JAARBOEK VOOR MUNT- EN PENNINGKUNDE

The Monetary Economy of the Netherlands, c. 690 – c. 715 and the Trade with England: A Study of the Sceattas of Series D.

90
2003

KONINKLIJK NEDERLANDS GENOOTSCHAP
VOOR MUNT- EN PENNINGKUNDE
AMSTERDAM

redactieadres
P/a Het Geldmuseum
Postbus 2407
3500 GK Utrecht
030-2910492

kopij-richtlijnen
op te vragen bij de redactie

ISSN 0920-380-X

uitgave

illustratieverantwoording
Tenzij anders vermeld, zijn foto's beschikbaar gesteld door Het Geldmuseum.

druk
Peeters, Leuven

The Monetary Economy of the Netherlands, c. 690 – c. 715 and the Trade with England: A Study of the Sceattas of Series D.

W. Op den Velde
and
D.M. Metcalf

Table of contents

Foreword

In an enjoyable collaboration spread over three years we have exchanged ideas, back and forth, and have gradually clarified our judgement about the interpretation of the very plentiful sceattas known to numismatists as Series D. The heart of the project, on which all our analyses depend, is a die-corpus of more than a thousand specimens, gathered from museums and collections far and wide. Classifying all these coins into varieties and sub-varieties was a daunting task, calling for determination and persistence. Checking them all against each other in order to establish exactly how many were die-duplicates, and how many different dies were known, was even more exacting. Once all this basic work was completed, many possibilities for analysing the data were opened up. In particular, the numerous specimens that have been recovered in the last twenty years or so by metal detectorists, and kindly reported to the curatorial staff of national and other museums, have created a large random sample of single finds – coins that were accidentally lost by their owners, no doubt much to their exasperation. These single finds of Series D are scattered all over the Netherlands, and all over England too. Just because they are random losses, they can be used to reconstruct the composition of the currency from which they fell out. They make possible regional comparisons, both within the Netherlands, and between the Netherlands and England. We cannot over-emphasize the scientific importance of randomness of the database.

The coins are evidence, first and foremost, of economic activity and of inter-regional trade. They add a new and completely independent perspective to what (little) is known about the history of the Netherlands in the time of Radbod. The sceattas of Series D were no respecters of political frontiers. They are found in abundance in both Frisian and Frankish-controlled territory – and our classification into varieties allows us to establish as a fact, that the coins from the same mint-place circulated both in Friesland and in the region of the big rivers.

The emporia of Domburg and Dorestad have usually figured prominently in the comments of general historians of the early middle ages. Our analysis of the single finds creates a wider and much more detailed geographical perspective. Wijnaldum and Katwijk come into consideration, but above all a thick carpet of accidental losses in small settlements through the countryside.

The question of the place(s) of production of the Series D varieties proved to be far from simple, and it may be approached in two ways. One is to be very reticent, and to avoid or postpone most conclusions, because the data

are still inconclusive. The other approach is, on the basis of the limited facts, to describe the most likely possibilities at this moment. The first approach is scientific, safe and also very boring. The latter is more risky, but stimulating and also sound from a scientific point of view. We have deliberately chosen the second approach, and in the text the strong and weak points of the hypotheses we have generated are clearly discussed.

New coin finds come to light year by year and, thanks to the cooperation of detectorists and archaeologists, they are being faithfully and reliably recorded. We have tried to be forward-looking, and to present our research in such a way that others can build on it in the future.

The place of Series D in the sceatta coinage

Around 670 in Merovingian Gaul as well as in England, the gold tremisses, which had been the standard currency for more than a hundred years, and which eventually had become severely debased, were replaced by coins of similar weight and module struck in fine silver. This major coinage reform thus saw the birth of the silver penny which became the standard denomination throughout most of Europe in the Middle Age. 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 eighth century there was a proliferation of coin types.

What these silver pieces were called undoubtedly varied from place to place. In Latin it was simply *denarius*. Coin collectors and dealers used, long ago, to refer to the Merovingian silver pieces as saigas, a usage that has been abandoned. But they still refer to those from England and the Low Countries as sceattas (singular in English: sceat, in Dutch: sceatta). 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 Æthelbert of Kent where it is used, just to refer to an equivalent weight of gold.[1]

The insights into the chronology of the sceattas are largely based on the presumed dates of concealment of some 25 hoards, both in England and on the Continent.[2] A major breakthrough was the study by Stuart Rigold 'The two primary series of sceattas'.[3] Instead of types, Rigold introduced the concept of series. He showed that the English sceattas fell into two phases, a primary and a secondary. This division is well-founded, but the picture of the emissions of sceattas is more complex. He considered that the small English Series Pa and Va antedated the primary phase, and were transitional types struck during the shift from gold to silver currency. They exist in both pale gold and silver, and belong to a preliminary phase. The following scheme gives the approximate dating:

1 Grierson & Blackburn (1986) p 157.
2 Grierson & Blackburn (1986) p 184.
3 Rigold (1960/61).

preliminary phase	c. 675-680
primary phase	c. 680-710
secondary phase	c. 710-760

The secondary phase may be subdivided in early-, mid-, and late secondary.[4] Most sceattas of the primary phase are of very pure silver, with traces of gold. In the secondary phase an early attempt to maintain a similarly high standard of fineness was quickly abandoned, and in the course of time there was a gradual or stepwise decrease of the silver content.

It is generally accepted that the various sceatta types were issued in many different regions. For example, archaeological evidence and the distribution of single finds clearly indicate that Series H (*BMC* Types 39 and 49) was struck at or near Southampton (Hamwic).[5] There is little information on the background of the issuers or on the degree of official regulation. On the other hand, there is secure numismatic evidence for substantial trade between England and the Continent during the first half of the eighth century.

BMC type 2c (belonging to Rigold's Series D) is called the Continental runic type because of its runic legend *æpa* and because of many finds on the European mainland. Together with the much scarcer Types 8 and 10 it forms Series D. The sceattas of Series D first appeared around 695-700, in the middle of the primary phase. Most specimens have, like the English primary-phase sceattas, a silver content of over 90 percent. The weight varies between 1.30 and 0.70 g, but the simultaneous production of whole and half sceattas, as some coin dealers tend to suggest, is unfounded. The supposed half-sceattas are nothing more than specimens which have suffered internal corrosion and leaching while buried in the ground. The issue seems to have ended sharply by c. 715, perhaps as a result of the pressure which led to the fall of weight. In the currency of the Netherlands this type was apparently superseded by the secondary-phase porcupine/standard sceattas (Series E^2).

Around 700 – 710, the money circulating all over the Netherlands was of silver coins of one denomination, weighing around 1.2 g. Gold pieces had disappeared from the circulation. There are no indications that besides the silver coins also base metal money has been in use at that time. The vast majority of these small silver pieces – over 90 percent – were sceattas of Series D, in particular Type 2c. There also circulated some Merovingian deniers, a few English primary-phase sceattas of Series A, B, and C with their imitations, and the early variants of the

4 See page 25 for an extension of this scheme with an intermediate phase.
5 Metcalf (1993b) pp 321-332.

porcupine/standard type (Series E^1). The composition of the Remmerden hoard is most likely illustrative of the circulating money in c. 710 (see pages 30 and 59).

The composition of sceatta hoards, and also regional assemblages of single finds, shows however that all the types became thoroughly mingled in circulation, especially in England. During the same years c. 700 – 710, Series D made up roughly 20 percent of the English currency. The specimens found in England are often struck from the same dies as specimens found in the Netherlands. It is therefore certain that they were in general money that had been exported from the Netherlands to England (see pages 109-112). Series D quickly became so well known in England, that it is not surprising that it should have been imitated there. Around one in ten of the English finds of Series D, that is c. two percent of the English currency, may be English imitations (see pages 87-89).

The development of the designs in Series D

Introduction

BMC type 8 *BMC* type 2c *BMC* type 10

There are three distinct types within Series D. The obverse design of *BMC* Type 2c, the Continental runic type, shows a bust, facing right on most coins, with in front a runic inscription *æpa* (often blundered), and behind the head sometimes a large **A**. Two related varieties, namely *BMC* Types 8 and 10, share in one case the reverse design and in the other the obverse design of Type 2c. They are 'double-reverse' and 'double-obverse' designs respectively.

The Continental runic type (*BMC* Type 2c)

The obverse design of the Continental runic type is a close copy of the English sceattas of Series C which were struck in Kent c. 695-710.[6]

Series A sceat Kent, c. 685-700 Series C2 sceat Kent, c. 700-710 Both × 2

6 Series C is divided into C1 and C2, C1 has, just like Series A, a tufa above and a cross below the square on the reverse; in C2 the reverse border is simplified into four crosses, and they are more coarse and spindly in style.

The obverse design of Series C sceattas is similar to Series A, with the legend **oTIC** in front of the head replaced by *æpa* in runes. Series A sceattas were struck in Kent between 685-700. In their turn the design of Series A coins are a montage of elements borrowed from earlier Kentish gold thrymsas.[7]
In the Low Countries the obverse of Series C was used for the huge issue of Continental runic sceattas.

Limmen grave find | Midlum Corpus no. 163 | Birchington grave find | Leiden Corpus no. 193 | All × 2

On the best sceattas of Type 2c the obverse is virtually indistinguishable from Series C2. One might even wonder about purloined or transferred dies. Yet, a comparison of some 70 coins of Series C with over 900 coins of Type 2c yielded 20 die-identical obverses within Series C, but not a single die link between Series C and Type 2c.
It is less easy to indicate the origin of the rather simple reverse design of Type 2c. This reverse design is quite different from the English Series C2. It shows a cross with four large pellets in the quarters, surrounded by blundered letters. Many of them have a cross and opposed to it a bold annulet in the pseudo-legend. In between the crosslet and circle something like **Λ V Λ**, sometimes with an **N** is seen. We have been unable to relate this pseudo-legend to a meaningful word or text.
There are numerous Merovingian gold and silver coins with a head on the obverse and a cross surrounded by letters on the reverse. They were well known in the Netherlands. The style of the head on these Merovingian issues is quite different from Series C and Type 2c, on which the head is covered by a kind of radiate crown.

7 Rigold (1960/61).

gold gold pale gold silver silver

Merovingian coins with a cross on the reverse. The last coin was found at Domburg
All coins actual size.

These Frankish coins may have inspired the reverse design of Type 2c. Perhaps also a silver coin found in the province of Friesland could have served as example for the reverse.

A Madelinus/Dorestad tremissis and a silver copy, found at Dongjum (× 2).

This crude silver copy of the well-known Madelinus/Dorestad tremisses shows a cross with bold pellets and blundered letters.
The design of the Continental runic sceattas soon underwent degradation. By the time the Aston Rowant hoard was deposited c. 710 it had undergone virtually its full development. It was the largest element in this hoard (179 out of 324 coins). The runic word *æpa* is sometimes preserved in a recognizable form, but it is often entirely blundered. On some the bust is so degenerate that is it just a series of Vs (representing the crown) and pellets. The simple reverse design suffered less from decay, apparently because it is so elementary. We suppose that either a great demand for these coins led to hasty and untidy die-cutting, or that large scale unofficial minting by less skilled workmen took place.
There are three additional distinguishing features between the coins of Series C and Type 2c. Firstly, on Series C sceattas struck off centre one can see that the designs were surrounded by a dotted line, with a circumference considerably

larger than the coin flans. This is not the case in Type 2c. Secondly, most official Series C coins have the obverse and reverse regularly adjusted at 0°, 90°, 180° or 270°, suggesting the use of square dies. In the Continental runic type the obverses and reverses are randomly adjusted. Thirdly, many Type 2c coins have a very high relief of the design, in particular of the cross-and-pellets side. This is apparently the result of deep cutting of the dies and a firm strike of the hammer during the production.

Types 8 and 10

BMC Type 8
Corpus no. 121

BMC Type 10
Corpus no. 320

Both × 2

BMC Type 8 shares a very similar cross-and-pellets design with Type 2c, but in place of the radiate bust it has a standard, often with tufa above. The letters **T T / ** in the standard of the English Series A and C (see page 4) are replaced by a simpler pattern of L-shaped pseudo-letters. Type 8 is thus composed of two reverse designs (although one of them must, of course, have been on the lower or anvil die). Whether the cross-and-pellets design was first used on Type 2c, from where it was imitated by Type 8, or *vice versa*, is conjectural, being dependent on which was introduced first.

Rigold included Type 8 in his Series D, thereby creating an untested presumption that both types were from the same mint-place. So far, no die-links between Type 2c and Type 8 have been discovered. Type 8 is much scarcer than Type 2c. Type 8 coins are of high quality silver alloy, and they are present already in the Aston Rowant and Remmerden hoards, indicating that these types are contemporary.

BMC Type 10 combines the obverse (radiate bust) of Type 2c with a version of the so-called 'porcupine' design. There are obverse die-links between Types 2c and 10. This indicates that Type 10 is closely connected to Type 2c, but does not prove production by the same mint. A minor mint might have begun by making close imitations of Type 2c, and might then have embarked on its own distinctive design. Type 10 and the die-linked specimens of Type 2c are rare, fewer than 30 coins being known.

Imitations and counterfeits

Sceattas were subject to imitation, especially in the primary phase, where all the major series include specimens which one can point to as being unofficial. It would be most surprising if this were not true also of Series D. Stuart Rigold, in his classic paper defining the various series of sceattas, was well aware of the wide spectrum of imitations and counterfeits – and of the practical difficulties of deciding between 'official' coins, produced in England under some degree of royal control, and copies of good quality. He wrote, 'The most imponderable lines are those between the passably orthodox, the tolerated imitation, and the downright fraudulent'.[8] Contrary to the title, Rigold's scheme also includes the continental sceattas such as Series D and E. In defining what was orthodox in each series, Rigold laid emphasis on 'internal [stylistic] coherence', that is, the settled habits of die-cutters. Lord Stewartby has usefully reminded us 'that, whereas close stylistic similarity between two coins normally amounts to proof that they are from the same workshop, dissimilarity does not prove the opposite'.[9] We can extend and amplify Rigold's spectrum, stretching from the official to the fraudulent as follows:

1. In East-Anglia, Series A → Series C copies lead to the development of Series R.[10] Series R was struck over a long period and shows progressive variation and deterioration of the design, and a decline of the weight and fineness of the metal.

