Corpus 0665. AUMB 162.11

Plate 2

21 1.28 g Corpus 0657; ELM 430
22 1.12 g Corpus 0643; ELM 368
23 1.26 g Corpus 0662; ELM 481

'Stepped cross' type. BMC type 53

24 1.26 g Possibly imitative. Corpus 3518; ELM 694

Secondary Phase Porcupine Types

25 1.33 g sub-variety a. Corpus 0717; ELM 378
26 1.05 g sub-variety a. Corpus 0718; ELM 432
27 1.41 g sub-variety a. Corpus 0720; ELM 488
28 n.r. sub-variety a. Corpus 0721; "Hanover hoard" Hill (1977a)
29 1.21 g sub-variety a. Corpus 0725; ELM 441
30 g sub-variety a. Corpus 0726; AUMB
31 1.24 g sub-variety a. Corpus 0728; ELM 37
32 1.25 g sub-variety a. Corpus 0729; ELM 38
33 1.23 g sub-variety a. Corpus 0734; ELM 408
34 1.27 g sub-variety a. Corpus 0735; ELM 206
35 1.27 g sub-variety a. Corpus 0740; ELM 77
36 1.02 g sub-variety a. Corpus 0741; ELM 478
37 1.11 g sub-variety a. Corpus 0742; ELM 613
38 0.88 g sub-variety a. Corpus 0744; WLMM; Berghaus (1980) 16
39 1.23 g sub-variety k. Corpus 2328; ELM 699
40 1.20 g sub-variety k. Corpus 2329; ELM 294

Plate 3

41 1.11 g sub-variety k. Corpus 2331; ELM 254
42 0.91 g sub-variety k. Corpus 2317; ELM 379
43 1.26 g sub-variety e. Corpus 1765; ELM 42
44 1.29 g sub-variety e. Corpus 1766; ELM 43
45 1.32 g sub-variety e. Corpus 1767; ELM 585
46 1.26 g sub-variety e. Corpus 1773; ELM 327
47 1.24 g sub-variety e. Corpus 1774; ELM 328
48 1.27 g sub-variety e. Corpus 1789; ELM 179
49 1.04 g sub-variety e. Corpus 1791; ELM 639
50 1.05 g sub-variety e. Corpus 1792; ELM 354
51 1.23 g sub-variety g. Corpus 1955; ELM 413
52 1.29 g sub-variety e. Corpus 1780; ELM 483
53 1.01 g sub-variety e. Corpus 1781; ELM 86
54 1.24 g sub-variety e. Corpus 1782; ELM 108
55 0.95 g sub-variety k. Corpus 2316; ELM 248
56 0.96 g sub-variety k. Corpus 2314; ELM 544
57 1.06 g sub-variety e. Corpus 1786; ELM 509
58 1.25 g sub-variety b. Corpus 0755; ELM 103
59 1.13 g sub-variety b. Corpus 0756; ELM 144
60 1.37 g sub-variety b. Corpus 0757; ELM 512

Plate 4

61 1.11 g sub-variety b. Corpus 0758; ELM 069
62 1.34 g sub-variety b. Corpus 0762; ELM 366
63 1.30 g sub-variety b. Corpus 0763; MCAG. Richardson (1984) pl 12-3; SCBI 48-154
64 1.24 g sub-variety b. Corpus 0770; ELM 590
65 1.25 g sub-variety b. Corpus 0771; BeM SCBI 36-12
66 1.25 g sub-variety b. Corpus 0772; ELM 346
67 1.17 g sub-variety b. Corpus 0777; ELM 94
68 1.09 g sub-variety b. Corpus 0778; ELM 493
69 0.91 g sub-variety b. Corpus 0779; ELM 516
70 0.82 g sub-variety b. Corpus 0780; ELM 586

71 1.23 g sub-variety b. Corpus 0781; ELM 610
72 1.02 g sub-variety b. Corpus 0784; ELM 273
73 1.27 g sub-variety b. Corpus 0785; ELM 281
74 1.21 g sub-variety b. Corpus 0788; ELM 384
75 1.19 g sub-variety b. Corpus 0789; ELM 152

76 1.17 g sub-variety b. Corpus 0790; ELM 343
77 1.29 g sub-variety b. Corpus 0792; ELM 601
78 1.24 g sub-variety b. Corpus 0794; ELM 252
79 1.26 g sub-variety b. Corpus 0795; ELM 160
80 1.07 g sub-variety b. Corpus 0796; ELM 240

Plate 5

81 1.42 g sub-variety b. Corpus 0798; ELM 259
82 1.24 g sub-variety b. Corpus 0799; ELM 168
83 1.31 g sub-variety b. Corpus 0800; ELM 332
84 1.07 g sub-variety b. Corpus 0801; ELM 548
85 1.33 g sub-variety b. Corpus 0802; ELM 298

86 0.96 g sub-variety b. Corpus 0803; ELM 133
87 1.25 g sub-variety b. Corpus 0804; ELM 492
88 1.06 g sub-variety b. Corpus 0805; ELM 231
89 1.12 g sub-variety b. Corpus 0806; ELM 373
90 1.33 g sub-variety b. Corpus 0807; ELM 459

91 1.08 g sub-variety b. Corpus 0808; ELM 568
92 1.05 g sub-variety b. Corpus 0809; ELM 278
93 1.27 g sub-variety b. Corpus 0810; ELM 304
94 1.32 g sub-variety b. Corpus 0811; ELM 305
95 1.35 g sub-variety b. Corpus 0812; ELM 324

96 1.23 g sub-variety b. Corpus 0816; ELM 325
97 1.41 g sub-variety b. Corpus 0817; ELM 326
98 1.26 g sub-variety b. Corpus 0818; ELM 295
99 1.12 g sub-variety b. Corpus 0819; ELM 297
100 1.21 g sub-variety b. Corpus 0820; ELM 296

Plate 6

101 1.15 g sub-variety b. Corpus 0824; ELM 229
102 1.33 g sub-variety b. Corpus 0827; ELM 244
103 1.22 g sub-variety b. Corpus 0828; ELM 377
104 1.16 g sub-variety b. Corpus 0829; ELM 238
105 1.13 g sub-variety b. Corpus 0830; ELM 536

106 1.10 g sub-variety b. Corpus 0831; ELM 634
107 1.25 g sub-variety b. Corpus 0832; ELM 253
108 1.12 g sub-variety b. Corpus 0836; ELM 267
109 1.24 g sub-variety b. Corpus 0837; ELM 407
110 1.35 g sub-variety b. Corpus 0881; ELM 355

111 1.10 g sub-variety b. Corpus 0852; ELM 582
112 1.35 g sub-variety b. Corpus 0857; ELM 242
113 1.24 g sub-variety b. Corpus 0858; ELM 431
114 1.16 g sub-variety b. Corpus 0860; ELM 083
115 1.06 g sub-variety b. Corpus 0861; ELM 468

116 1.17 g sub-variety b. Corpus 0862; ELM 581
117 1.13 g sub-variety b. Corpus 0863; ELM 337
118 1.15 g sub-variety b. Corpus 0867; ELM 338
119 1.18 g sub-variety c. Corpus 1276; ELM 29
120 1.07 g sub-variety b. Corpus 0869; ELM 30

Plate 7

121 1.15 g sub-variety b. Corpus 0871; ELM 564
122 1.17 g sub-variety b. Corpus 0872; ELM 237
123 1.08 g sub-variety b. Corpus 0873; ELM 31
124 0.95 g sub-variety b. Corpus 0874; ELM 454
125 1.26 g sub-variety b. Corpus 0875; ELM 429

126 1.27 g sub-variety b. Corpus 0876; ELM 256
127 1.18 g sub-variety b. Corpus 0877; ELM 631
128 0.98 g sub-variety b. Corpus 0878; ELM 172
129 1.30 g sub-variety b. Corpus 0879; ELM 476
130 1.20 g sub-variety b. Corpus 0880; ELM 370

131 1.18 g sub-variety b. Corpus 0881; ELM 630
132 1.18 g sub-variety c. Corpus 0893; ELM 258
133 1.15 g sub-variety c. Corpus 0894; ELM 277
134 1.28 g sub-variety c. Corpus 0884; ELM 576
135 1.32 g sub-variety c. Corpus 0886; ELM 52