R1	has the runic legend EPA	weight 1.20-1.25 g, 91-95% silver
R3		weight 1.05-1.15 g, 70-90% silver
R5		weight 0.80-0.90 g, 60-75% silver
R7	head with no neck	weight 0.80-1.10 g, c. 50% silver
R8	" " " "	weight 0.70-0.90 g, 24-38% silver
R9-12		weight 0.70-0.90 g, 7-35% silver

This officially sanctioned design was produced in two (or more) separate mint-places, and by different die-cutters, e.g. Series R includes Types R5 and R9, minted at Burgh Castle or nearby, with a different distribution pattern from the main sequence, small differences of style, and sometimes a different runic

8 Rigold (1977).
9 Stewart (1984); the name is now Stewartby.
10 Metcalf (1994) pp 502-523.

inscription. Both these, and coins from the main mint, were (as their users saw them) of 'the same design' and were equally acceptable – because both mints belonged to the kingdom of East Anglia.

2. In an age of small political unities, a sceatta type was copied in a mint place lying outside the kingdom where it originated, but not outside its sphere of circulation. Sometimes both obverse and reverse were copied, sometimes only one side. This was presumably done in genuine admiration, or as a tribute to the commercial acceptability of the prototype. There was no intention, or almost no intention, to deceive. Series D, Type 2c begins, after all, with very careful copies of the obverse of the English Series C. This happened at a major mint, the activity of which was public knowledge: there was nothing secretive about it.

3. In similar circumstances a much smaller mint, perhaps in a small town with a less active commercial life, might produce a more or less direct copy of an acceptable prototype.

Type 2c Type 10

Type 10, for example, seems to have begun in that way, although it then changed one side of its coins to a more distinctive design. The two varieties are die-linked.

Type 2c sub-variety 3c, with laterally reversed bust, probably an English imitation (Corpus no. 654)

Similarly, there is a group of copies which are laterally reversed imitations of Type 2c, localized in England rather than in the Netherlands, and presumably minted in England (see page 87). Perhaps they belong to an English town which

traded across the North Sea, and whose merchants were therefore familiar with Type 2c. The users could have noticed that the bust was left-facing. Probably they did not bother about it. Such coins mingled in the currency of the Netherlands. The average weight of sub-variety 3c is, at 1.28 g, exemplary.[11] The alloy of only one apparently English imitation (of sub-variety 3h) has been analysed. Its 'silver' content is at 86% substandard (see page 57). Was there an element of sharp practice here?[12]

4. Specimens of Type 2c with extremely blundered obverse designs, which one would hardly recognize as a radiate bust at all, without prior knowledge, pose slightly different problems of interpretation. They exist in very large quantities. Were the dies cut in great haste? However hasty, any die-cutter could have done better than what we see. Were they imitations, produced at some other mint? Or were they manufactured here and there by (very) unskilled persons, in small-scale initiatives? It is, generally speaking, only the die-cutting that is at fault: the other technical processes involved in manufacturing a coin, such as the preparation of the flans and the actual striking, are normally competent enough.

Corpus no. 856

Corpus no. 988 Both × 2

Some of them are of excellent alloy and very adequate weight (Corpus no. 856); others may contain only 86 percent 'silver' instead of c. 95 percent (Corpus nos 898 and 988).

Corpus no. 898

Corpus no. 850 Both × 2

11 Corpus nos 640, 644-6, 649-52, 657-60.

12 The famous example, from the middle ages, concerns the Serbian imitations of Venetian grossi. Although their silver alloy was very good, their average weight soon began to drop below the Venetian standard. A strict embargo was imposed against them on the Rialto – because they tended to damage the reputation of the republic's coinage.

Yet others may be seriously sub-standard, e.g. a well preserved specimen in degenerate style weighing only 0.54 g. (Corpus no. 850). Coins like these are quite possibly a 'mixed bag', and it may be a mistake to try to apply a single explanation or a single context to all of them. Perhaps the significant fact about them is that, as a group, they make up a considerable proportion of all the stray finds (and they occur in similar proportions in the hoards). There is no reason to think that they are over-represented in our database, in relation to the numbers that were struck. That means that, taking them all together as a group, they were manufactured in quantities running into many hundreds of thousands. These are not what one thinks of as typical imitations. Who could have operated on such a scale? And where? There is also the question of how they were put into circulation. It was not a clandestine operation, on this scale. The work of punching the design into the die is by no means the most time-consuming nor the most expensive part of the whole process of minting sceattas. Anyone could see the difference, whether they were Frisian or Frankish or Anglo-Saxon, between a radiate bust and a hopelessly jumbled dyslexic version of the same, in which a human head is hardly recognizable. Yet it seems that no one cared. These coins were acceptable. If they had not been, the people who made them would soon have given up pouring time and effort, and silver, into the project. It is difficult to enter into the mentality that lies behind such clumsy, incompetent coins. The only reasonable explanation that has occurred to us is that the head was deliberately made unrecognizable, to avoid infringing the prerogative of the ruler whom it represented. Perhaps there was some kind of stand-off between the ruler, and an urban community of merchants, who were the real moneyed class.

Corpus no. 621 × 2

5. Then there are severely debased coins, of which the style may reveal faults, but which are intended to look like the real thing, in a poor light (Corpus no. 621). Note that the reverse design is inaccurate, borrowing from Type 8. We have now definitely crossed the line, into the fraudulent.

6. Plated forgeries on base-metal cores are, again, clearly fraudulent in intention.[13] There was an example of Series D, Type 2c in the Birchington grave-find, from Kent (Corpus no. 1111), and an example of Type 8 in the Aston Rowant hoard, whose surface showed 85 percent silver (Corpus no. 119); exposed areas of the core were separately analysed, and showed essentially nothing but copper.

Given the six categories described above, scrutiny of the database for forgeries and imitations is not a single, and certainly not a simple operation. It is perhaps more difficult for Series D than it is for several other primary series, because the design of the coins, other than a handful of the best copies of Series C, is rather simple and unsophisticated.

Corpus no. 1111 Corpus no. 119 Both × 2

Also, the style is variable, as one might expect in such a major issue. Rigold's criterion of internal coherence, which should reveal the black sheep, does not work very well, because the style is not as coherent, nor as accomplished, as it might be. The rapid circulation of the currency, both in the Netherlands and in England, quickly blurred any localization that may originally have existed. Die-alignment is erratic, even in the best coins. In an ideal world, that is, with an unlimited amount of data, histograms of weights or of alloys might offer tell-tale clues to activity outside the main official mint (or mints). But first one has to define the groups of coins from which the histograms are constructed.

That creates a practical problem. Several of the sub-varieties that we have proposed in our classification are by no means stylistically coherent. In an attempt to accommodate all or almost all the material into a scheme of classification, we may well have 'buried' imitations among the officially-produced or publicly-produced coinage.

13 XRF analysis of the uncleaned surface of sceattas has sometimes shown dramatically higher silver measurements, even when the coin was deep chestnut brown in colour. L. Cope has shown the possibility of silver-washing by dipping in molten silver chloride.

Sub-variety 2d (Corpus no. 339) T&S no. 213 Both × 2

Thus, for example, in sub-variety 2d there is an obverse die on which the radiate crown curves deeply, to hang down behind the neck like an American-Indian head-dress. Dies strongly reminiscent of this one are known with other reverse types.[14] The style is, in any case, so abnormal for Type 2c that one would prefer to think of it as well outside the main stream, and certainly unofficial.

Assessing the official character (or otherwise) of Type 8 is even more difficult than it is for Type 2c, because of the geometrical simplicity of the design. The lack of a bust means that there is very little by which the die-cutter's distinctive 'hand-writing' could be recognized.

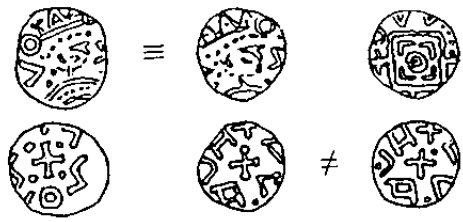
Type 8 (Corpus no. 113) Type 2c, sub-variety 2b (Corpus no. 280) Both × 2

The pseudo-letter ⊓, which is seen on the cross-and-pellets side of many specimens of Type 8, is routinely imitated on Type 2c, sub-variety 2b. These coins have in the past been described as 2c/8 mules (Corpus no. 280) implying that they were transitional between the two types, using obsolete Type 8 dies with the new Type 2c obverses. This now seems very unlikely, both because the blundered runes are implausible on early obverses of good aesthetic quality, if they were official, and also because the cross-and-pellets design seems to have been on the obverse die of Type 8. The survival-rate of sub-variety 2b is such that it could in principle be the product of another small mint. As to where such

14 Type C2, e.g. SCBI Midlands 63; Coin Register (1998) 53 and an R1,2/VICO mule (Metcalf 1993b no. 213).

a mint might have been located, single finds of sub-variety 2b should be the best indication. The pseudo-letter ⊓ could, after all, have been imitated almost everywhere.

A more delicate problem altogether concerns the extremely similar reverse dies sometimes found in Type 2c sub-variety 3h and in Type 8 respectively. As the reader may judge from the illustrations below, there is an obvious prima-facie case that the reverse dies of Corpus no. 916 and 28 were cut by the same hand. Because there are strong reasons to think that sub-variety 3h is English, and strong reasons to think that Type 8 is not English, one should look for some other hypothesis, for example that the relevant specimens of Type 8 (Corpus nos. 28-31 and 58-9 – and others?) are English imitations, and are not from the same mint as the main part of Type 8.[15] The English provenances are mostly southerly, e.g. Trimley St Martin (Sf), East Tilbury (Ess), Lashley Wood (Ess), and Spalding (L). It seems that any other hypothesis such as that of an itinerant die-cutter, would have unacceptable chronological implications. One should be alert to the possibility that specimens of Type 8 and of Type 2c sub-variety 3h could turn out to be actually die-linked – like Type 10 and sub-variety 2c.



Type 2c Sub-var. 3h Corpus no. 915 | Type 2c Sub-var. 3h Corpus no. 916 | Type 8 Corpus no. 28

It is the fourth category above (i.e. with extremely blundered obverse designs) which creates many of the practical problems of recognizing and understanding the imitations. Any failures to reproduce the official design correctly (which might in another series amount to a tell-tale sign of imitation) could be merely within normal parameters for the large and varied fourth category.

But we should not assume that all unofficial imitations will be clumsy. Die-cutters were sometimes surprisingly skilled at reproducing the style of their

15 Note that corpus nos 28-31 are all from the same cross-side die – and that corpus no. 28 is from the same 'standard' die as no. 27, plate 2.

model. We see that in the group which includes Type 10 – and, of course, in the initial copying of Series C.

One strategy which suggests itself is to look for small groups or clusters of distinctive specimens among the English find-material, which find no parallel among the finds from the Netherlands. Because Type 2c was an export coinage, the flow of money is in an outward direction, with only limited counter-flows towards the Netherlands. That is the statistical argument by which some sub-varieties have been interpreted as English.

The same basic argument can be applied to *BMC* Type 50, which again is technically a 2c/8 'mule'. Rigold spoke of 'the passably orthodox, the tolerated imitation, and the downright fraudulent'. One senses the need for an additional sort, namely opportunistic counterfeits. They might contain 85 percent silver, and have an average weight that was 85 percent of what it should be. In combination the silver contents would then be 72 percent of the norm, which would offer a small-time counterfeiter a worth-while margin. Coins of that description, once they had been put into circulation, would be analogous to a 'victimless crime'. Some of them may be lurking among our Variety 3, where they will remain difficult to detect until a substantial programme of non-destructive chemical analysis has been completed. One would perhaps expect them to have had a lower average output per die than the official coins, and therefore a lower survival-rate per die.

Another, independent strategy is to look with a critical eye at the Domburg finds, for stylistic irregularity. In other series, where the practical problems are less severe, there tends to be a rather high proportion of imitative or fraudulent coins. We might expect the same in Series D. The weight and alloy will, unfortunately, be unreliable guides, because many Domburg coins have suffered badly from corrosion and leaching. Our subjective impression is that as many as 20 or 40 percent of the Domburg coins of Series D could be to some extent fraudulent.[16] In hoards such as Remmerden or Aston Rowant, by contrast, the proportion would be much lower.

16 Domburg 110-266 includes specimens of Varieties 3 and 4, but also many dubious pieces.

Modern forgeries

A coin of Type 2c with an acceptable obverse design, but a reverse with unusually shaped pseudo-letters, and a too regular edge, with a weight of 1.32 grammes had a quite acceptable brown patina. X-ray analysis by 'isoprobe' revealed an alloy of lead, tin and bismuth, and the complete absence of silver, gold and copper, thus proof of a modern forgery.[17] Another modern forgery of a specimen of Type 2c was published in 1984, together with some other recently made early English coin types.[18]

Forgery of lead, tin and bismuth Forgery published in 1984 Both × 2

A coin of Type 8, acquired well before 1941, is also a modern forgery. Metal analysis showed 91-93% silver and 7-9% copper, with the absence of trace elements, and this corresponds with sterling silver.[19] A Type 8 coin, with a very large flan, and an unusual design with many circles on the cross side, is possibly also a modern fabrication.[20] It bears a marked resemblance to a coin published by Lelewel in 1835 (see illustration on page 21).

A spurious Type 8 coin × 2

17 Metcalf (1978).
18 Spink's Numismatic Circular (May 1984) p 113.
19 Metcalf & Hamblin (1968).
20 Auction Coin Investment 38 (1991) 364.

Nineteenth century collectors had an unfortunate habit for making reproductions of rarities in their collection as gifts for their friends.[21] An example of such replicas, subsequently taken as originals, are perhaps two Type 10 coins. They seem to be cast from a genuine coin, but they are too heavy. A cast specimen of Type 10, present in the collection of the Geldmuseum (The National Collection of the Netherlands) originated from the collection of Marie de Man. Its weight is with 1.61 g excessive, and on microscopic examination it has the characteristics of being cast, and not of being struck.[22]

Cast copies of *BMC* Type 10 Both × 2

Another Type 10 coin in the former Lockett collection (ex Grantley collection) also has the same characteristics, as far as can be ascertained from its photograph, and the weight is again certainly excessive, at 1.52 g.[23] It is conceivable that a genuine coin was used to prepare a mould for casting duplicates. This was perhaps the coin illustrated by De Belfort under no. 6796, ex Duhamel, weighing 1.35 g (Corpus no. 322). It is certain that there should be a genuine original, because another die-duplicate was excavated near Valkenburg (ZH), over a hundred years later (Corpus no. 323). Ultimately, non-destructive metal analysis will probably offer a firm verdict.

Doubtful sceattas auctioned in 1997 × 2

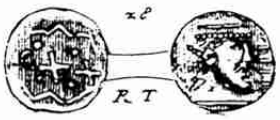
21 Grierson & Blackburn (1986) p 443.
22 Op den Velde (1985).
23 Metcalf (1993b) p 250.

Among sceattas, auctioned in November 1997, some porcupines and a Type 2c coin are highly doubtful because of their unusual and very clumsy design. This is in particular true for an E/D mule, and a Type 2c coin alleged to be found near St. Annaparochie (Fr).[24] Although genuine E/D 'mules' (i.e. contemporary counterfeits) are not unknown (Corpus nos 156-7), note, however, that the 2c/8 mule (Corpus no. 280), should be understood as a regular 2c variety, which borrows certain details from the (earlier) Type 8. The 'St. Annaparochie forger' has been rather too inventive in combining unrelated obverses and reverses. In conclusion, older copies and recent forgeries of Series D sceattas might be commoner than is generally believed. The forgeries and suspect coins were excluded from the die-corpus of Series D. It remains possible, however, that some non-genuine coins have accidentally been included in the Corpus.

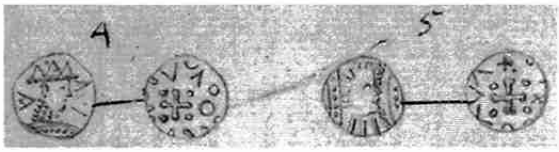
24 Auction Coin Investment 52 (1997) 340, 341, and 347.

Overview of earlier studies

The first illustration of a Type 2c coin is to be found in *Camden's Britannia*, followed by a drawing by A. van Dam of two similar specimens found on the beach of Domburg.[25] The second edition of Archdeacon Battely's study of Reculver includes a specimen of Type 2c; and another from the same locality is illustrated by Withy and Ryall.[26]



Camden (1695)



Cannegieter scriptum (c. 1735)

Battely (1745)

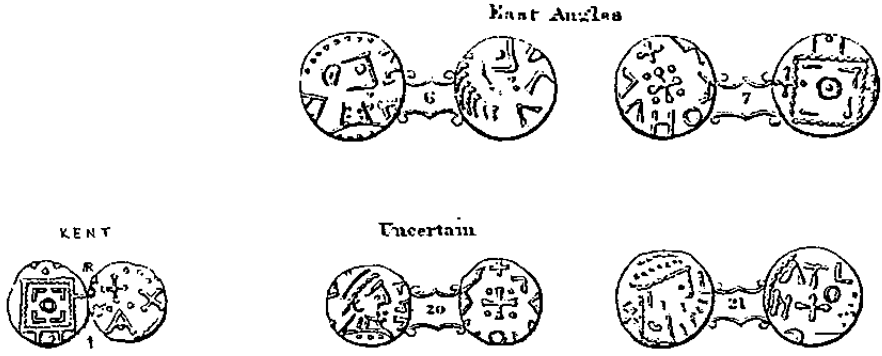
A Type 8 coin (listed under Kent) is shown in *Numismatique du moyen-âge*.[27] In *A view of the coinage of the Heptarchy* are illustrated a Type 10 and Type 8 under 'East Angles', and two Type 2c coins under 'Uncertain'.[28]

25 Camden (1695) Tabula II no 38; Drawing by A. van Dam for the never published Cannegieter scription, around 1735. University Library Leiden BPL 953 IV.

26 Battely (1745); R. Withy & I. Ryall (1756). Stowe (British Museum Manuscript 1049) adds a Type 8 again from Reculver or nearby.

27 Lelewel (1835) Planche X no. 1.

28 Lindsay (1842) Plate 1.



Lelewel (1835) Lindsay (1842)

In England, in the first part of the nineteenth century, important numismatic works were published by the Reverend Rogers Ruding (edited by J. Young Akerman), Edward Hawkins, Keeper of Antiquities in the British Museum, and John Lindsay, barrister-at-law in Cork.[29] These three publications are more or less contemporary and amplify each other, and they include the first solid essay on sceattas. Ruding attributes the sceattas to the Anglo-Saxons, Hawkins dates these coins between 500 and 700, and points out that it is uncertain if the Angles and Saxons brought the sceattas to Britain or started minting only after their crossing of the North Sea.

The coin type that played an important role in early attempts to date the sceat coinage

The – according to modern insights – much too early dating was based on a sceat with on the reverse Æthiliræd in runes, which was misread as Ethilbert, and erroneously attributed to Ethilbert I, King of Kent, who reigned from 568 to 615. Furthermore, this coin was believed to postdate the uninscribed sceattas.[30]

29 Ruding (1840); Hawkins (1841); Lindsay (1842).

30 In the British Museum Catalogue (Keary 1887) this coins is attributed to King Æthelred of Mercia (674-704), which is also unlikely. The attribution of this type is still uncertain, see Metcalf (1993b) pp 120-124 and Metcalf (2001) pp 44-45.

The English authors are of the opinion that most sceattas were struck after the conversion of the English to Christianity, following the Gregorian mission (597 onwards). Conbrouse mentions sceattas inquiringly as *deniers cisrhènans (pennies of this [the French] side of the Rhine)*.[31]
Jonkheer Rethaan Macaré published his first treatise on the coins found on the beach of Domburg in 1838. He considers the cross-and-pellets side of Types 2c and 8 as proof that they were minted by Christians.[32] His second treatise was published in 1856. He had visited the British Museum in 1851 and understood there that in England most sceattas were found on the beaches of Kent. With this information in mind and because of the runic inscription on Type 2c he attributes this type *"one may safely say to Kent"*.[33] Dirks (1870) also considers the runes on Type 2c as proof of a non continental origin.[34] In the Dutch standard work on early medieval coins by Van der Chijs over 64 sceattas are illustrated. Van der Chijs takes a prudent point of view*: eene muntsoort van welke het niet met zekerheid bekend is van welk volk zij is uitgegaan (a kind of money of which there is no certainty by which people they were issued)*, and he cites the dating suggested by Hawkins. Although, the good numismatic intuition of Van der Chijs resonates in a footnote: ... *het is mogelijk dat ze op het vasteland het eerst zijn geslagen (... it is possible that they were first struck on the mainland)*.[35] At the end of the nineteenth century sceattas were believed to have been produced between 600 and 760.[36]
The question raised again and again is whether these coins were struck in Britain and exported to the Continent, or struck in Friesland and exported to Britain.[37]
Marie de Man made extensive studies of the sceattas found on the beach of Domburg. Like Rethaan Macaré, Marie de Man had one Type 2c coin sacrificed for destructive metal analysis (see page 55). She writes: *Almost all sceat types described in the interesting British Museum Catalogue*[38] *were represented in the Domburg finds. Certain types, rarely found in England, are nevertheless abundant amongst the pieces collected on our littoral. It is quite probable that these sceattas have been struck in our parts, either by the Anglo-Saxons, or by the Frisians, or by the Franks who dwelled near our country*.[39] Marie de Man

31 Conbrouse (1840/41) the author's name is often written as Combrouse.
32 Rethaan Macaré (1838) p 23.
33 Rethaan Macaré (1856) p 35.
34 Dirks (1870) p 553.
35 Van der Chijs (1866) p 28.
36 Evans (1894).
37 Evans (1864) p 24.
38 Keary (1887) remained for a long time the standard work of reference for Anglo-Saxon coins.
39 De Man (1899) pp 63 and 99.

further argues: *the runic characters* apa *and* epa *are of moneyers of that epoch*, and she contradicts the opinion that these runes indicate a Mercian King.[40] She also disputes the opinion of John Evans, that all sceattas with runic inscriptions are East Anglian. She advocates a Frisian origin for Type 2c: "*Il nous semble que ces pièces doivent provenir d'une frappe frisonne de nos contrées*".[41] This important new insight was, however, neglected by Boeles in his standard work on Frisian history, published in 1927: *Until the Carolingian period, the coins of the Frisians are of gold, with exception of the so-called sceattas, which were struck in England from 600 onwards.*[42]

In his important description and study of sceattas found in France, Le Gentilhomme – following Marie de Man – attributes Type 2c and Type 8 to Frisia: *The "cross-and-pellets" reverse may belong to Frisia, or even perhaps to the Frisian emporia on the coast of Gaul.*[43]

The progress of numismatics in the 20th century becomes clear in reading the second edition of Boeles's standard work on Frisian history, from 1951: *The earliest sceattas have much in common with the thrymsas and Roman prototypes. Those with PADA in runes belong to the earliest sceattas, formerly attributed to a king of Mercia, nowadays PADA is understood as the name of a moneyer.* Boeles now describes Type 2c as produced in the Netherlands, with Merovingian influence as appears from the cross design.[44] Le Gentilhomme dates the French hoards containing sceattas, reasonably enough, to the first half of the eighth century, and has even assigned one of them, the Cimiez hoard, a precise date of concealment, 737, the year of the destruction of the town by the Lombards.[45] According to Le Gentilhomme the introduction of the sceattas took place between 680 and 700, and their period of circulation fell during the first two quarters of the eighth century.[46]

In the 1950s the English numismatist Philip Hill visited the Netherlands and studied the sceattas in Dutch public collections. He concludes: *Many types are exclusively Anglo-Saxon and some are equally exclusively Frisian, yet the commercial intercourse between the two peoples seems to have resulted in their mutually copying each other's types, both originals and imitations.*[47] He considers Types 2c and 8 as Frisian: *BMC 2c may well be an intelligent*

40 De Man (1899) p 70.
41 De Man (1899) p 71.
42 Boeles (1927) p 154.
43 Le Gentilhomme (1938) pp 31 and 75.
44 Boeles (1951) p 369.
45 Blackburn (1984) pp 129-154 and Grierson have convincingly redated the Cimiez hoard to not later than c. 720.
46 Le Gentilhomme (1944).
47 Hill (1954) p 11.

Frisian copy of an English Runic obverse combined with a purely Frisian reverse.[48] Hill dates Type 2c between 660 and 680, and Type 10 around 670.[49] A major step forward was Rigold's study in which he showed that the English sceattas fell into two phases, a Primary and a Secondary.[50] He located the watershed between the two at c. 725, based on the then accepted dating of the Cimiez hoard.[45] Instead of the established system of reference by *BMC* Types, Rigold introduced the much better concept of Series, indicated by a letter of the alphabet.[51] He grouped the sceattas into 26 series in a partly mnemonic scheme, e.g. H for Hamwic, L for London, R for runic types, Y for York.[52] It was Rigold who grouped Types 2c and 8 together into a single series (Series D), thereby creating an untested presumption that both types were from the same mint-place. These series were divided between three phases, Primary, Intermediate and Secondary. The sceattas of the Primary phase (Series A, B and C) are confined largely to south-eastern England. They are neat in technique with little flexibility in the design, suggesting a well-controlled production. The approximate date of the Primary phase is 680-710, that of the Secondary phase c. 710-760.

Series A Series B Series C

Sceattas of the Primary phase (c. 680 – 710)

Series H Series L Series R

Examples of sceattas of the Secondary phase (c. 710 – 760)

The sceattas of the kaleidoscopic Secondary phase (Series H to R) are also English, more variable in technique, with well-organized, often highly original

48 Hill (1957) pp 321-324.
49 Hill (1959/61) pp 129-154.
50 Rigold (1960/61).
51 Rigold (1977).
52 There is a Series V and Va, but no Series I.

designs. Their silver content is more debased. Series S to Z remained enigmatic. In this Secondary phase there are many imitations at different levels, from quite acceptable imitations to low-quality contemporary forgeries. In 1980, Rigold introduced an Intermediate phase, overlapping the others in date (c. 695-740), and with strong Frisian or north-east Frankish connections.[53] The designs are aesthetically more negative and barbarous. In his definition, Series D, E, and G were Intermediate.[54] Rigold thought that Series E (the 'porcupines') was to be divided between England and the Continent, and that Series D (*BMC* Types 2c and 8) was Frisian but might include English imitations.

Series D
Type 2c

Series D
Type 8

Series D
Type 10

Series E

Series G

Sceattas of the Intermediate (Continental) phase (c. 695 - 740)

In his 1960/61 article Rigold listed *BMC* Type 2c as "Runic Type R3", in his 1977 article as "Frisian Runic". The more neutral term "Continental runic type" was introduced in 1982.[55]

During the Seventh Oxford Symposium on Coinage and Monetary History in 1984 Blackburn presented a revised chronology and dating for the sceat coinage, suggesting 700 to 710/715 for Series D.[56]

At the same symposium Metcalf argued on grounds of the relative frequency of different sceatta types as site-finds at various sites, that Series D is in any case certainly not English.[57] In a chapter of *Thrymsas and Sceattas* published

53 Rigold (1980).
54 Initially Series G was listed as early secondary, see Metcalf (1993b) pp 266-274.
55 Op den Velde (1982), following a suggestion by A. Pol.
56 Blackburn (1984) pp 165-174.
57 Metcalf (1984) pp 159-164.

in 1993 Metcalf attempted to distinguish the places of origin of Series D and E by comparing the percentages of site-finds which each contributed to the places which then seemed to be the obvious candidates as the location of the mints. He calculated the proportions of Series D and E as a percentage of finds of all series of sceattas, in England, at Domburg, and at Dorestad. The percentage figures were in 1993 as follows:

	D	E
England	6.4	20.7
Domburg	21	47
Dorestad	7	47

He compared these statistics with the evidence derived from hoards, and explored various potential weaknesses of the argument (including the possibility that neither series was from a single mint-place), but concluded that Type 2c, which was relatively much more plentiful at Domburg than at any other site (even though Series E was absolutely more plentiful), may have been minted there. However, we are now in a much stronger position to reconsider the facts, using a very much larger data-base of single finds of Series D (and also of other series) than was available in 1993. The results of this analysis are presented at pages 82 ff.