136 1.21 g sub-variety c. Corpus 0880; ELM 747
137 1.24 g sub-variety c. Corpus 0895; ELM 521
138 1.07 g sub-variety c. Corpus 0897; ELM 436
139 1.17 g sub-variety c. Corpus 0897; ELM 440
140 1.26 g sub-variety c. Corpus 1091; ELM 427

Plate 8

141 1.28 g sub-variety c. Corpus 1092; ELM 310
142 1.31 g sub-variety c. Corpus 1093; ELM 311
143 1.17 g sub-variety c. Corpus 1094; ELM 320
144 1.19 g sub-variety b. Corpus 0903; ELM 335
145 1.26 g sub-variety b. Corpus 0904; ELM 336

146 1.23 g sub-variety b. Corpus 0905; ELM 362
147 1.19 g sub-variety b. Corpus 0906; ELM 530
148 1.07 g sub-variety b. Corpus 0907; ELM 89
149 1.09 g sub-variety b. Corpus 0914; ELM 611
150 1.26 g sub-variety b. Corpus 0915; ELM 234

151 1.22 g sub-variety b. Corpus 0917; ELM 56
152 1.11 g sub-variety b. Corpus 0918; ELM 331
153 1.16 g sub-variety b. Corpus 0919; ELM 306
154 1.19 g sub-variety b. Corpus 0924; ELM 404
155 1.19 g sub-variety b. Corpus 0925; ELM 605
156 1.22 g sub-variety b. Corpus 0926; ELM 78
157 1.22 g sub-variety b. Corpus 0927; ELM 85
158 1.26 g sub-variety b. Corpus 0931; AUMB 162.18
159 1.27 g sub-variety b. Corpus 0937; ELM 178
160 1.19 g sub-variety b. Corpus 0938; ELM 411

Plate 9

161 1.28 g sub-variety b. Corpus 0939; ELM 27
162 1.03 g sub-variety b. Corpus 0940; ELM 28
163 1.33 g sub-variety b. Corpus 0941; ELM 198
164 1.11 g sub-variety b. Corpus 0946; ELM 412
165 1.11 g sub-variety b. Corpus 0947; ELM 401

166 1.19 g sub-variety b. Corpus 0948; ELM 560
167 1.34 g sub-variety b. Corpus 0954; ELM 246
168 1.16 g sub-variety b. Corpus 0956; ELM 391
169 1.41 g sub-variety b. Corpus 0965; ELM 230
170 1.12 g sub-variety b. Corpus 0966; ELM 182

171 1.25 g sub-variety b. Corpus 0967; ELM 389
172 1.23 g sub-variety c. Corpus 0986; ELM 193
173 1.13 g sub-variety c. Corpus 0987; ELM 583
174 1.11 g sub-variety c. Corpus 0990; ELM 98
175 1.09 g sub-variety c. Corpus 0996; ELM 505

176 1.34 g sub-variety c. Corpus 0999; ELM 309
177 1.15 g sub-variety c. Corpus 1000; ELM 303
178 1.15 g sub-variety c. Corpus 1001; ELM 317
179 1.17 g sub-variety c. Corpus 1002; ELM 318
180 1.17 g sub-variety c. Corpus 1004; ELM 347

Plate 10

181 1.38 g sub-variety c. Corpus 1005; ELM 542
182 1.14 g sub-variety c. Corpus 1006; ELM 134
183 1.24 g sub-variety c. Corpus 1007; ELM 632
184 1.07 g sub-variety c. Corpus 1009; ELM 619
185 1.13 g sub-variety c. Corpus 1011; ELM 263

186 1.12 g sub-variety c. Corpus 1014; ELM 11
187 1.09 g sub-variety c. Corpus 1015; ELM 12
188 1.12 g sub-variety c. Corpus 1018; ELM 570
189 1.17 g sub-variety c. Corpus 1019; ELM 392
190 1.24 g sub-variety b. Corpus 0972; ELM 104

191 1.13 g sub-variety c. Corpus 1020; ELM 573
192 1.18 g sub-variety c. Corpus 1021; ELM 322
193 1.26 g sub-variety c. Corpus 1025; ELM 84
194 1.37 g sub-variety c. Corpus 1026; ELM 216
195 1.21 g sub-variety c. Corpus 1028; ELM 418

196 1.31 g sub-variety c. Corpus 1029; ELM 113
197 1.09 g sub-variety c. Corpus 1030; ELM 453
198 1.23 g sub-variety c. Corpus 1043; ELM 181
199 1.14 g sub-variety c. Corpus 1045; ELM 233
200 1.17 g sub-variety c. Corpus 1046; ELM 46

Plate 11

201 1.24 g sub-variety c. Corpus 1050; ELM 5
202 1.30 g sub-variety c. Corpus 1051; ELM 342
203 1.22 g sub-variety c. Corpus 1052; ELM 448
204 1.17 g sub-variety c. Corpus 1055; ELM 46
205 1.47 g sub-variety c. Corpus 1058; ELM 228

206 0.95 g sub-variety c. Corpus 1059; ELM 339
207 1.05 g sub-variety c. Corpus 1060; ELM 315
208 1.23 g sub-variety c. Corpus 1061; ELM 9
209 1.40 g sub-variety c. Corpus 1062; ELM 21
210 1.15 g sub-variety c. Corpus 1066; ELM 321

211 1.26 g sub-variety c. Corpus 1069; ELM 403
212 1.36 g sub-variety c. Corpus 1070; ELM 99
213 1.20 g sub-variety c. Corpus 1072; ELM 39
214 1.20 g sub-variety c. Corpus 1077; ELM 187
215 1.11 g sub-variety c. Corpus 1078; ELM 439

216 1.16 g sub-variety c. Corpus 1080; ELM 61
217 1.09 g sub-variety c. Corpus 1081; ELM 70
218 1.14 g sub-variety c. Corpus 1083; ELM 264
219 1.37 g sub-variety c. Corpus 1084; ELM 151
220 1.12 g sub-variety c. Corpus 1085; ELM 584

Plate 12

221 1.22 g sub-variety c. Corpus 1086; ELM 139
222 1.05 g sub-variety c. Corpus 1087; ELM 175
223 1.32 g sub-variety c. Corpus 1088; ELM 615
224 1.08 g sub-variety c. Corpus 1095; ELM 171
225 1.04 g sub-variety c. Corpus 1096; ELM 498

226 1.26 g sub-variety c. Corpus 1097; ELM 58
227 1.17 g sub-variety c. Corpus 1098; ELM 261
228 1.14 g sub-variety c. Corpus 1100; ELM 383
229 1.03 g sub-variety c. Corpus 1101; ELM 539
230 1.25 g sub-variety c. Corpus 1102; ELM 522

231 1.25 g sub-variety c. Corpus 1103; ELM 644
232 1.33 g sub-variety c. Corpus 1104; ELM 457
233 1.13 g sub-variety c. Corpus 1130; ELM 623
234 1.21 g sub-variety c. Corpus 1131; ELM 227
235 1.14 g sub-variety c. Corpus 1132; ELM 260

236 1.32 g sub-variety c. Corpus 1133; ELM 375
237 1.01 g sub-variety c. Corpus 1134; ELM 415
238 1.20 g. sub-variety c. Corpus 1145; MCAG. Richardson (1984) pl 12-3; SCBI 48-155
239 1.06 g sub-variety c. Corpus 1136; ELM 301
240 1.20 g sub-variety c. Corpus 1142; ELM 302

Plate 13

241 0.88 g sub-variety c. Corpus 1146; ELM 352
242 1.19 g sub-variety c. Corpus 1147; ELM 329
243 1.16 g sub-variety c. Corpus 1148; ELM 330
244 1.29 g sub-variety c. Corpus 1158; ELM 251
245 1.27 g sub-variety c. Corpus 1159; ELM 97

246 1.13 g sub-variety c. Corpus 1160; ELM 282
247 1.25 g sub-variety c. Corpus 1161; ELM 241
248 0.91 g sub-variety c. Corpus 1162; ELM 243
249 1.12 g sub-variety c. Corpus 1166; ELM 135
250 1.04 g sub-variety c. Corpus 1167; ELM 616

251 1.08 g sub-variety c. Corpus 1170; ELM 272
252 1.19 g sub-variety c. Corpus 1179; ELM 76
253 1.29 g sub-variety c. Corpus 1183; ELM 275
254 1.24 g sub-variety c. Corpus 1192; ELM 72
255 1.18 g sub-variety c. Corpus 1197; ELM 106