Summary

Over the centuries again and again the big question was whether the sceattas of Series D were minted and used in England but also exported to the Continent, or struck and used on the mainland but also exported to England. They were first considered English, but gradually more and more arguments were found for production in the Netherlands, although imitation on a limited scale in England was not excluded. The consensus which had developed by 1984 was very fairly stated by Lord Stewartby when he wrote "*I have for convenience used the term Frisian to cover those continental types which have frequently been found in Frisia, without meaning to imply that they were all necessarily struck by the Frisians .... Also common in Frisia are the two types of Series D. [Type 2c] has an obverse copied from Series C, the other a standard type copied from Series E. Despite the strong representation of these Series D types in the Aston Rowant hoard, they are otherwise rarely found in England* [!], *and most if not all of them seem likely to have been struck in the*

region of Domburg, where they are especially common".[58] Over the years the date of issue of Series D was pushed forward from 500 – 700 to c. 695-715, that is to say contemporary with the primary phase in England, rather than with the 'intermediate'. The current dating is mainly based on the date of concealment of the Aston Rowant hoard, found 1971 (t.p.q. c 710),[59] which contained Series D in abundance, together with English primary types, but no secondary coins. Series D is mostly struck from high-quality silver alloy.

58 Stewart (1984) p 19; the name of the author is now Stewartby.

59 In numismatic usage, *terminus post quem* (t.p.q.) means, in effect, the (earliest) date of the latest coin in a hoard. The date of deposit of the hoard could well be later than the date of the youngest coin, but is not demonstrably so. If there was some catastrophe a couple of years after the t.p.q. of a hoard, it will appear probable that the hoard was lost, or not recovered, because of the catastrophe, but that is to some extent speculative.

Compilation of a die-corpus

Photographs of sceattas of Series D were collected from books, journal articles, auction sale catalogues, dealers' price lists, internet data bases and from private collections. All pictures were enlarged to 200% natural size by photocopying. As a safeguard against unconscious bias obverses and reverses were separated and die-checked blind (the find spot or origin was written on the reverse of the photocopies). These images were compared in order to establish die-linkage. Following this, the remaining images were compared for a second time to exclude die-identity. To do this, in case of doubt a drawing of each enlarged coin was made on transparent paper, and by superimposing two drawings, it was possible to decide if they were from the same die or not. These drawings – reduced to actual size – were used to prepare plates 1 – 33. A certain die-link is indicated by the symbol ≡ on the plates. If this procedure gave an uncertain result, a probable die-link was indicated by a question-mark on the plates. In some instances one and the same coin was present twice or more, for example from the publication of a hoard, from an auction sale catalogue, and a private collection. These were of course counted as one. Furthermore, some definitely modern forgeries were detected. These were excluded from the corpus.

The comparison of the drawings on transparent paper taught us that several groups of coins were struck from a set of very similar, but different dies, apparently produced by one individual die-cutter. Most of these coins generated chains of die-linked specimens, often from quite different find places. And the obverse dies were often used together with a number of reverse dies. Others are only known from one pair of dies. They often have untidy designs, and tend to be found only as singletons. The ratio bust side / cross-and-pellets side approached 2 : 1. This implies that the design with the head with radiate crown was on the lower die, and the cross-and-pellets' design was on the upper die, as one might expect.

The finds of Series D coins with a geographical provenance, but without an available illustration, or which are of such a poor quality that die-comparison is not possible, are listed at the end of the Corpus.

A stylistic classification of Series D

Sub-classification of Type 2c

The best obverse style of Type 2c gives way almost immediately to rougher workmanship and, over the course of a few years, to a great stylistic diversity. The two hoards with a considerable number of Type 2c coins, Aston Rowant and Remmerden, show a confusing diversity in style. On good style coins there is a well-shaped head, facing right, with a radiate crown, and the neck is indicated by several rows of dots or lines. Before the bust are runes reading *æpa*, or when partially off the flan, they could read *apa*. The runes become illiterate or perfunctory. At the poorer end of the spectrum of style the face disintegrates into a few hardly recognizable elements crushed between the remnants of the crown and the truncation. On about five percent of the coins of Type 2c the bust is laterally reversed. The much simpler reverse design with cross and pellets suffers less from deterioration. There is an initial cross as part of the pseudo-legend, and we place this at 12 o'clock. At 6 o'clock there is usually an annulet. These two elements of the reverse design are very regular. The pelletted style of the cross is sometimes replaced by a seriffed, or a sanserif cross. Our intention was to develop a well-defined subdivision of the Type 2c coins, like the sub-classification of Series R.[60] But that proved to be far from easy. It was hoped to divide Type 2c into subgroups that were more or less chronological. And it was hoped to separate official issues from imitations, and the output of different mints, in case Type 2c was produced in more than one workshop. A criterion for a subgroup is that the dies used are cut in the same style. Another criterion is that there are no die-links with others subgroups. A problem was encountered in coins with a more degraded design. Sometimes it was difficult to decide if this was the sole result of crude and untidy die-cutting, or of wear and tear of the dies or the coins themselves. Furthermore, it is possible that some dies were repaired or touched-up in the course of their use. There are examples of dies of tremisses that were changed with additional dots after some time. If this is also true for the dies used for the production of Continental runic sceattas, this tends to blur the exclusion of die-identity.
It was not difficult to delimit the first group – called Variety 1 – which has an obverse design very similar to the prototype, Series C. However, it was less easy to identify the later issues. Although the specimens with a good obverse

60 Metcalf (1993b) pp 502-523 and p 9 of this article.

may be considered the initial issues it would be rash to assume that stylistic deterioration correlates closely with a chronological sequence. One has to keep in mind the possibility of production by one or more official mints, and less controlled incidental, private or even illegal minting at the same time.
In early medieval Western Europe the coinage reveals a recurrent pattern of the alloy, with a high percentage of precious metal, followed by debasement, and finally restoration.[61] The available metal analyses of Series D reveal hardly any serious debasement (pages 55-58). Most of the analyzed coins are of excellent 'silver' with a level well above 90%.[62]
Another, and more certain method to distinguish early from later issues is the analysis of hoards. Any hoards which terminate part-way through the issue of Type 2c are especially useful. They should offer evidence, also, of the chronological relationship of Types 2c, 8, and 10.

Table 1. The composition of the Aston Rowant and Remmerden hoards.

Series	Aston Rowant (O)	Remmerden (Gld)
A	3	
B	25	
C	31	1
R	22	
D type 2c	178	155
type 8	19	4
porcupines	73	6
other sceattas	30	
Merovingian pennies	5	2

Fortunately, there are two important hoards with a considerable number of Type 2c coins, namely Aston Rowant (1971) and Remmerden (1988).[63] At first inspection both hoards contain a wide range of Type 2c from very well made to further down the road. One may expect that the older coins in a hoard should have more signs of wear and tear. This is, for example, the case in the Franeker hoard, composed mainly of porcupine sceattas from the end of the secondary phase.[64]

61 Metcalf (1993b) p 612.
62 'Silver' is an approximation to the silver contents as they would have been perceived at the time, namely the scientifically measured contents of silver + gold + lead.
63 Kent (1972); Rigold & Metcalf (1984) p 246; Pol (1989).
64 Op den Velde (2001).

The few primary phase coins in this hoard had a substandard weight and showed signs of having been in use for a long time. However, for the Remmerden hoard this principle did not work. On inspection almost all coins were in very good condition. This is perhaps the result of a limited period of production of Series D and a relatively early date of concealment of this treasure. Also, they might have belonged to someone who kept them idle in his treasure-chest for several years.
We therefore attempted another approach to the question of chronology. If we count the number of die-linked coins of Series D Sceattas in both hoards, die-linked specimens are over-represented in the Remmerden find.

Table 2. The number of multiples of Series D Sceattas in the Aston Rowant and Remmerden hoards

Chain of	Aston Rowant coins	Remmerden coins
2	28	26
3	9	27
4		16
5		5
6		6
8		8
	37/157	88/152

This clustering implies that the Remmerden find contains coins which had less time or less use between leaving the mint and entering the hoard. There was less opportunity for them to become diffused into the currency. In other words the Remmerden find was closer to source, and – as we shall see – most likely earlier concealed than the Aston Rowant hoard. There is much less clustering in the Aston Rowant hoard, and the contrast is even sharper, if we compare the material up to sub-variety 3f. Most of the clustering in Aston Rowant is among the more recent coins, not represented in Remmerden. It would be reasonable to conclude that the longer chains of die-linked coins represent the last additions to the hoard, and that these are the later issues. Unfortunately, the die-linked chains are both of very well made coins, as well as very garbled ones. So this method also failed to give a useful clue to chronology.
Yet, there is another difference between the two hoards; the weight distribution of Type 2c is not the same.

Aston Rowant

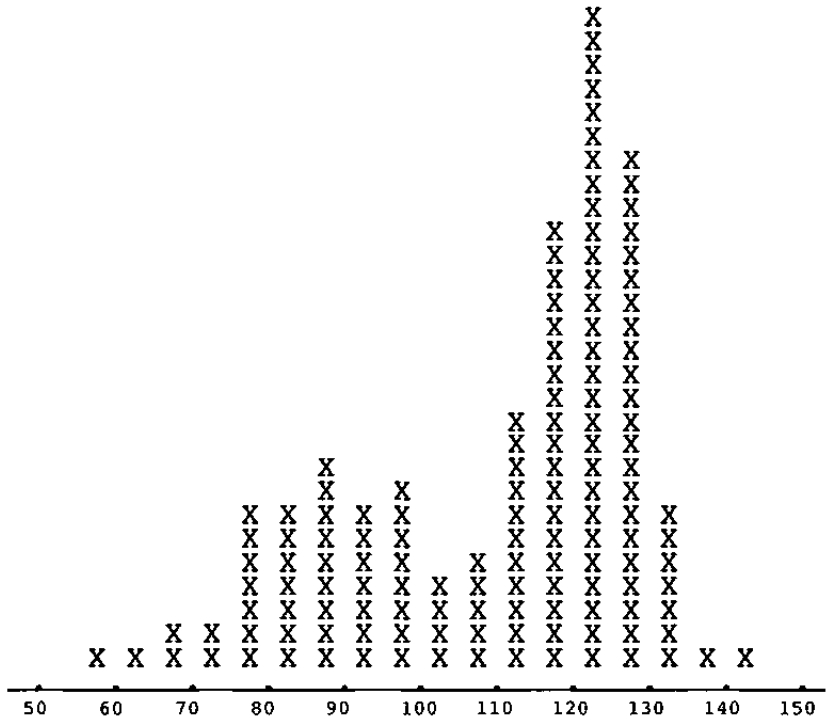


Figure 1a. Histogram of the weights of Type 2c coins in the Aston Rowant hoard.

Remmerden has a rather compact weight distribution, with a peak around c. 1.20 g. Aston Rowant, on the other hand, shows some downward shift in the weights. The main peak of the histogram is around c. 1.22 g, and there is a separate second peak at around c. 0.86 g.

The varieties with a low average weight, present in the Aston Rowant hoard, but absent in the Remmerden hoard, were characterized by zigzag or fishbone pseudo-runes, and these were labelled Variety 4. About ten percent of the specimens of Variety 4 are on the higher weight-standard, but most are of lower weight. It seemed that there was a weight-reduction soon after the sceattas making up Variety 4 were introduced, to c. 0.9 g. Because Variety 4 occurs among single finds in the Netherlands, its absence in Remmerden strongly suggests that the hoard was concealed before the issue of Variety 4 began. So now there

Remmerden

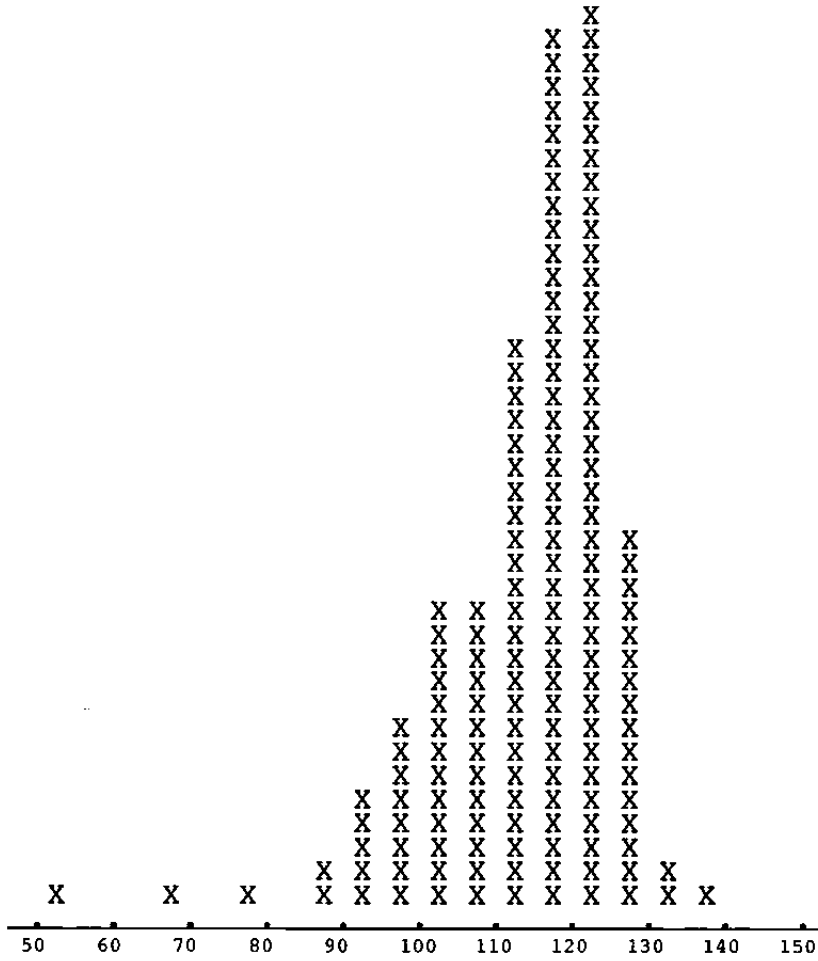


Figure 1b. Histogram of the weights of Type 2c coins in the Remmerden hoard.

is an idea of the initial issue – Variety 1 – and the latest issues, Variety 4. But what about the 80% of the coins of the Continental runic type in between the Varieties 1 and 4?