256 1.08 g sub-variety c. Corpus 1199; ELM 393
257 1.13 g sub-variety c. Corpus 1200; ELM 269
258 1.06 g sub-variety c. Corpus 1201; ELM 578
259 1.12 g sub-variety c. Corpus 1208; ELM 638
260 1.33 g sub-variety c. Corpus 1209; ELM 195

Plate 14

261 1.29 g sub-variety c. Corpus 1217; ELM 533
262 1.07 g sub-variety c. Corpus 1223; ELM 465
263 0.90 g sub-variety c. Corpus 1224; ELM 268
264 0.94 g sub-variety d. Corpus 1492; ELM 435
265 1.20 g sub-variety c. Corpus 1226; ELM 185

266 1.20 g sub-variety c. Corpus 1227; ELM 545
267 1.40 g sub-variety c. Corpus 1236; ELM 266
268 1.39 g sub-variety c. Corpus 1242; ELM 462
269 1.19 g sub-variety b. Corpus 0973; ELM 255
270 1.31 g sub-variety c. Corpus 1252; ELM 400

271 1.25 g sub-variety c. Corpus 1257; ELM 319
272 1.13 g sub-variety c. Corpus 1258; ELM 316
273 1.24 g sub-variety c. Corpus 1259; ELM 180
274 1.18 g sub-variety c. Corpus 1263; ELM 235
275 1.10 g sub-variety c. Corpus 1264; ELM 372

276 1.04 g sub-variety c. Corpus 1268; ELM 186
277 1.10 g sub-variety c. Corpus 1269; ELM 4
278 1.17 g sub-variety c. Corpus 1270; ELM 3
279 1.15 g sub-variety c. Corpus 1271; ELM 469
280 1.15 g sub-variety c. Corpus 1272; ELM 197

Plate 15

281 1.27 g sub-variety c. Corpus 1277; ELM 479
282 1.27 g sub-variety c. Corpus 1278; ELM 48
283 1.18 g sub-variety c. Corpus 1281; ELM 553
284 1.28 g sub-variety c. Corpus 1282; ELM 477
285 1.34 g sub-variety c. Corpus 1283; ELM 557

286 1.24 g sub-variety c. Corpus 1284; ELM 451
287 1.46 g sub-variety c. Corpus 1290; ELM 514
288 n.r. sub-variety c. Corpus 1291; 'Hannover hoard' Hill (1977a)
289 0.89 g sub-variety d. Corpus 1321; ELM 443
290 1.04 g sub-variety d. Corpus 1322; ELM 192

291 1.16 g sub-variety d. Corpus 1323; ELM 614
292 1.03 g sub-variety d. Corpus 1330; ELM 239
293 1.10 g sub-variety d. Corpus 1331; ELM 416
294 1.20 g sub-variety d. Corpus 1339; ELM 156
295 1.07 g sub-variety d. Corpus 1361; ELM 130

296 1.15 g sub-variety d. Corpus 1365; ELM 74
297 1.09 g sub-variety d. Corpus 1368; ELM 57
298 1.39 g sub-variety d. Corpus 1338; ELM 597
299 0.83 g sub-variety d. Corpus 1383; ELM 59
300 0.95 g sub-variety d. Corpus 1384; ELM 140

Plate 16

301 1.31 g sub-variety d. Corpus 1341; ELM 26
302 1.43 g sub-variety d. Corpus 1342; ELM 25
303 1.17 g sub-variety d. Corpus 1343; ELM 33
304 1.21 g sub-variety d. Corpus 1344; ELM 32
305 1.29 g sub-variety d. Corpus 1345; ELM 323

306 1.22 g sub-variety d. Corpus 1348; ELM 334
307 1.12 g sub-variety d. Corpus 1349; ELM 333
308 1.38 g sub-variety d. Corpus 1391; ELM 340
309 1.27 g sub-variety d. Corpus 1392; ELM 341
310 1.11 g sub-variety d. Corpus 1393; ELM 364

311 1.32 g sub-variety d. Corpus 1396; ELM 549
312 1.09 g sub-variety d. Corpus 1397; ELM 376
313 1.17 g sub-variety d. Corpus 1398; ELM 593
314 1.21 g sub-variety d. Corpus 1404; ELM 91
315 1.14 g sub-variety d. Corpus 1405; ELM 109

316 1.27 g sub-variety d. Corpus 1418; ELM 499
317 1.26 g sub-variety d. Corpus 1430; ELM 299
318 1.22 g sub-variety d. Corpus 1431; ELM 307
319 1.29 g sub-variety d. Corpus 1433; ELM 387
320 1.35 g sub-variety d. Corpus 1435; ELM 402

Plate 17

321 1.12 g sub-variety d. Corpus 1437; ELM 489
322 1.27 g sub-variety d. Corpus 1444; ELM 555
323 1.24 g sub-variety d. Corpus 1445; ELM 620
324 1.40 g sub-variety d. Corpus 1446; ELM 547
325 1.27 g sub-variety d. Corpus 1447; ELM 348

326 1.25 g sub-variety d. Corpus 1456; ELM 409
327 1.24 g sub-variety d. Corpus 1457; ELM 504
328 1.19 g sub-variety d. Corpus 1458; ELM 214
329 1.09 g sub-variety d. Corpus 1459; ELM 191
330 1.33 g sub-variety d. Corpus 1460; ELM 482
331 1.15 g sub-variety d. Corpus 1464; ELM 194
332 1.27 g sub-variety d. Corpus 1465; ELM 527
333 1.22 g sub-variety i. Corpus 2265; ELM 95
334 1.29 g sub-variety i. Corpus 2266; ELM 224
335 1.24 g sub-variety i. Corpus 2269; ELM 503

336 0.90 g sub-variety i. Corpus 2270; ELM 276
337 1.19 g sub-variety d. Corpus 1469; ELM 337
338 1.10 g sub-variety d. Corpus 1470; ELM 249
339 1.25 g sub-variety d. Corpus 1471; ELM 119
340 1.34 g sub-variety d. Corpus 1472; ELM 223

Plate 18

341 1.37 g sub-variety d. Corpus 1475; ELM 591
342 1.14 g sub-variety d. Corpus 1476; ELM 209
343 1.04 g sub-variety d. Corpus 1477; ELM 433
344 1.14 g sub-variety d. Corpus 1478; ELM 406
345 1.27 g sub-variety d. Corpus 1479; ELM 437

346 1.11 g sub-variety d. Corpus 1494; ELM 285
347 1.32 g sub-variety d. Corpus 1495; ELM 284
348 1.07 g sub-variety d. Corpus 1496; ELM 271
349 1.38 g sub-variety d. Corpus 1490; ELM 592
350 1.12 g sub-variety d. Corpus 1505; ELM 523

351 1.11 g sub-variety d. Corpus 1507; ELM 71
352 1.07 g sub-variety d. Corpus 1508; ELM 212
353 1.06 g sub-variety d. Corpus 1515; ELM 68
354 1.19 g sub-variety d. Corpus 1516; ELM 60
355 1.30 g sub-variety d. Corpus 1517; ELM 388

356 1.22 g sub-variety d. Corpus 1521; ELM 515
357 1.23 g sub-variety d. Corpus 1522; ELM 608
358 1.10 g sub-variety d. Corpus 1525; ELM 607
359 1.13 g sub-variety d. Corpus 1526; ELM 627
360 1.17 g sub-variety d. Corpus 1527; ELM 405

Plate 19

361 1.17 g sub-variety d. Corpus 1535; ELM 215
362 0.99 g sub-variety d. Corpus 1536; ELM 205
363 1.03 g sub-variety d. Corpus 1537; ELM 141
364 1.17 g sub-variety d. Corpus 1540; ELM 642
365 1.10 g sub-variety d. Corpus 1541; ELM 218

366 1.20 g sub-variety d. Corpus 1561; ELM 250
367 1.10 g sub-variety d. Corpus 1562; ELM 752
368 1.09 g sub-variety d. Corpus 1563; ELM 537
369 0.99 g sub-variety d. Corpus 1564; ELM 528
370 1.19 g sub-variety d. Corpus 1566; ELM 369