What remains is a study of the style of the coins themselves. We first looked to the reverse side, with the simple, distinctive cross with pellets in the corners,

surrounded by pseudo-letters. A seriffed cross is perhaps an early feature. However, both the cross pommée and the seriffed cross were found in combination with all kinds of obverses, and sometimes even die-linked. Also the pseudo-letters failed to give useful indications.
So the attention was directed to the obverses. Using a classification in first instance based on the general impression of the artistic quality or competence of the obverse design, the coins were divided into two additional varieties, of declining quality of the obverse design, namely varieties 2 and 3. The resulting four groupings were further tentatively subdivided on the basis of stylistic similarities, on rather intuitive than objective criteria, into 18 sub-varieties indicated with a letter, e.g. 2a, 2b, etc. These sub-varieties are illustrated here in the text from a few characteristic specimens. This classification is certainly far from perfect. There is as yet no reliable procedure to distinguish "official" coins from imitations. And we are well aware of the fact that medieval die-cutters were very skilled in imitating. Some sub-varieties are obviously homogeneous, others are a grouping of poorly designed coins of very divergent style.

sub-var 3a
Corpus no. 496

sub-var. 3c
Corpus no. 664

sub-var. 4b
Corpus no. 979

All × 2

For example, there are several Type 2c coins with a large, oversized concave crown. Perhaps they belong to a related group. However, because of other features, such as unusual or 'fishbone' pseudo-runes they were allotted to different groups.

It is quite possible that a certain proportion of the coins have been misclassified.[65] That would tend to blur or lessen any statistically based conclusions outlined later. But reliance on within-sample variation means that any statistically sufficient contrasts which persist in spite of any blurring would very probably be sharper if the sub-classification were completely correct.
At some date in the future, perhaps a new hoard will come to light, with a terminus post quem during the issue of Variety 2 or early in Variety 3. That might offer a good opportunity to reconsider the chronology of the sub-varieties.

Corpus no. 176 Corpus no. 185 Both × 2

1a. Corpus nos 158-199. The obverse of this sub-variety has a head with a radiate crown and runic *æpa* closely copied from Series C. The row of dots forming the base of the radiate crown is slightly bent. It is most likely an initial issue. The bust always faces right, and the three runic characters are properly shaped.

Corpus no. 209 Corpus no. 248 Both × 2

1b. Corpus nos 200-259. This sub-variety is related to 1a with regard to the portrait (always facing right), the crown and the truncation, but the row of dots from the head-covering is straight, with a sharp hook behind the ear. The two dots at the position of the lips are more robust. There are several obverse and reverse dies with only minimal differences, apparently cut by the same hand. The reverse shows a cross pommée and on most specimens of this sub-variety

65 For example, during the proof reading of the manuscript we saw that coin no. 670, included into sub-variety 3d, has many characteristics of sub-variety 1b, compare no. 211.

the pseudo-letters **+ ᚢ V И O ᚢ W**. An additional characteristic is that often the lower leg of the cross has a spike pointing to 7 o'clock, perhaps a special mark.

Corpus no. 264

Corpus no. 275 Both × 2

2a. Corpus nos 260-277. The bust is very similar to 1a or 1b, but the runes are irregular, sometimes incomplete or one of the runes is reversed. The reverse design is more variable, but the initial cross and the annulet at 6 o'clock are preserved.

Corpus no. 281

Corpus no. 296 Both × 2

2b. Corpus nos 278-310. More variable execution of the bust, the third rune is often a **P**. On the reverse there is always the annulet at 6 o'clock, but the initial cross is often replaced by ⊓, a distinctive letter-shape associated especially with Type 8.

Corpus no. 317 × 2

2c. Corpus nos 311-317. A small group characterized by a large nose. This subvariety is die-linked to Type 10.

Corpus no. 335 × 2

2d. Corpus nos 334-339. A group of 6 sceattas all struck from one obverse die. The radiate crown curves deeply, to hang down behind the neck like an American-Indian head-dress.

Corpus no. 342

Corpus no. 356 Both × 2

2e. Corpus nos 340-367. An immediately striking feature on the obverse is a robust circular prominence at the position of chin. This way of modelling the chin can be seen on other types of primary sceattas, and is also found on many Frisian tremisses.[66]

Corpus no. 368

Corpus no. 380 Both × 2

2f. Corpus nos 368-400. The face is rounded, the crown is substantially broader than the head.

Variety 3 is a very large and inhomogeneous group of Type 2c coins, lacking equilibrium in the obverse design. For the sake of analytical convenience this variety is subdivided rather arbitrarily.

66 A. Pol, personal communication.

Corpus no. 416 Corpus no. 423 Both × 2

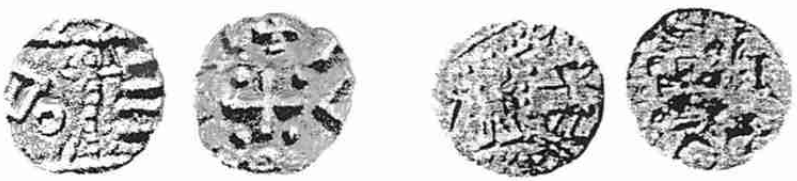
3a. Corpus nos 401-619. A more or less blundered obverse, bust facing right. Compare with 4a.

Corpus no. 620 Corpus no. 634 Both × 2

3b. Corpus nos 620-639. A more or less blundered obverse, bust facing left.

Corpus no. 642 Corpus no. 652 Both × 2

3c. Corpus nos 640-667. A smaller and more homogeneous subgroup, with a small sharp nose, bearing an oversized crown, with three more or less identical "runes" resembling a **P**. In most instances the bust is facing left.



Corpus no. 723 Corpus no. 738 Both × 2

3d. Corpus nos 668-778. Further degradation of the obverse design. A bust is still recognizable, but often grossly deformed or "Picasso-like". The bust faces right. This is also a large and inhomogeneous group.

Corpus no. 786

Corpus no. 814 Both × 2

3e. Corpus nos 779-814. Like 3d, with a head facing left.

Corpus no. 824

Corpus no. 858 Both × 2

3f. Corpus nos 815-869. Extremely blundered obverse design, which one would hardly recognize as a radiate bust at all, without prior knowledge. Only some elements of the obverse, such as an ear or a part of the crown are preserved.

Corpus no. 873

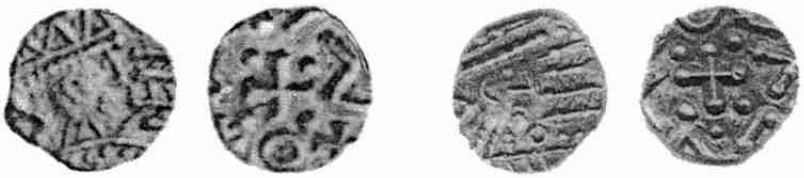
Corpus no. 886 Both × 2

3g. Corpus nos 870-886. A distinctive group of coins. The relatively long neck reaches almost to the nose. The crown is slightly bent. The eyebrow is prominent.

Corpus no. 903 Corpus no. 918 Both × 2

3h. Corpus nos 887-923. Like in 3g, the relatively long neck extends almost to the nose and ear. In addition there is a large annulet at each end of the radiate crown, although this is not always visible, if the obverse is struck somewhat off-centre.

Variety 4 are the Type 2c coins without representation in the Remmerden hoard, and therefore considered as later issues.



Corpus no. 936 Corpus no. 948 Both × 2

4a. Corpus nos 924-962. A rather variable and heterogeneous group, with as common feature replacement of the runes in front of the bust by parallel lines with zigzag connections, resulting in a distinctive feathered appearance, or a fishbone-like pattern.

Corpus no. 982 Corpus no. 1012 Both × 2

4b. Corpus nos 963-1042. A distinctive group, with replacement of the runes as in 4a. The face seems to be compressed between the two lines indicating the crown and the truncation. The crown is often somewhat concave, and the trunk is very broad.

Corpus no. 1046

Corpus no. 1056 Both × 2

4c. Corpus nos 1043-1070. Very much like 4b, however, the row of dots between the two lines at the position of the trunk is replaced by other figures, for example the **Λ**s of the crown are repeated.

A stylistic classification of Type 8

Corpus no. 24 ×2

Corpus no. 123 ×2

The main group of coins of Type 8 (Corpus nos. 18 to 134) are in a rather homogeneous style, and they show definitely much less stylistic variation than is present in Type 2c. In place of the pseudo-legend **+ΛVΛOΛVΛ** which is standard on Type 2c, Type 8 has fewer symbols, untidily disposed, and often including a large **⊓**, usually facing inwards, a clear A, and/or a diamond-shaped **O** and a large **N** of **H** with sloping cross-bar. The style is pommée. A regular feature of the cross-side of Type 2c is the presence of four pellets in the corners of the cross. In Type 8 all or some of these pellets are often omitted. On some specimens of Type 8, for example Corpus nos 18 and 79, there is hardly any difference in style with the cross side of Type 2c.

Corpus no. 18 ×2

Corpus no. 79 ×2

However, we have not found any die-links between Types 8 and 2c.[67] On grounds of style it is thus rather unlikely that Types 8 and 2c are from the same mint-place.
Type 8 shows a distinctive version of the standard reverse found on Series A, C, and E, with four or three L-shaped elements. But again we were unable to find any die-links between these Series.

Corpus no. 4 ×2

Corpus no. 17 ×2

There are two rather small groups of Type 8 with a conspicuous design of the cross side: Corpus nos 1-10 have a catapult-like figure in their design, and Corpus nos 11-17 have four annulets in the corners of the cross. These are perhaps initial issues of Type 8.

Corpus no. 135 ×2

As might be expected, some Type 8 coins are probably imitations, as may be judged from of their untidy design (Corpus nos 135-137).

Corpus no. 142 ×2

Corpus no. 145 ×2

67 A near 8/2c die-link is illustrated and discussed on page 15.

Corpus nos. 138-151 includes a much simplified derivative without any legend, to which Metcalf attached the separate label 8Z.[68] This variety is arguably from an English mint-place, probably somewhere in the region of Cambridge (see pages 107-108).

Corpus no. 153 ×2

Finally, four die-linked specimens (Corpus nos 152-155), characterized by a triangle on the cross-side, and a cross within a circle on the standard-side, are so different in style that they are only provisionally inserted into Type 8. These four coins, which are in all probability English, were excluded from the further analyses.

68 Metcalf (1993b) p 195.

Die-estimation

Estimation of the numbers of dies used to strike Series D sceattas

How many dies were used to strike the sceattas of Series D? The original total will certainly have exceeded the number of known dies, represented in our corpus. From a consideration of the proportion of duplicates (i.e. coins struck from the same die – obverse or reverse, or both) in our sample, it is possible to derive an estimate of the original total. One can readily understand that if our 913 specimens of Types 2c and 10 had proved on careful inspection to be all from just 100 pairs of dies, each pair being represented by at least six specimens (and some by more), one could have concluded with perfect confidence that only 100 pairs of dies were ever extensively used. There might have been a few more which broke very early in their life. But for practical purposes one could say that all the dies of Series D were known. At the other end of the spectrum, a random sample of 913 coins in which there were very few duplicates would clearly imply an original total of many thousands of dies. The truth, of course, lies somewhere in between these extremes. The numbers of non-singletons, i.e. specimens which are not the only example in our corpus from a particular die, amount to over 600. How can one interpret, and quantify, that information? Statisticians have devised various formulas by which the data can be processed. The reliability and limitations of several of the better-known methods were compared with each other by statisticians at a *Table ronde* held in Paris in 1980.[69] The results were generally favourable, allowing one to choose, for example, Good's formula, which has the merits, for numismatists, that it is easy to use, and that it is designed to cope with the fact that some dies were used to strike more coins than others. The resulting estimates need to be qualified by acceptable margins of statistical variation, especially if any of the numbers in the formula are small. The formula states that

$$\frac{\text{non-singletons}}{\text{sample}} = \frac{\text{known dies}}{x}$$

where x represents the original total output. Thus, in our very simple hypothetical example above,

$$\frac{913}{913} = \frac{100}{x} \qquad \text{therefore, } x = 100.$$

69 Carcassonne & Hackens (1981).

Or, at the other extreme

$$\frac{9}{913} = \frac{\text{c. } 900}{x} \qquad \text{therefore, } x = 91{,}300.$$

Table 3. Die-estimation.

Variety	Corpus nos	Specimens	Non-singletons		Known dies		Estimates		Die-ratios
			Obv.	Rev.	Obv.	Rev.	Obv.	Rev.	
8	1-134	134	76	93	89	72	156	104	(1.5)
8Z etc	135-155	21	14	13	13	13	20	21	1
1a	158-199	42	41	31	10	17	10	22	2
1b	200-259	60	53	43	20	33	23	46	2
2a	260-277	18	12	8	12	14	18	32	1.5
2b	278-310	33	30	29	11	14	12	16	1.5
2c/10	311-333	23	20	14	6	15	7	23	3
2d	334-339	6	6	6	1	1	1	1	–
2e	340-367	28	23	19	8	14	10	21	2
2f	368-400	33	27	19	15	21	18	38	2
3a	410-619	219	93	74	157	175	370	518	1.5
3b	620-639	20	9	6	15	17	33	57	2
3c	640-667	28	23	17	9	16	11	26	2
3d	668-778	111	37	27	89	96	267	395	1.5
3e	779-814	36	8	10	31	30	140	108	(1.3)
3f	815-869	55	19	9	41	48	122	299	2.5
3g	870-886	17	16	12	5	9	5	13	2
3h	887-923	37	13	4	30	35	85	324	4
4a	924-962	39	34	16	11	33	126	80	(1.5)
4b	963-1042	80	24	10	68	75	227	600	2.5
4c	1043-1070	28	17	11	17	20	26	51	2
Totals	Type 8	155					176		
	Type 2c/10	913						2670	

Note: Nos 156-7 and 1071, which are (imitative) 'mules', have been omitted from the tabulation.

A painstaking search has been conducted, and repeated, under rigorous conditions, in order to identify all existing instances of die-duplication in the corpus. We are confident, in the light of prolonged examination that the results are either exact (for Type 8 and Varieties 1 and 2), or rather close to target (for Varieties 3 and 4). Table 3 and Plates 1-33 set out the resultant data for Types 8, 8Z, and 2c and 10, variety by variety.

Metrology

It was recognized already in 1993 that there was a contrast in the metrology of Type 2c, between the Remmerden and the Aston Rowant hoards.[70] Histograms for the rather later Aston Rowant hoard included a separate second peak at a lower weight standard, see page 32. The separation of the two peaks seemed to imply a deliberate reduction in the weight-standard rather than merely drift or indifference or fraud. It was suggested at the time that the lower peak might reflect either a weight-reduction at the main mint, or alternatively that the lighter coins might be from a separate source.[71]

With the benefit of a larger data-base and a more refined classification of Type 2c, it is now possible to submit these hypotheses to close scrutiny. One can compare histograms for individual varieties, to see how they differ. This exercise reveals that coins of reduced weight are not restricted to Variety 4, but occur already in Variety 3. That might have a bearing on the difficult question of attributing the Varieties 3 and 4 to their mint-places. Variety 3 is a very large group, of atrocious workmanship, where style does not offer much detailed guidance on the validity of the classification. Metrology, as we shall see, offers the possibility of an independent check on the scheme proposed. Comparing the weights of die-linked specimens allows one to see whether their weight-variation is less than for non-linked specimens. That could be a starting point for the argument that weight-decline was chronological or, conversely, that the minters abandoned any pretension of keeping to an intended weight-standard.[72]

There is also the difficult question of opportunistic counterfeits, which might be expected to be deficient in weight and/or alloy. If the lighter coins were official, that need not have been disastrous for commercial confidence, provided that large transactions were made by weight rather than by tale.

Our analyses will reveal considerable complexity, not least within Variety 3, where it will become clear that the Aston Rowant hoard contains an admixture of lighter coins, not present in the Remmerden hoard. That contrast between the hoards occurs in most or all of the sub-varieties of 3. It would seem, therefore, that our scheme of classification has not succeeded in matching the detailed chronological development of Variety 3; or else that more than one mint was at work in Variety 3, with different policies as regards weight-standards, perhaps involving unfair competition. If all that sounds far-fetched, one only has

70 Metcalf (1993b) p 186.
71 Metcalf (1993b) pp 186-187.
72 Weight reduction can also be the result of clipping.

to remember the much greater complexity of the later Anglo-Saxon coinage, where multiple, concurrent weight-standards were integral to monetary policy.[73] It very quickly becomes apparent that the Domburg site-finds often weigh much less than the average. That is no doubt because they have suffered severely from corrosion and leaching due to the soil conditions. The practical corollary is that mean average weights for individual sub-varieties are, if not quite meaningless, a very poor tool for recovering the intentions of the mint-workers. Modal weights, i.e. peaks in the histograms, are the best available guide. In spite of our large data-base, many of the sub-varieties are, on their own, still represented by too few specimens to generate a peak with clear parameters, or even to measure the modal value more closely than to within about 0.2 g. The best one can do is to rely on over-all contrasts between histograms, to establish the main perspectives.

Sub-variety 1a illustrates well several of the points that have been made above. In all, 39 weights are available, and most specimens are die-linked, forming part of a die-chain. In the histogram, figure 2, Domburg coins are indicated by D, Remmerden coins by R, Aston Rowant coins by A, and the rest by X.

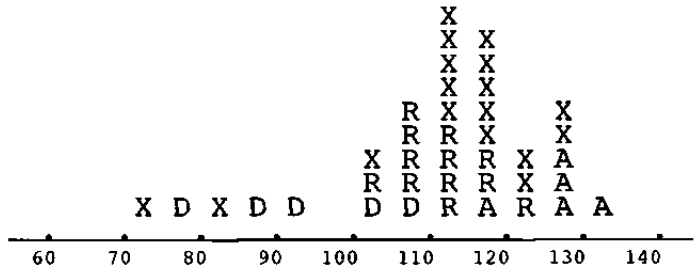


Figure 2. Histogram of the weights of Type 2c sub-variety 1a. Step intervals 0.60-0.64, 0.65-0.69, etc. N = 39. Domburg coins are indicated by D, Remmerden coins by R, Aston Rowant by A, and the rest by X.

The separation of the Domburg coins is very clear. They have suffered variably, some more than others. The main peak is at c. 1.14 g. and the Remmerden coins, which account for half of it, are matched by various other stray finds, together indicating a compact, well-maintained weight-standard. Surprisingly, the Aston Rowant coins are well above the modal value, with their own small peak at c. 1.27 g, a difference of ten percent or more. More than one hypothesis comes to mind to explain this curious feature, but one needs to take into

73 Metcalf (1998) pp 56-58.

account that all the Aston Rowant coins of sub-variety 1a are die-linked to Remmerden coins. First, perhaps the owner of the Aston Rowant hoard, or a previous owner, of the coins, had very carefully sorted out the money that passed through his hands, and had kept the heaviest pieces.[74] Secondly, and less plausible, the mint workers might have manufactured heavier coins for the convenience of merchants who intended to spend them in England. Thirdly, the difference may be due to corrosion and leaching of the Remmerden coins. One can, in principle, test that idea by comparing the stray finds from England with those from the Netherlands, to see whether they tell the same story, i.e., to see whether the English finds are on average heavier.

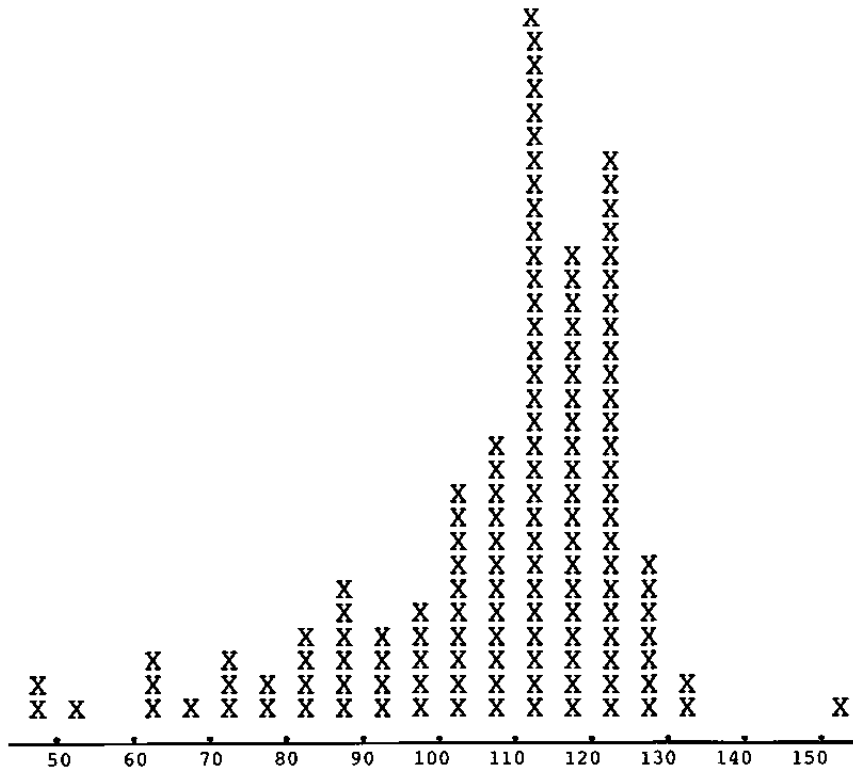


Figure 3. The weight histogram of Type 2c single finds in England.

74 This practise, using a trébuchet, was condemned by moral theologists later in the middle ages.

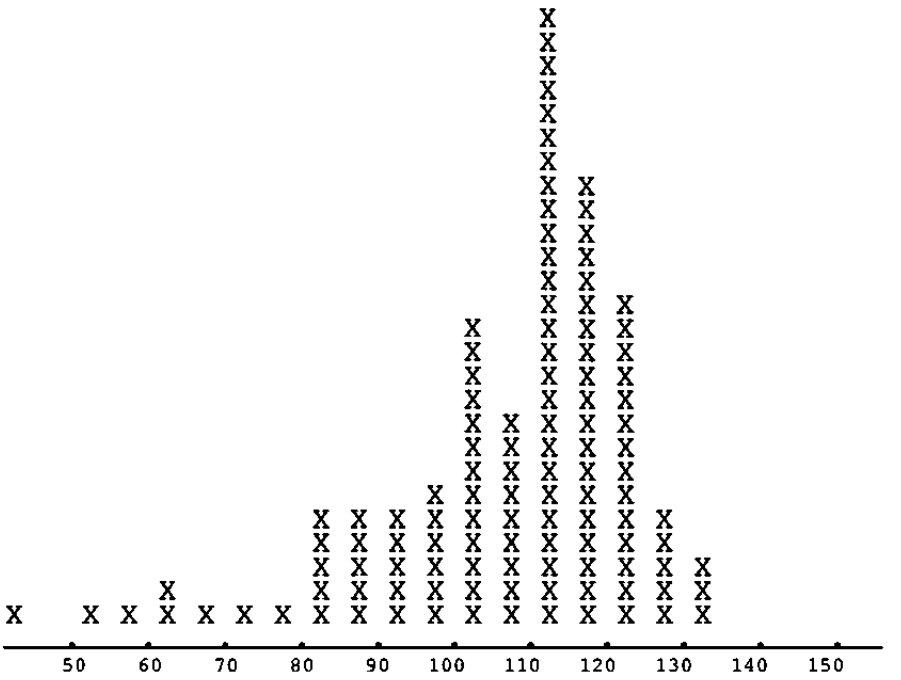


Figure 4. The weight histogram of Type 2c single finds in The Netherlands (Domburg excluded).

It turns out that they are, indeed, slightly heavier (Figures 3 and 4), although not nearly so much as in sub-variety 1a. In later sub-varieties the difference is much less, but Aston Rowant coins are consistently at the heavier end of the histogram. However, the coins of the Remmerden find were cleaned in the Royal Coin Cabinet; and if we compare the weights of the Remmerden coins before cleaning with those from the Aston Rowant hoard, the difference seems to disappear. Next we examine sub-varieties 1b, 2a, and 2b (having ascertained by inspection that 2b, which is related by its lettering to Type 8, shows no obvious peculiarities of weight). That gives a combined sample of 99 weights.

The reduced weight of the Domburg site-finds is again clear-cut. There are only two Aston Rowant coins included (curiously), but for what it is worth, both are heavy. The dramatic difference which Figure 5 reveals is that the modal weight is c. 1.21-1.22 g, distinctly heavier than sub-variety 1a at 1.14 g. Perhaps sub-variety 1a was experimental, at the beginning of the issue of Type 2c, and the weight-standard was quickly adjusted.

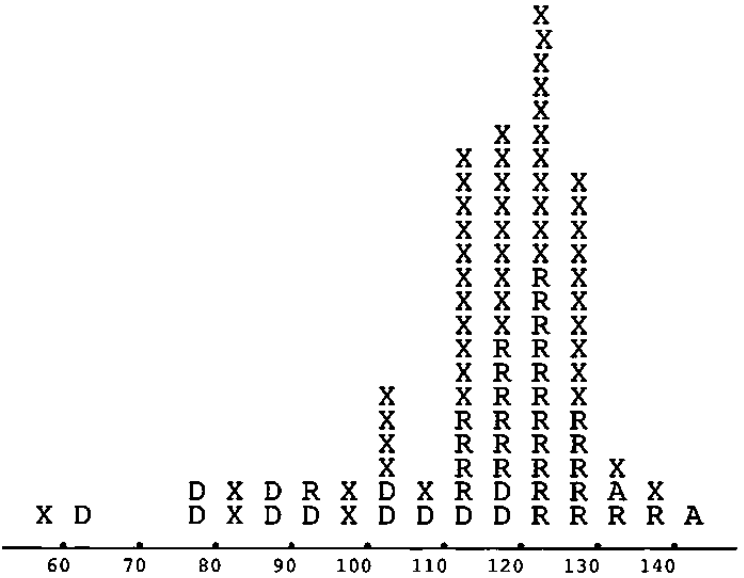


Figure 5. Weight histogram of the sub-varieties 1b, 2a, 2b. N = 99. D = Domburg, R = Remmerden, A = Aston Rowant, X = other find spots.

Sub-variety 2c, with which Type 10 is die-linked, is presumably the product of a separate little mint. The sample of 22 weights is too small to offer an exact modal value (c. 1.22-1.25 g originally?), and it lacks Aston Rowant coins and has only one from Domburg (Figure 6). On the assumption that the coins of sub-variety 2c were minted before those of Type 10, there is a small downwards drift in the weight-standard, sub-variety 2c shows an average weight of 1.23 g, Type 10 achieves only c. 1.16 g.

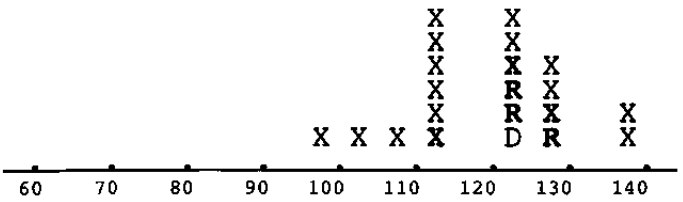


Figure 6. The weights of sub-variety 2c and Type 10. N = 22. D = Domburg, R = Remmerden, X = other find spots. Specimens of sub-variety 2c are indicated by a bold letter.

The rest of Variety 2, namely sub-varieties 2d, 2e, and 2f, provides a sample of 52 weights. The histogram, Figure 7 conforms to the now familiar pattern. Only one of the Aston Rowant coins is die-linked, but that one is linked to a coin of normal weight. The modal value seems to be c. 1.18-1.20 g

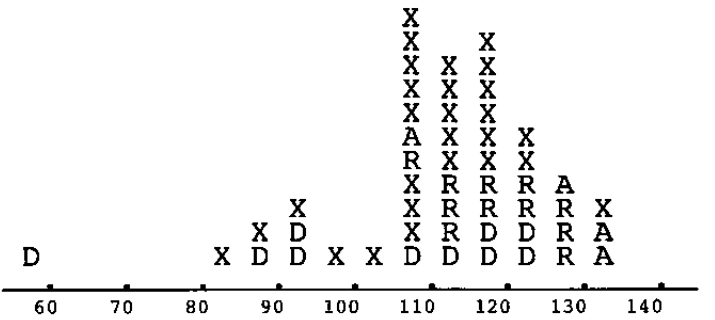


Figure 7. Weight histogram of sub-varieties 2d, 2e, and 2f. N = 52. D = Domburg, R = Remmerden, A = Aston Rowant, X = other find spots.

With sub-variety 3a, for which 187 weights are available in all, we are in a good position to compare histograms for the Remmerden and Aston Rowant hoards (Figures 8 and 9). Note that single finds are omitted from this comparison.