371 1.33 g sub-variety e. Corpus 1579; ELM 265
372 1.24 g sub-variety e. Corpus 1581; BeM SCBI 36-14
373 1.10 g sub-variety e. Corpus 1584; ELM 225
374 1.04 g sub-variety e. Corpus 1604; ELM 157
375 1.21 g sub-variety e. Corpus 1605; ELM 217

376 1.21 g sub-variety e. Corpus 1634; ELM 116
377 1.27 g sub-variety e. Corpus 1636; ELM 495
378 1.36 g sub-variety e. Corpus 1638; ELM 487
379 1.36 g sub-variety e. Corpus 1644; ELM 617
380 1.31 g sub-variety e. Corpus 1655; ELM 458

Plate 20

381 1.08 g sub-variety e. Corpus 1646; ELM 618
382 1.33 g sub-variety e. Corpus 1648; ELM 556
383 1.18 g sub-variety e. Corpus 1649; ELM 417
384 1.15 g sub-variety e. Corpus 1650; ELM 517
385 1.28 g sub-variety e. Corpus 1651; ELM 219

386 0.98 g sub-variety e. Corpus 1652; ELM 579
387 1.45 g sub-variety e. Corpus 1653; ELM 120
388 1.09 g sub-variety e. Corpus 1654; ELM 245
389 1.40 g sub-variety e. Corpus 1655; ELM 595
390 1.12 g sub-variety e. Corpus 1656; ELM 371

391 1.17 g sub-variety e. Corpus 1657; ELM 511
392 1.18 g sub-variety e. Corpus 1660; ELM 398
393 1.24 g sub-variety e. Corpus 1661; AUMB 162.17
394 1.01 g sub-variety e. Corpus 1664; ELM 566
395 1.10 g sub-variety e. Corpus 1665; ELM 110

396 1.21 g sub-variety e. Corpus 1669; ELM 633
397 1.08 g sub-variety e. Corpus 1670; ELM 381
398 1.24 g sub-variety e. Corpus 1671; ELM 629
399 1.34 g sub-variety e. Corpus 1679; ELM 107
400 1.13 g sub-variety e. Corpus 1680; ELM 494

Plate 21

401 1.20 g sub-variety e. Corpus 1683; ELM 137
402 1.03 g sub-variety e. Corpus 1684; ELM 149
403 1.20 g sub-variety e. Corpus 1699; ELM 428
404 1.29 g sub-variety e. Corpus 1701; ELM 534
405 1.24 g sub-variety e. Corpus 1702; ELM 567

406 1.10 g sub-variety e. Corpus 1706; ELM 363
407 1.24 g sub-variety e. Corpus 1707; ELM 380
408 1.18 g sub-variety e. Corpus 1708; ELM 700
409 1.30 g sub-variety e. Corpus 1709; ELM 204
410 1.17 g sub-variety e. Corpus 1712; ELM 132

411 1.34 g sub-variety e. Corpus 1713; ELM 541
412 1.30 g sub-variety e. Corpus 1717; ELM 529
413 1.24 g sub-variety e. Corpus 1718; ELM 456
414 1.11 g sub-variety e. Corpus 1727; ELM 88
415 1.41 g sub-variety e. Corpus 1732; ELM 463

416 1.21 g sub-variety e. Corpus 1737; ELM 123
417 1.29 g sub-variety e. Corpus 1738; ELM 574
418 1.26 g sub-variety e. Corpus 1745; ELM 138
419 1.40 g sub-variety e. Corpus 1746; ELM 291
420 1.15 g sub-variety e. Corpus 1747; ELM 290

Plate 22

421 1.37 g sub-variety e. Corpus 1748; ELM 350
422 1.31 g sub-variety e. Corpus 1749; ELM 210
423 1.11 g sub-variety e. Corpus 1750; ELM 257
424 1.12 g sub-variety e. Corpus 1751; ELM 124
425 1.35 g sub-variety e. Corpus 1752; ELM 169

426 1.23 g sub-variety e. Corpus 1753; ELM 211
427 1.30 g sub-variety e. Corpus 1758; ELM 532
428 1.17 g sub-variety g. Corpus 1897; ELM 506
429 1.14 g sub-variety g. Corpus 1899; ELM 236
430 1.07 g sub-variety g. Corpus 1898; ELM 221

431 1.16 g sub-variety g. Corpus 1900; ELM 232
432 0.99 g sub-variety g. Corpus 1952; CM SCBI 4-32 Ex Thompson
433 1.20 g sub-variety g. Corpus 1901; ELM 92
434 1.29 g sub-variety g. Corpus 1902; ELM 374
435 1.27 g sub-variety g. Corpus 1903; ELM 745

436 1.27 g sub-variety g. Corpus 1904; ELM 496
437 1.30 g sub-variety g. Corpus 1907; ELM 148
438 1.34 g sub-variety g. Corpus 1908; ELM 150
439 1.30 g sub-variety g. Corpus 1910; ELM 146
440 1.26 g sub-variety g. Corpus 1915; ELM 96

Plate 23

441 1.24 g sub-variety g. Corpus 1911; ELM 143
442 1.28 g sub-variety g. Corpus 1913; ELM 467
443 1.24 g sub-variety g. Corpus 1916; ELM 202
444 1.28 g sub-variety g. Corpus 1920; ELM 82
445 1.18 g sub-variety g. Corpus 1921; ELM 114

446 1.22 g sub-variety g. Corpus 1923; WLMM Laufaurie (1980) – 14 aquired 1964 ex. Saml. Engels.
447 1.26 g sub-variety g. Corpus 1924; ELM 540
448 1.24 g sub-variety g. Corpus 1925; ELM 356
449 1.28 g sub-variety g. Corpus 1926; BeM SCBI 36-9
450 1.23 g sub-variety g. Corpus 1928; ELM 474

451 1.27 g sub-variety g. Corpus 1940; ELM 563
452 1.29 g sub-variety g. Corpus 1941; BeM SCBI 36-8
453 1.29 g sub-variety g. Corpus 1942; ELM 81
454 1.32 g sub-variety g. Corpus 1943; ELM 161
455 1.29 g sub-variety g. Corpus 1945; ELM 485

456 1.28 g sub-variety g. Corpus 1946; ELM 111
457 1.27 g sub-variety g. Corpus 1947; ELM 125
458 1.28 g sub-variety g. Corpus 1948; BeM SCBI 36-10
459 1.19 g sub-variety g. Corpus 1950; ELM 645
460 1.07 g sub-variety g. Corpus 1951; ELM 513

Plate 24

461 1.16 g sub-variety g. Corpus 1949; ELM 587
462 1.32 g sub-variety g. Corpus 1958; ELM 425
463 1.44 g sub-variety g. Corpus 1961; ELM 201
464 1.15 g sub-variety e. Corpus 1755; ELM 464
465 1.34 g sub-variety e. Corpus 1756; ELM 635

466 1.31 g sub-variety i. Corpus 2271; ELM 199
467 0.92 g sub-variety i. Corpus 2272; ELM 174
468 1.36 g sub-variety i. Corpus 2273; ELM 507
469 1.28 g sub-variety h. Corpus 1968; ELM 735
470 1.30 g sub-variety h. Corpus 1969; ELM 698

471 1.15 g sub-variety h. Corpus 1970; ELM 697
472 1.26 g sub-variety h. Corpus 1971; ELM 696
473 1.40 g sub-variety h. Corpus 1972; ELM 695
474 1.25 g sub-variety h. Corpus 1974; ELM 743
475 1.31 g sub-variety h. Corpus 1975; ELM 744

476 1.19 g sub-variety h. Corpus 1976; ELM 742
477 1.29 g sub-variety h. Corpus 1979; ELM 741
478 1.19 g sub-variety h. Corpus 1983; ELM 196
479 1.17 g sub-variety h. Corpus 1988; ELM 344
480 1.35 g sub-variety h. Corpus 1989; ELM 145

Plate 25

481 1.28 g sub-variety h. Corpus 1992; ELM 314
482 1.29 g sub-variety h. Corpus 1993; ELM 313
483 1.26 g sub-variety h. Corpus 1994; ELM 312
484 1.27 g sub-variety h. Corpus 1997; ELM 51
485 1.24 g sub-variety h. Corpus 1998; BeM SCBI 36-15

486 1.33 g sub-variety h. Corpus 2005; ELM 300
487 1.35 g sub-variety h. Corpus 2006; ELM 308
488 1.32 g sub-variety h. Corpus 2007; ELM 604
489 1.27 g sub-variety h. Corpus 2013; ELM 159
490 1.37 g sub-variety h. Corpus 2014; ELM 358