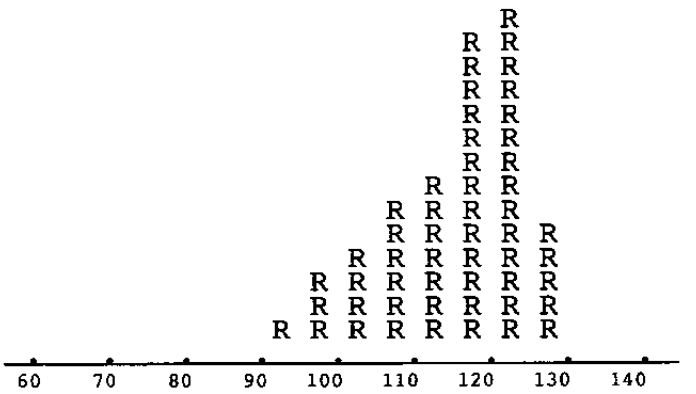


Figure 8. The weight histogram of the Type 2c coins of sub-variety 3a in the Remmerden hoard. N = 53.

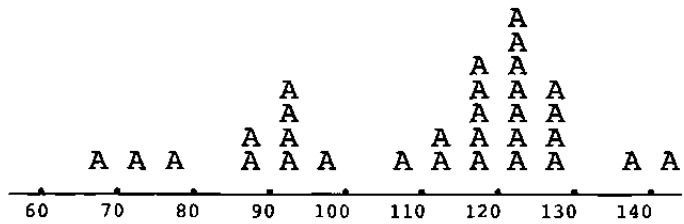


Figure 9. The weight histogram of the Type 2c coins of sub-variety 3a in the Aston Rowant hoard. N = 31.

While Aston Rowant, as usual, includes a couple of exceptionally heavy coins, and its main peak is slightly higher than that for Remmerden, it also includes a significant number of specimens weighing less than 1.00 g. Where these lighter coins are die-linked, they are linked with lighter specimens. Various hypotheses come to mind. The light coins could be English imitations, although in our opinion that is an unlikely explanation. The best hypothesis is that they post-date the deposit of the Remmerden hoard.

Sub-varieties 3b – h show a similar contrast between the two hoards. The main peak is, again, heavier in Aston Rowant (Figures 10 and 11).

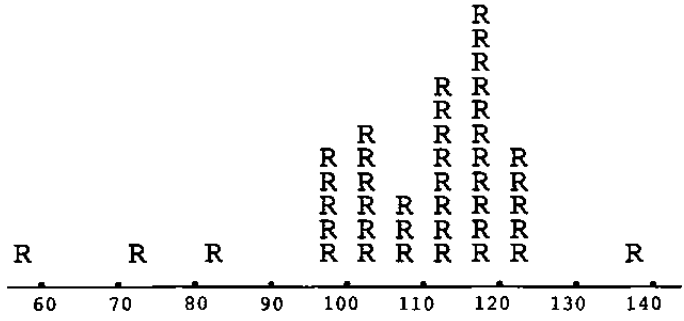


Figure 10. The weight histogram of the Type 2c coins of sub-varieties 3b - h in the Remmerden hoard. N = 42.

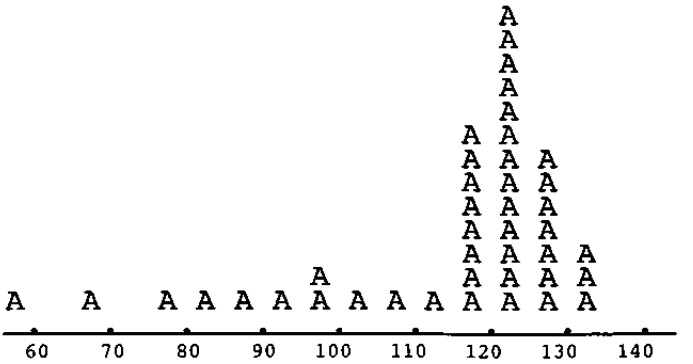


Figure 11. The weight histogram of the Type 2c coins of sub-varieties 3b - h in the Aston Rowant hoard. N = 42.

For sub-varieties 4a and 4b, one cannot make the same comparison between the hoards, because Variety 4 is absent from Remmerden. But the histogram for Aston Rowant can be compared with those for Variety 3. Coins weighing less than 1.05 g are now relatively more numerous. Whether there is an intended weight-standard at 0.90 g is a delicate question. There is a second peak in the histogram (Figure 12), but the numbers are small.

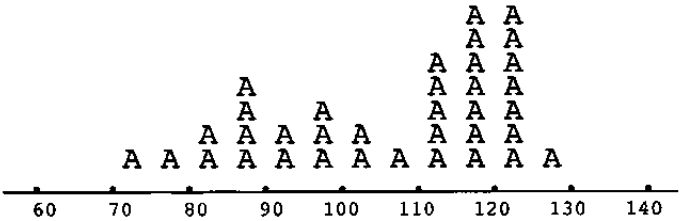


Figure 12. The weight histogram of the Type 2c coins of sub-varieties 4a and 4b in the Aston Rowant hoard. N = 36.

It is interesting, therefore, that sub-variety 4c appears to be exclusively in the lower register, with a distinct peak at c. 0.82-0.83 g (Figure 13).

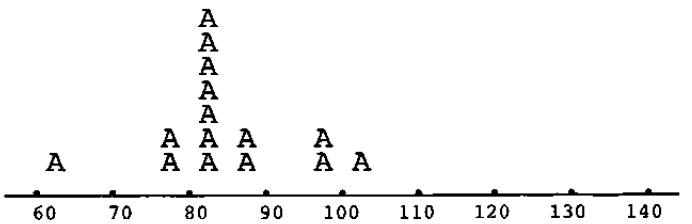


Figure 13. The weight histogram of the Type 2c coins of sub-variety 4c in the Aston Rowant hoard. N = 15.

The major question which the metrological evidence poses for the classification of Type 2c is whether part of Variety 3 was minted concurrently with Variety 4. Before scrutinizing the evidence in detail one had imagined that there was a weight reduction a year or so after Variety 4 was introduced (and after Variety 3 had ceased). Coins of lower weight appear in the Aston Rowant hoard, but hardly at all in the Remmerden hoard, which suggests that both sub-variety 3a and sub-varieties 3b – h span the change. The Aston Rowant histograms do not appear to be characteristic of negative skewness, but on the other hand, they do not reveal any serious attempt to conform to a new, lower standard. Die-links are unfortunately rather few, and offer ambivalent evidence, although tending to show that dies were used to strike either heavy or light coins but not both. Between the Aston Rowant histograms for Variety 3 and for 4a and 4b, there is no sharp contrast, even if the proportion of light coins is higher in Variety 4. The difference between the t.p.q.[59] of the two hoards cannot be great – one would suppose five years at most, and probably less. The lighter coins in Varieties 3 and 4 were thus nearly concurrent in any case, and the *prima-facie* conclusion is that they are from different mints.

Finally, Type 8 conforms to the usual pattern (Domburg light, Aston Rowant heavy), and is probably free of genuinely light-weight issues, other than a plated forgery in Aston Rowant (shown in Figure 12 as (A). The modal value, for Type 8, which is well maintained, is c. 1.18 g. Metrology reinforces the view that Type 8 is relatively early in date.

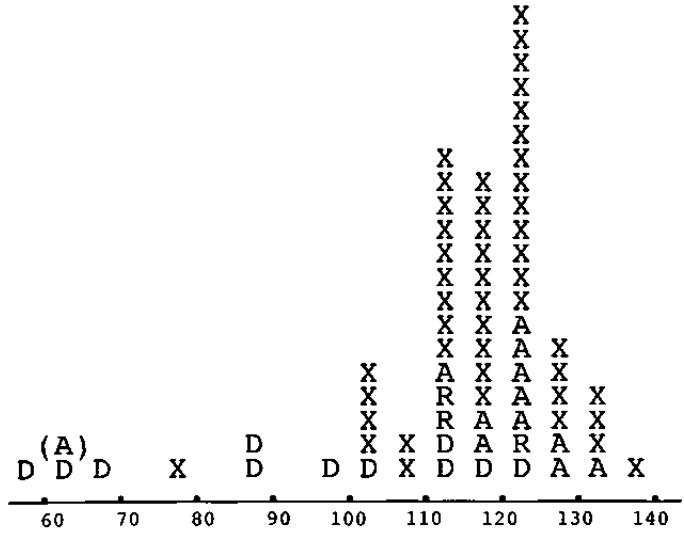


Figure 14. The weight histogram of Type 8, excluding variants. N = 73. D = Domburg, R = Remmerden, A = Aston Rowant, (A) = plated forgery, X = other find spots.

The metal contents of Series D

In speaking about the silver contents of sceattas, it is convenient to refer to what would have been perceived as silver by craftsmen at the time, which would have included the small amounts of gold invariably found in the alloy, and also the traces of lead remaining from the cupellation process. Thus, 'silver' should be understood as the measured amount of silver + gold + lead. It might be logical to include bismuth as well, but that element is normally present only in very small quantities, and in practice it is rather difficult to measure accurately.

Workmen at the end of the seventh century were quite capable of refining silver to a high degree of purity, to which a little copper was then added to harden the alloy, making it more serviceable. In this way the workmen could routinely produce a coinage of c. 96 or 95 percent 'silver'. To do so was rather wasteful, because the cupellation, if it was continued for too long, resulted in some loss of silver by evaporation. In practice, 'silver' of c. 92 to 94 percent was the working norm, arrived by the rule-of-thumb control of the cupellation process. Series D conforms to this general pattern, seen in the English primary series. Some good specimens of Type 2c are c. 95 to 96 percent 'silver', while most show a more normal result declining towards 90 percent. Anything below 90 percent should be regarded as sub-standard, reflecting either debasement, or incompetence, or fraud. The results of non-destructive analyses become interesting when they are used to compare Type 2c with Type 8, and when they are placed in the context of the classification of Type 2c into varieties and sub-varieties. The thesis that many of the specimens of Type 2c in crude style are unofficial products – and might therefore be expected to be inferior, or at any rate less consistent in their alloy – merits careful study.

In the nineteenth century, Rethaan Macaré asked the Royal Netherlands Mint at Utrecht to analyse the metal composition of one Type 2c coin. The mint reported weight 1.132 grams, 0.952 parts silver, 0.016 parts gold, 0.0588 parts copper and traces of tin.[75] Also Marie de Man had a Type 2c coin found at Domburg sacrificed for destructive metal analysis: 91.5% silver, 0.7% gold, 7.8% copper.[76] Unfortunately, there is no clue to the sub-variety these two coins belonged to, because there are no casts or engravings of them.

75 Rethaan Macaré (1856) p 41.
76 De Man (1899) p 64.

In 1968 a systematic programme of analysis of sceattas in the Ashmolean Museum collection was undertaken, using X-ray fluorescence spectrometry (XRF), and this programme included nine specimens of Series D.[77] These were useful, and they can be referred to illustrations of the coins in question, and therefore to particular sub-varieties of Type 2c, but XRF is of limited accuracy, for two technical reasons. The X-ray beam was too wide (c. 1 mm) to avoid picking up data from surface-enriched areas of the edges of the sceattas; and trace elements could not be measured with sufficient accuracy (or even reproducibility) to permit valid comparisons between individual coins. The next step, therefore, was to use electron-probe micro-analysis, rostering over 50-micron squares selected by microscopic examination on a prepared section of the edge. Dr. J.P. Northover, of the Department of Materials, Oxford University, made EPMA analyses of 24 specimens of Series D. The results for 11 elements were published, and the coins illustrated.[78] As an example of the discrepancies that could occur between XRF and EPMA analysis of the same coin, Corpus no. 264, showed 91% 'silver' by XRF, but 94% by EPMA. More typically, Corpus no. 280 showed 94% by XRF, and 95% by EPMA. Similar observations apply to four specimens in the *ancien fonds* of the Fitzwilliam Museum, Cambridge. Clearly, comparisons between results obtained by different methods could be unreliable, except as a broad indication of debasement. In any future work, a systematic programme of analyses using the same instrument under identical operating conditions and preferably by the same investigator, is essential.

Dr. Northover's results can now be re-presented, in an abbreviated form, arranged in the order of the stylistic classification (Table 4). XRF results, including those from Cambridge, have been included in the list, but should be used only appropriately.

Only one analysis was available, unfortunately, of the English imitative sub-variety 3h, which fell well below standard, at 86 percent. Otherwise, no debasement is apparent earlier than sub-variety 4b, which includes some coins of good silver, and others with only 80 – 86 percent 'silver'. The light-weight coins in Variety 3 are of very good silver, as are some of those in Variety 4. Of Type 8 we have two specimens of good silver, and one with only 87 percent 'silver' (Corpus no. 119, T&S 186 is silver-plated on a base-metal core).

77 Metcalf, Merrick & Hamblin (1968); Metcalf & Hamblin (1968b); Metcalf (1978b).
78 Metcalf (1994) pp 614-615.

Table 4. Results of the metal analyses of coins of Series D.

Variety	Corpus no.	Specimen	'Silver'	Gold	Lead	Tin	(Weight)
Type 8	113	T&S 184	94.9	1.12	1.06	–	1.18 g
Type 8	117	T&S 185	87.1	0.53	0.76	0.06	1.21 g
Type 8	119	T&S 186	84.6	0.84	1.06	–	0.62 (surface)
Type 8	121	T&S 183	93.6	1.30	0.80	–	1.32 g
1a	168	MEC 642	90 (XRF)				0.73 g
1a	176	T&S 158	94.9	1.53	0.79	–	1.28 g
1b	245	T&S 161	95 (XRF)				1.11 g
2a	264	T&S 163	93.8	1.67	0.90	–	1.23 g
2b	280	T&S 187	95.5	2.29	0.71	0.02	1.12 g
2b	310	T&S 177	93 (XRF)				0.88 g
3a	413	T&S 178	93 (XRF)				0.67 g
3a	445	MEC 643	92 (XRF)				0.83 g
3a	473	T&S 160	95.1	1.17	0.59	0.06	1.26 g
3a	516	MEC 641	92 (XRF)				1.05 g
3a	616	T&S 171	95.7	1.11	0.86	0.45	0.99 g
3d	700	MEC 639	92 (XRF)				1.27 g
3d	722	Hamwic 3	91.3	1.51	1.01	0.03	0.89 g
3e	793	T&S 176	94.8	1.09	0.77	–	0.92 g
3f	827	T&S 164	94.0	1.01	1.21	1.08	1.13 g
3f	856	T&S 169	95.8	1.70	0.81	–	1.23 g
3h	898	T&S 168	85.7	0.66	0.74	1.10	1.20 g
4a	929	T&S 170	95.5	0.67	0.77	0.04	1.16 g
4b	981	T&S 165	94.8	0.83	0.81	0.39	1.10 g
4b	988	T&S 167	86.0	1.12	1.01	0.94	1.16 g
4c	1050	T&S 172	90.2	1.43	1.12	1.22	0.89 g
4c	1051	T&S 173	69.2	0.90	1.32	2.39	0.95 g
4c	1061	T&S 175	93.9	1.35	1.38	0.95	0.88 g
4c	1067	T&S 174	81.3	0.59	1.35	–	0.84 g

As regards the minor constituents of the alloy, gold levels are relatively high in Varieties 1 and 2, after which they decline somewhat, on average. Bismuth contents are very low, at c. 0.002 – 0.004 percent. Tin is absent or virtually absent in varieties 1, 2, and most of 3, but is nearly around 1 percent in Variety 4. This probably reflects a change of mint policy, whereby scrap bronze rather than scrap copper was added to harden the cupelled silver. Significant amounts of tin were added to the alloy of Corpus no. 1051, probably with the intention of improving its colour.