491 1.32 g sub-variety h. Corpus 2016; ELM 190
492 1.28 g sub-variety h. Corpus 2018; ELM 466
493 1.27 g sub-variety h. Corpus 2019; ELM 163
494 1.29 g sub-variety h. Corpus 2025; ELM 166
495 1.23 g sub-variety h. Corpus 2026; ELM 207

496 1.21 g sub-variety h. Corpus 2027; ELM 577
497 1.18 g sub-variety h. Corpus 2032; ELM 7
498 1.29 g sub-variety h. Corpus 2033; ELM 8
499 1.23 g sub-variety h. Corpus 2034; ELM 535
500 1.28 g sub-variety h. Corpus 2035; ELM 395

Plate 26

501 1.29 g sub-variety h. Corpus 2036; ELM 637
502 1.27 g sub-variety h. Corpus 2038; ELM 121
503 1.27 g sub-variety h. Corpus 2040; ELM 359
504 1.35 g sub-variety h. Corpus 2041; AUMB 162.16
505 1.21 g sub-variety h. Corpus 2042; ELM 501

506 1.30 g sub-variety h. Corpus 2043; BeM SCBI 36-6
507 1.29 g sub-variety h. Corpus 2044; ELM 636
508 1.23 g sub-variety h. Corpus 2045; ELM 546
509 1.25 g sub-variety h. Corpus 2047; ELM 188
510 1.30 g sub-variety h. Corpus 2051; ELM 102

511 1.29 g sub-variety h. Corpus 2052; ELM 66
512 1.31 g sub-variety h. Corpus 2053; ELM 565
513 1.30 g sub-variety h. Corpus 2054; ELM 220
514 1.28 g sub-variety h. Corpus 2056; ELM 424
515 1.32 g sub-variety h. Corpus 2059; MCAG. Richardson (1984) pl 12-2; SCBI 48-159

516 1.25 g sub-variety h. Corpus 2060; ELM 365
517 1.27 g sub-variety h. Corpus 2061; ELM 562
518 1.20 g sub-variety h. Corpus 2064; ELM 580
519 1.30 g sub-variety h. Corpus 2065; ELM 446
520 1.12 g sub-variety h. Corpus 2066; ELM 426

Plate 27

521 1.26 g sub-variety h. Corpus 2067; ELM 434
522 1.16 g sub-variety h. Corpus 2068; ELM 353
523 1.26 g sub-variety h. Corpus 2069; ELM 519
524 1.28 g sub-variety h. Corpus 2078; ELM 208
525 1.29 g sub-variety h. Corpus 2081; ELM 701

526 1.23 g sub-variety h. Corpus 2082; ELM 122
527 1.30 g sub-variety h. Corpus 2083; ELM 47
528 1.39 g sub-variety h. Corpus 2084; ELM 126
529 1.26 g sub-variety h. Corpus 2086; ELM 486
530 1.23 g sub-variety h. Corpus 2090; ELM 19

531 1.23 g sub-variety h. Corpus 2091; ELM 526
532 1.32 g sub-variety h. Corpus 2092; ELM 20
533 1.30 g sub-variety h. Corpus 2093; ELM 13
534 1.23 g sub-variety h. Corpus 2094; ELM 22
535 1.22 g sub-variety h. Corpus 2095; ELM 23

536 1.21 g sub-variety h. Corpus 2096; ELM 24
537 1.37 g sub-variety h. Corpus 2100; ELM 162
538 1.21 g sub-variety h. Corpus 2101; ELM 569
539 1.25 g sub-variety h. Corpus 1208; MCAG. Richardson (1984) pl 12-1; SCBI 48-157
540 1.27 g sub-variety h. Corpus 2109; ELM 165

Plate 28

541 1.03 g sub-variety h. Corpus 2114; ELM 173
542 1.26 g sub-variety h. Corpus 2115; ELM 559
543 1.32 g sub-variety h. Corpus 2119; AUMB 162.13
544 1.29 g sub-variety h. Corpus 2121; ELM 588
545 1.24 g sub-variety h. Corpus 2128; ELM 622

546 1.32 g sub-variety h. Corpus 2129; ELM 183
547 1.23 g sub-variety h. Corpus 2133; ELM 472
548 1.27 g sub-variety h. Corpus 2134; ELM 142
549 1.26 g sub-variety h. Corpus 2135; ELM 624
550 1.30 g sub-variety h. Corpus 2136; ELM 473

551 1.27 g sub-variety h. Corpus 2137; ELM 460
552 1.29 g sub-variety h. Corpus 2138; ELM 444
553 1.23 g sub-variety h. Corpus 2139; ELM 445
554 1.27 g sub-variety h. Corpus 2146; ELM 54
555 1.27 g sub-variety h. Corpus 2147; ELM 561

556 1.28 g sub-variety h. Corpus 2152; ELM 749
557 1.22 g sub-variety h. Corpus 2154; ELM 2
558 1.20 g sub-variety h. Corpus 2155; ELM 1
559 1.18 g sub-variety h. Corpus 2140; ELM 50
560 1.22 g sub-variety h. Corpus 2192; ELM 438

Plate 29

561 1.11 g sub-variety h. Corpus 2193; ELM 286
562 1.32 g sub-variety h. Corpus 2194; ELM 287
563 1.36 g sub-variety h. Corpus 2199; ELM 131
564 1.09 g sub-variety h. Corpus 2202; ELM 442
565 1.29 g sub-variety h. Corpus 2203; ELM 87

566 1.14 g sub-variety h. Corpus 2205; ELM 118
567 1.24 g sub-variety h. Corpus 2206; ELM 293
568 1.23 g sub-variety h. Corpus 2207; ELM 40
569 1.24 g sub-variety h. Corpus 2208; ELM 41
570 1.25 g sub-variety h. Corpus 2209; ELM 292

571 1.16 g sub-variety h. Corpus 2215; ELM 36
572 1.10 g sub-variety h. Corpus 2216; ELM 34
573 1.34 g sub-variety h. Corpus 2217; ELM 35
574 1.29 g sub-variety h. Corpus 2224; ELM 621
575 1.23 g sub-variety h. Corpus 2226; ELM 421

576 1.17 g sub-variety h. Corpus 2227; BeM SCBI 36-18
577 1.29 g sub-variety h. Corpus 2228 ; BeM SCBI 36-8
578 1.24 g sub-variety i. Corpus 2232; ELM 79
579 1.18 g sub-variety i. Corpus 2235; ELM 571
580 1.44 g sub-variety i. Corpus 2236; ELM 63

Plate 30

581 1.24 g sub-variety k. Corpus 2340; ELM 64
582 1.19 g sub-variety i. Corpus 2240; ELM 558
583 1.11 g sub-variety i. Corpus 2241; ELM 53
584 1.36 g sub-variety i. Corpus 2245; ELM 360
585 1.27 g sub-variety i. Corpus 2247; ELM 502

586 1.02 g sub-variety i. Corpus 2249; ELM 390
587 0.83 g sub-variety i. Corpus 2250; ELM 594
588 1.29 g sub-variety i. Corpus 2251; ELM 65
589 1.29 g sub-variety i. Corpus 2252; ELM 154
590 1.29 g sub-variety i. Corpus 2253; ELM 599

591 0.96 g sub-variety i. Corpus 2255; ELM 345
592 1.21 g sub-variety i. Corpus 2256; ELM 127
593 1.29 g sub-variety i. Corpus 2257; ELM 750
594 1.27 g sub-variety i. Corpus 2258; ELM 461
595 1.15 g sub-variety i. Corpus 2259; AUMB 162.21

596 1.15 g sub-variety i. Corpus 2260; ELM 49
597 1.29 g sub-variety i. Corpus 2262; ELM 589
598 1.17 g sub-variety i. Corpus 2264; ELM 164
599 1.02 g sub-variety k. Corpus 2290; ELM 177
600 1.34 g sub-variety k. Corpus 2291; ELM 226

Plate 31

601 1.23 g sub-variety k. Corpus 2446; ELM 531
602 1.15 g sub-variety k. Corpus 2447; ELM 452
603 1.27 g sub-variety k. Corpus 2448; ELM 394
604 1.10 g sub-variety k. Corpus 2451; ELM 170
605 1.11 g sub-variety k. Corpus 2452; ELM 484

606 1.17 g sub-variety k. Corpus 2453; ELM 280
607 1.28 g sub-variety k. Corpus 2454; AUMB 162.12
608 1.29 g sub-variety k. Corpus 2455; ELM 45
609 1.25 g sub-variety k. Corpus 2456; ELM 500
610 1.22 g sub-variety k. Corpus 2457; ELM 603

611 0.95 g sub-variety k. Corpus 2458; ELM 419
612 1.23 g sub-variety k. Corpus 2458; ELM 176
613 0.95 g sub-variety k. Corpus 2460; ELM 101
614 1.20 g sub-variety k. Corpus 2461; ELM 117
615 1.29 g sub-variety k. Corpus 2462; ELM 751

616 1.32 g sub-variety e. Corpus 1482; ELM 222
617 1.19 g sub-variety e. Corpus 1483; ELM 279
618 1.48 g sub-variety e. Corpus 1486; ELM 115
619 1.11 g sub-variety e. Corpus 1487; ELM 262
620 1.28 g sub-variety k. Corpus 2463; ELM 606

Plate 32

621 1.14 g sub-variety k. Corpus 2464; ELM 490
622 1.16 g sub-variety k. Corpus 2465; ELM 153
623 1.21 g sub-variety k. Corpus 2466; ELM 136
624 1.13 g sub-variety k. Corpus 2468; ELM 274
625 1.03 g sub-variety k. Corpus 2471; ELM 575

626 1.24 g sub-variety k. Corpus 2472; ELM 67
627 n.r. sub-variety k. Corpus 2473; 'Hanover hoard' Hill (1977a)
628 1.25 g sub-variety k. Corpus 2482; ELM 510
629 1.02 g sub-variety k. Corpus 2483; ELM 385
630 1.20 g sub-variety k. Corpus 2484; ELM 200

631 1.02 g sub-variety k. Corpus 2485; ELM 247
632 1.09 g sub-variety k. Corpus 2486; ELM 270
633 1.15 g sub-variety k. Corpus 2487; ELM 184
634 1.35 g sub-variety k. Corpus 2488; ELM 420
635 1.17 g sub-variety k. Corpus 2489; ELM 158

636 1.14 g sub-variety k. Corpus 2491; CM SCBI 4-33 ex. Thompson
637 0.98 g sub-variety k. Corpus 2494; CM SCBI 4031 ex. Thompson
638 1.21 g sub-variety k. Corpus 2499; ELM 128
639 1.21 g sub-variety k. Corpus 2501; ELM 75
640 1.26 g sub-variety k. Corpus 2503; ELM 520

Plate 33

641 1.27 g sub-variety k. Corpus 2505; ELM 596
642 1.29 g sub-variety k. Corpus 2506; ELM 602
643 1.17 g sub-variety k. Corpus 2525; ELM 93
644 0.94 g sub-variety k. Corpus 2526; ELM 382
645 1.24 g sub-variety k. Corpus 2528; ELM 423

646 0.81 g sub-variety k. Corpus 2534; ELM 100
647 0.82 g sub-variety k. Corpus 2539; ELM 646
648 1.03 g sub-variety k. Corpus 2541; ELM 538
649 1.06 g sub-variety k. Corpus 2542; ELM 525
650 1.18 g sub-variety k. Corpus 2545; ELM 397

651 1.39 g sub-variety k. Corpus 2556; ELM 475
652 1.22 g sub-variety k. Corpus 2557; ELM 112
653 1.28 g sub-variety k. Corpus 2558; AUMB 162.19
654 1.32 g sub-variety k. Corpus 2559; ELM 640
655 1.20 g sub-variety f. Corpus 1806; ELM 740

656 1.21 g sub-variety f. Corpus 1807; ELM 739
657 1.19 g sub-variety f. Corpus 1808; ELM 702
658 1.33 g sub-variety f. Corpus 1809; ELM 703
659 1.36 g sub-variety f. Corpus 1810; ELM 704
660 1.35 g sub-variety f. Corpus 1811; ELM 705

Plate 34

661 1.30 g sub-variety f. Corpus 1812; ELM 706
662 1.40 g sub-variety f. Corpus 1813; ELM 708
663 1.30 g sub-variety f. Corpus 1814; ELM 709
664 1.25 g sub-variety f. Corpus 1815; ELM 710
665 1.21 g sub-variety f. Corpus 1816; ELM 711

666 1.21 g sub-variety f. Corpus 1817; ELM 712
667 1.39 g sub-variety f. Corpus 1818; ELM 713
668 1.28 g sub-variety f. Corpus 1819; ELM 707
669 1.33 g sub-variety f. Corpus 1820; ELM 714
670 1.30 g sub-variety f. Corpus 1824; ELM 715

671 1.08 g sub-variety f. Corpus 1825; ELM 716
672 1.25 g sub-variety f. Corpus 1826; ELM 717
673 1.37 g sub-variety f. Corpus 1827; ELM 718
674 1.31 g sub-variety f. Corpus 1828; ELM 719
675 1.30 g sub-variety f. Corpus 1829; ELM 720

676 1.29 g sub-variety f. Corpus 1830; ELM 721
677 1.23 g sub-variety f. Corpus 1831; ELM 722
678 1.35 g sub-variety f. Corpus 1832; ELM 723
679 1.29 g sub-variety f. Corpus 1833; ELM 724
680 1.27 g sub-variety f. Corpus 1834; ELM 725

Plate 35

681 1.30 g sub-variety f. Corpus 1835; ELM 726
682 1.32 g sub-variety f. Corpus 1836; ELM 727
683 1.20 g sub-variety f. Corpus 1837; ELM 728
684 1.33 g sub-variety f. Corpus 1838; ELM 729
685 1.28 g sub-variety f. Corpus 1839; ELM 730

686 1.32 g sub-variety f. Corpus 1840; ELM 731
687 1.29 g sub-variety f. Corpus 1841; ELM 732
688 1.48 g sub-variety f. Corpus 1842; ELM 733
689 1.28 g sub-variety f. Corpus 1843; ELM 734
690 1.25 g sub-variety f. Corpus 1844; ELM 748

691 1.34 g sub-variety f. Corpus 1845; AUMB 162.14
692 1.30 g sub-variety f. Corpus 1857; ELM 357
693 1.32 g sub-variety f. Corpus 1858; ELM 677
694 1.23 g sub-variety f. Corpus 1859; ELM 678
695 1.31 g sub-variety f. Corpus 1860; ELM 679

696 1.25 g sub-variety f. Corpus 1861; ELM 680
697 1.25 g sub-variety f. Corpus 1862; ELM 681
698 1.28 g sub-variety f. Corpus 1863; ELM 682
699 1.33 g sub-variety f. Corpus 1864; ELM 683
700 1.32 g sub-variety f. Corpus 1865; ELM 684

Plate 36

701 1.28 g sub-variety f Corpus 1866; ELM 685
702 1.27 g sub-variety f. Corpus 1867; ELM 686

703 1.30 g sub-variety f. Corpus 1868; ELM 687
704 1.29 g sub-variety f. Corpus 1869; ELM 688
705 1.29 g sub-variety f. Corpus 1870; ELM 689

706 1.23 g sub-variety f. Corpus 1871; ELM 690
707 1.33 g sub-variety f. Corpus 1872; ELM 691
708 1.32 g sub-variety f. Corpus 1873; ELM 692
709 1.27 g sub-variety f. Corpus 1874; ELM 693
710 1.34 g sub-variety f. Corpus 1875; AUMB 162.15

711 1.30 g sub-variety f. Corpus 1876; ELM 676
712 1.34 g sub-variety f. Corpus 1894; ELM 736
713 1.27 g sub-variety f. Corpus 1896; ELM 410
714 1.31 g sub-variety h. Corpus 2158; ELM 649
715 1.33 g sub-variety h. Corpus 2159; ELM 650

716 1.25 g sub-variety h. Corpus 2160; ELM 651
717 1.19 g sub-variety h. Corpus 2161; ELM 652
718 1.22 g sub-variety h. Corpus 2162; ELM 653
719 1.30 g sub-variety h. Corpus 2164; ELM 654
720 1.30 g sub-variety h. Corpus 2164; ELM 655

Plate 37

721 1.31 g sub-variety h. Corpus 2165; ELM 656
722 1.40 g sub-variety h. Corpus 2166; ELM 657
723 0.91 g sub-variety h. Corpus 2167; ELM 658
724 1.32 g sub-variety h. Corpus 2168; ELM 659
725 1.33 g sub-variety h. Corpus 2169; ELM 660

726 1.32 g sub-variety h. Corpus 2170; ELM 661
727 1.24 g sub-variety h. Corpus 2171; ELM 662
728 1.24 g sub-variety h. Corpus 2172; ELM 663
739 1.57 g sub-variety h. Corpus 2173; ELM 664
730 1.34 g sub-variety h. Corpus 2174; ELM 665

731 1.28 g sub-variety h. Corpus 2175; ELM 666
732 1.21 g sub-variety h. Corpus 2176; ELM 667
733 1.35 g sub-variety h. Corpus 2177; ELM 668
734 1.36 g sub-variety h. Corpus 2178; ELM 669
735 1.23 g sub-variety h. Corpus 2179; ELM 670

736 1.33 g sub-variety h. Corpus 2180; ELM 671
737 1.37 g sub-variety h. Corpus 2181; ELM 672
738 1.32 g sub-variety h. Corpus 2182; ELM 673
739 1.35 g sub-variety h. Corpus 2183; ELM 674
740 1.32 g sub-variety h. Corpus 2184; ELM 675

Plate 38

741 1.20 g sub-variety h. Corpus 2185; WLMM Berghaus (1980) 15
742 1.40 g sub-variety h. Corpus 2186; ELM 648
743 1.00 g sub-variety k. Corpus 2562; AUMB 162.20
744 1.06 g sub-variety k. Corpus 2567; ELM 600
745 1.17 g sub-variety k. Corpus 2568; ELM 155

746 1.03 g sub-variety k. Corpus 2569; ELM 213
747 1.51 g sub-variety k. Corpus 2568; ELM 414
748 1.23 g sub-variety k. Corpus 2569; ELM 647
749 1.13 g sub-variety k. Corpus 2571; ELM 351
750 1.46 g sub-variety k. Corpus 2573; ELM 283

751 1.23 g sub-variety k. Corpus 2585; ELM 491
752 1.11 g sub-variety k. Corpus 2587; ELM 147
753 1.27 g sub-variety k. Corpus 2602; ELM 349
754 1.19 g sub-variety k. Corpus 2603; ELM 422
755 1.26 g sub-variety k. Corpus 2604; ELM 14

756 1.27 g sub-variety k. Corpus 2605; ELM 15
757 1.20 g sub-variety k. Corpus 2606; ELM 16
758 1.44 g sub-variety k. Corpus 2607; ELM 55
759 1.22 g sub-variety k. Corpus 2608; ELM 746
760 1.26 g sub-variety k. Corpus 2609; ELM 399

Plate 39

761 1.23 g sub-variety k. Corpus 2612; ELM 609
762 1.22 g sub-variety k. Corpus 2613; ELM 80
763 1.37 g sub-variety k. Corpus 2616; ELM 552
764 1.30 g sub-variety k. Corpus 2628; ELM 543
765 1.26 g sub-variety k. Corpus 2637; ELM 90

766 1.30 g sub-variety h. Corpus 2075; ELM 508
767 1.33 g sub-variety k. Corpus 2641; ELM 471
768 1.07 g sub-variety k. Corpus 2642; ELM 480
769 1.31 g sub-variety k. Corpus 2643; ELM 450
770 1.24 g sub-variety k. Corpus 2646; ELM 6

771 1.25 g sub-variety k. Corpus 2649; ELM 10
772 1.19 g sub-variety k. Corpus 2651; ELM 17
773 1.28 g sub-variety k. Corpus 2652; ELM 18
774 1.30 g sub-variety k. Corpus 2653; ELM 470
775 1.20 g sub-variety k. Corpus 2654; ELM 449

776 1.27 g sub-variety k. Corpus 2655; ELM 497
777 1.25 g sub-variety k. Corpus 2656; ELM 105
778 1.19 g sub-variety k. Corpus 2657; ELM 524
779 1.26 g sub-variety k. Corpus 2660; ELM 361
780 1.23 g sub-variety k. Corpus 2662; ELM 73

Plate 40

781 1.40 g sub-variety k. Corpus 2666; ELM 396
782 1.31 g sub-variety k. Corpus 2667; ELM 554
783 1.21 g sub-variety k. Corpus 2668; ELM 598
784 1.24 g sub-variety k. Corpus 2669; ELM 189
785 1.07 g sub-variety k. Corpus 2672; ELM 628

786 1.34 g sub-variety k. Corpus 2678; ELM 386
787 1.21 g sub-variety k. Corpus 2680; ELM 455
788 1.20 g sub-variety k. Corpus 2683; ELM 551
789 1.11 g sub-variety k. Corpus 2684; ELM 167

Anschrift der Verfasser:

Plates 1-40

The Sceatta Hoard from „Kloster Barthe“

Photo: R. Bärenfänger; Graphic Design: Gerhard Kronsweide

Early medieval Sceattas from „Kloster Barthe", Hesel, Scale 2:1.
Photos No. 1, 2, 4–12, 14–19 R. Bärenfänger, No. 3 Manchester Art Gallery,
No. 13, 20 Herzog Anton Ulrich Museum, Braunschweig.

Early medieval Sceattas from „Kloster Barthe“, Hesel, Scale 2:1.
Photos No. 21–27, 29, 31–37, 39–40 R. Bärenfänger, No. 28 E. Cartier, No. 30, Herzog Anton Ulrich Museum, Braunschweig, No. 38 LWL-Landesmuseum für Kunst und Kulturgeschichte, Münster.

Early medieval Sceattas from „Kloster Barthe", Hesel, Scale 2:1.
Photos No. 41–60 R. Bärenfänger.

Early medieval Sceattas from „Kloster Barthe“, Hesel, Scale 2:1.
Photos No. 61–62, 64, 66–80 R. Bärenfänger, No. 63 Manchester Art Gallery,
No. 65 Münzkabinett Staatliche Museen zu Berlin.

Early medieval Sceattas from „Kloster Barthe", Hesel, Scale 2:1.
Photos No. 81–100 R. Bärenfänger.

Early medieval Sceattas from „Kloster Barthe", Hesel, Scale 2:1.
Photos No. 101–120 R. Bärenfänger.

Early medieval Sceattas from „Kloster Barthe", Hesel, Scale 2:1.
Photos No. 121–140 R. Bärenfänger.

Early medieval Sceattas from „Kloster Barthe“, Hesel, Scale 2:1.
Photos No. 141–157, 159–160 R. Bärenfänger, No. 158 Herzog Anton Ulrich Museum, Braunschweig.

Early medieval Sceattas from „Kloster Barthe", Hesel, Scale 2:1.
Photos No. 161–180 R. Bärenfänger.

Early medieval Sceattas from „Kloster Barthe", Hesel, Scale 2:1.
Photos No. 181–200 R. Bärenfänger.

Early medieval Sceattas from „Kloster Barthe", Hesel, Scale 2:1.
Photos No. 201–220 R. Bärenfänger.

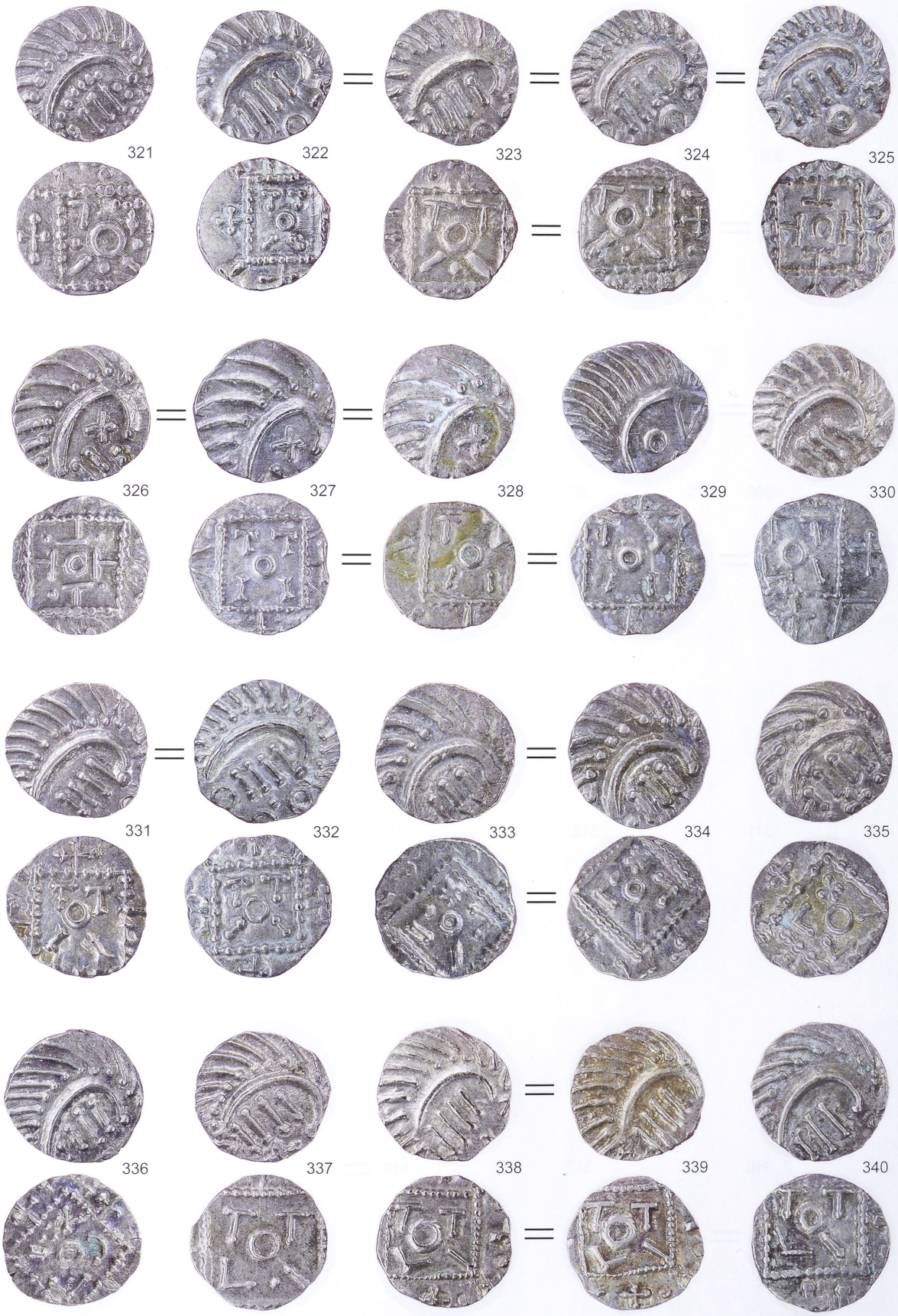
Early medieval Sceattas from „Kloster Barthe", Hesel, Scale 2:1.
Photos No. 221–236, 238–240 R. Bärenfänger, No. 237 Manchester Art Gallery.

Early medieval Sceattas from „Kloster Barthe", Hesel, Scale 2:1.
Photos No. 241–260 R. Bärenfänger.

Early medieval Sceattas from „Kloster Barthe", Hesel, Scale 2:1.
Photos No. 261–280 R. Bärenfänger.

Early medieval Sceattas from „Kloster Barthe", Hesel, Scale 2:1.
Photos No. 281–287, 289–300 R. Bärenfänger, No. 288 E. Cartier.

Early medieval Sceattas from „Kloster Barthe“, Hesel, Scale 2:1.
Photos No. 301–320 R. Bärenfänger.



Early medieval Sceattas from „Kloster Barthe", Hesel, Scale 2:1.
Photos No. 321–340 R. Bärenfänger.

Early medieval Sceattas from „Kloster Barthe“, Hesel, Scale 2:1.
Photos No. 341–360 R. Bärenfänger.

Early medieval Sceattas from „Kloster Barthe", Hesel, Scale 2:1.
Photos No. 361–371, 373–380 R. Bärenfänger, No. 372 Münzkabinett Staatliche Museen zu Berlin.

Early medieval Sceattas from „Kloster Barthe", Hesel, Scale 2:1.
Photos No. 381–392, 394–400 R. Bärenfänger, No. 393 Herzog Anton Ulrich Museum, Braunschweig.

Early medieval Sceattas from „Kloster Barthe", Hesel, Scale 2:1.
Photos No. 401–420 R. Bärenfänger.

Early medieval Sceattas from „Kloster Barthe“, Hesel, Scale 2:1.
Photos No. 421–431, 433–440 R. Bärenfänger, No. 432 National Museum Copenhagen.

Early medieval Sceattas from „Kloster Barthe", Hesel, Scale 2:1.
Photos No. 441–445, 447–448, 450–451, 453–457, 459–460 R. Bärenfänger, No. 446 LWL-Landesmuseum für Kunst und Kulturgeschichte, Münster, No. 449, 458 Münzkabinett Staatliche Museen zu Berlin.

Early medieval Sceattas from „Kloster Barthe", Hesel, Scale 2:1.
Photos No. 461–480 R. Bärenfänger.

Early medieval Sceattas from „Kloster Barthe“, Hesel, Scale 2:1.
Photos No. 481–484, 486–500 R. Bärenfänger, No. 485 Münzkabinett Staatliche Museen zu Berlin.

Early medieval Sceattas from „Kloster Barthe“, Hesel, Scale 2:1.
Photos No. 501–503, 505–515, 517–520 R. Bärenfänger,
No. 504 Herzog Anton Ulrich Museum, Braunschweig, No. 516 Manchester Art Gallery.

Early medieval Sceattas from „Kloster Barthe“, Hesel, Scale 2:1.
Photos No. 521–538, 540 R. Bärenfänger, No. 539 Manchester Art Gallery.

Early medieval Sceattas from „Kloster Barthe“, Hesel, Scale 2:1.
Photos No. 541–542, 544–560 R. Bärenfänger, No. 543 Herzog Anton Ulrich Museum, Braunschweig.

Early medieval Sceattas from „Kloster Barthe", Hesel, Scale 2:1.
Photos No. 561–575, 578–580 R. Bärenfänger, No. 576, 577 Münzkabinett Staatliche Museen zu Berlin.

Early medieval Sceattas from „Kloster Barthe", Hesel, Scale 2:1.
Photos No. 581–594, 596–600 R. Bärenfänger, No. 595 Herzog Anton Ulrich Museum, Braunschweig.

Early medieval Sceattas from „Kloster Barthe", Hesel, Scale 2:1.
Photos No. 601–606, 608–620 R. Bärenfänger, No. 607 Herzog Anton Ulrich Museum, Braunschweig.

Early medieval Sceattas from „Kloster Barthe“, Hesel, Scale 2:1.
Photos No. 621–626, 628–635, 638–640 R. Bärenfänger, No. 627 E. Cartier, No. 636, 637 National Museum Copenhagen.

Early medieval Sceattas from „Kloster Barthe“, Hesel, Scale 2:1.
Photos No. 641–652, 654–660 R. Bärenfänger, No. 653 Herzog Anton Ulrich Museum, Braunschweig.

Early medieval Sceattas from „Kloster Barthe“, Hesel, Scale 2:1.
Photos No. 661–680 R. Bärenfänger.

Early medieval Sceattas from „Kloster Barthe", Hesel, Scale 2:1.
Photos No. 681–685, 687–690, 692–700 R. Bärenfänger, No. 686 G. Kronsweide,
No. 691 Herzog Anton Ulrich Museum, Braunschweig.

Early medieval Sceattas from „Kloster Barthe“, Hesel, Scale 2:1.
Photos No. 701–709, 711–720 R. Bärenfänger, No. 710 Herzog Anton Ulrich Museum, Braunschweig.

Early medieval Sceattas from „Kloster Barthe“, Hesel, Scale 2:1.
Photos No. 721–740 R. Bärenfänger.

Early medieval Sceattas from „Kloster Barthe“, Hesel, Scale 2:1.
Photos No. 742, 744–760 R. Bärenfänger, No. 741 LWL-Landesmuseum für Kunst und Kulturgeschichte, Münster, No. 743 Herzog Anton Ulrich Museum, Braunschweig.

Early medieval Sceattas from „Kloster Barthe", Hesel, Scale 2:1.
Photos No. 761–780 R. Bärenfänger.

Early medieval Sceattas from „Kloster Barthe“, Hesel, Scale 2:1.
Photos No. 781–789 R. Bärenfänger.