Variety 3, which contains mainly coins struck from dies of poor aesthetic quality, nevertheless maintains a very acceptable alloy standard. There are no signs of unofficial minting, so far as the alloy composition is concerned. A couple of

light-weight coins of Variety 3 show particularly good 'silver' contents, suggestive of careful preparation. That tends to show that the lower weights were not a question of failure or fraud. That is about as far as one should attempt to go, on the basis of the present sample.

Any future research to extend the analytical programme will need, as explained above, to use EPMA or some equally appropriate and exact methods. There would be merit in analysing a selection, of carefully chosen varieties, from the Remmerden hoard, since they should all have shared the same history of corrosion and leaching (or, hopefully, absence of same) while in the ground. For suitable specimens of Type 8 one would need to turn elsewhere. A larger sample will be needed in order to see whether there was a secondary alloy standard of c. 85-87 percent. Type 10 and its related specimens of Type 2c await analysis.

The main question of historical interest which comes to mind is how Series D compares, alloy-wise, with the primary porcupines. That topic lies outside the scope of this monograph.

Overview of the finds of Series D

Hoards and grave-finds

As well as supplying well-preserved specimens for collections, large hoards can provide information about monetary circulation that single finds never can: they illustrate the age-structure of the currency at the time, and in the place, of their concealment. The two large hoards from Remmerden and Aston Rowant were concealed within three or four years of each other, close to the end of the period of minting of Series D. They both contain a broad range of stylistic varieties. Although they could, in theory, be savings-hoards which had been assembled gradually over a period of fifteen or twenty years, that is radically unlikely. We are justified in working on the hypothesis that they were put together, out of the currency, shortly before concealment. We return now to examine in more detail the composition of the Remmerden and Aston Rowant hoards, both of which are very satisfactorily on record, although there may be a few 'escapees' missing from our account.

In a field at **Remmerden** (near Rhenen in the region of the big rivers) by metal detection some gold tremisses and sceattas were found.[79] Further exploration of the site yielded 97 gold coins and 163 sceattas. It concerns most likely a single deposit. The combination of Merovingian gold coins and sceattas is unusual and puzzling.

The silver coins are:	1	Merovingian denier
	1	Series C Type 77a
	1	porcupine var VER
	2	porcupines var VICO
	3	porcupines var G
	152	Series D Type 2c
	4	Series D Type 8

The **Aston Rowant** hoard came to light in 1971, when two detectorists were walking home at the end of the day, through Grove Wood.[80] They discovered a hoard on the site of an old-established badger-holt. Generations of badgers, while digging their tunnels, had scattered the hoard far and wide. The detectorists declared 175 sceattas to the authorities. It is certain, however, that the

79 Pol (1989), a brief report.
80 Kent (1972); Rigold & Metcalf (1984) p 246.

hoard was twice as large. Portions of it were sold by auction on four occasions, in 1975 (32 sceattas), 1985 (43), 1986 (49), and 1988 (77). In all, 376 sceattas can be accounted for, of which 178, or 37 percent of the total, were of Type 2c, and 19, or 5 percent, were of Type 8. There may have been other coins, sold less openly. The rest of the hoard comprised:

5 Merovingian deniers
3 Series A
22 Series B
2 Type BIIIA
1 Series BZ (*BMC* Type 29)
31 Series C
61 Series E (of the four primary varieties)
2 imitations of E
25 Series F
2 new type, classed with Series Z
2 Saroaldo type
1 Series G, Type 36, cf. *BMC* 52.

The sub-varieties of Type 2c present in both hoards are shown in Table 5. The Remmerden hoard terminates with sub-variety 3f.

Table 5. The Series D varieties in the Remmerden and Aston Rowant hoards.

Variety	Remmerden	Aston Rowant	Variety	Remmerden	Aston Rowant
8	3	14	3a	54	38
8Z, etc	1	1	3b	4	4
1a	12	5	3c	3	3
1b	18	2	3d	23	23
2a	4	0	3e	5	4
2b	6	1	3f	9	8
2c/10	3	0	3g	–	1
2d	2	1	3h	–	8
2e	5	1	4a	–	18
2f	4	3	4b	–	25
			4c	–	17

Source: the Corpus, omitting nos 135-155, 156-7, and 1071.

While Remmerden and Aston Rowant are the backbone of our study, there are various other hoards and grave-finds which contain smaller numbers of specimens of Series D.

In 1980, in a field by **Escharen**, on the south bank of the river Maas, many prehistoric and Roman remains were found. Metal detection yielded 9 sceattas in an old plough furrow, all of Series D.[81] These were four specimens of Type 10, and five of Type 2c, of sub-varieties 1b, 2b, 2e, and 3a (2). This small hoard is the earliest Series D hoard available to us The fact that it is relatively unmixed could be because its owner had recently obtained a batch of coins from the mint; or it may be that at the date of concealment the rather sparse currency of the Big rivers region was circulating less vigorously.

The **De Meern** hoard was found during construction work, close to the remnants of the old Roman castellum at the Old Rhine near De Meern (U).[82] The site of a vicus adjacent to the Roman fortress was found. Archaeological exploration of the area in 2004 in an old silted-up tributary of the Rhine yielded 122 sceattas.[83]

1 Series D Type 2c
1 Series D Type 8
1 Series J Type 85
1 Series R Metcalf group 8 (intrusive?)
1 porcupine, plumed bird var J
3 porcupines var D
3 porcupines var G, possibly imitative
111 porcupines of the Kloster Barthe phase

This hoard must have been concealed early in the secondary phase of sceattas. It demonstrates the virtual disappearance of Series D during the 710s, when the existing currency was no doubt melted down and reminted into coins of somewhat lower fineness. Although the best of the Kloster Barthe phase porcupines are of very good silver, the alloy quickly declined, into the 80-90 percent range.[84] The almost complete disappearance of Series D seems to be true also of a poorly documented hoard from Friesland, from the Stephanik collection, although one cannot now be certain that the three specimens of Series D were actually found in association with the majority porcupines.[85]

In England, too, Series D was thoroughly swept away in the early stages of the secondary phase, and no doubt for the same reason. The Kings Lynn find

81 Op den Velde (1985).
82 Graafstal & Pol (2004), a preliminary report.
83 Unpublished.
84 Metcalf (1993b) pp 237-238.
85 Auction F. Muller (1904).

of 20 sceattas (very possibly a grave-find), from very early in the secondary phase, includes three specimens of Series D.[86] There are none surviving in, for example, the Woodham Walter (Ess) hoard.[87]

Mini-hoards

Occasionally one will suspect that two single finds, recovered on the same occasion, are in fact a very small hoard, i.e. they were deliberately concealed, together. If they are from a find-spot with few sceattas, or if they are of the same variety or are otherwise unusual, the conviction will be strengthened. There are various examples from England of 'mini-hoards' consisting of two or three sceattas stuck together by corrosion, which prove that such an event could happen.[88] But even if the coins are found a metre apart, they may have been a hoard, scattered in modern times.[89] The Ven-Zelderheide sceattas of Series D may well be a 'mini-hoard', as may two coins of the 'catapult' variety of Type 8 from De Panne (Belgium) and there are doubtless other instances.

Stray finds in the Netherlands

Controlled archaeological excavations, in which the sceattas recovered are carefully recorded one by one, offer evidence of the highest quality for the monetary historian. The Wijnaldum excavations are an important reference point for Series D, and so are the modern Wijk-bij-Duurstede excavations.[90] The same cannot, alas, be said for Domburg, where the finds may include grave-finds, and even (one wonders) a substantial hoard, scattered before recovery by marine erosion. The Westenschouwen site-finds, with a much smaller proportion of Series D, may, paradoxically, be a more reliable sample; either that, or the losses begin later.[91] At Katwijk a/d Rijn it seems clear that the losses begin somewhat later.

86 Metcalf (1993b) p 193: One specimen of Type 8 and two of Type 2c.
87 Access to the hoard kindly granted by M. Archibald.
88 In 1995 a lump of 12 porcupine sceattas was excavated at Wijk-bij-Duurstede.
89 The nine coins of the Escharen hoard were found scattered in an old plough furrow.
90 Besteman, Bos & Heidinga (1999) pp 220-225.
91 Op den Velde & Klaassen (2004) p 81.

Table 6. The number of recorded stray finds of Series D sceattas in the Netherlands in 1984 and 2005.

	Domburg + Westenschouwen	Friesland	Dorestad	Big rivers area	coast of Noord- and Zuid Holland
1984					
Type 2c	189	1	6	5	2
Type 8	18	0	0	0	1
Type 10	1	1	0	0	0
2005					
Type 2c	199	77	14	30	25
Type 8	17	5	0	1	1
Type 10	1	2	0	1	0

During the Oxford Symposium on Sceattas in England and on the Continent, held in 1984, a total of 224 finds of Series D with a provenance in the Netherlands were recorded (Table 6). Mainly due to the activity of metal detectorists, who systematically searched likely find-spots, this number has increased to 373 in 2005. In particular the province of Friesland now shows a dramatically different pattern. The 373 finds were divided regionally. Within these regional groupings, four sites have been especially productive.

1. The huge amount of early medieval coins found at **Domburg** on the island of Walcheren, and Westenschouwen on the island of Schouwen-Duiveland, is now published in detail.[92] From the 17th century onwards, the remains of settlements and cemeteries have been laid bare by the sea. The finds on the beach of Domburg included at least 1000 sceattas and Merovingian silver pennies. An unknown, but perhaps substantial number of these finds might have been grave gifts. The great number of coins found at Domburg indicates that an important centre of international trade was located there in the early middle ages. Probably because of rapid growth of the commercial activity c. 710 a secondary trading place originated on the nearby island of Schouwen.
2. The ***terpen* area in the province of Friesland** yielded many sceatta-finds, including 18 coins of Series D, unearthed by the systematic archaeological excavation of the Wijnaldum terps.[93] Wijnaldum stands out in this respect, partly because of the intensive effort devoted to its excavation. But it seems to be the case that the place had more proto-urban functions than many of the other terps.

92 Op den Velde & Klaassen (2004).
93 Besteman e.a. (1999).

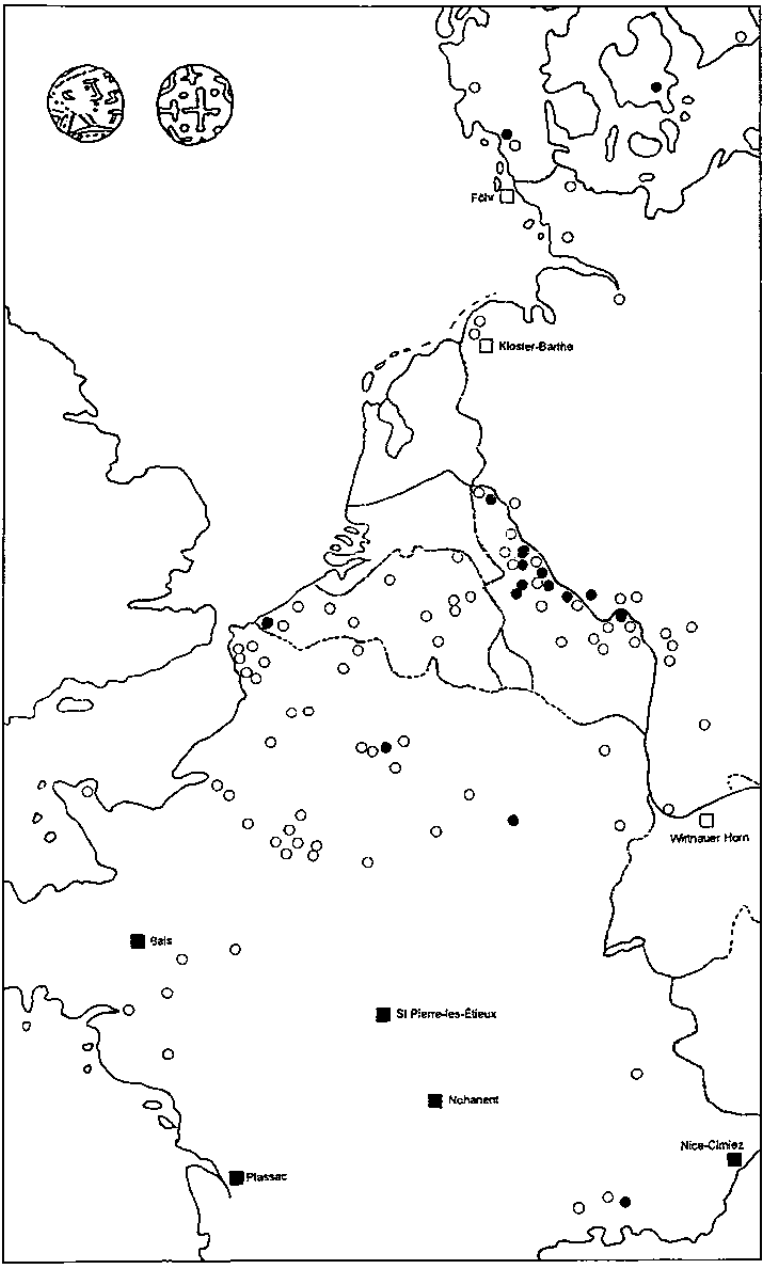


Figure 15. Finds of sceattas of Type 2c in Europe. Circles represent single finds of all types of sceattas, squares represent hoards. Solid dots and squares indicate finds of Type 2c. For the finds in England and the Netherlands see the separate figures 16 and 18.

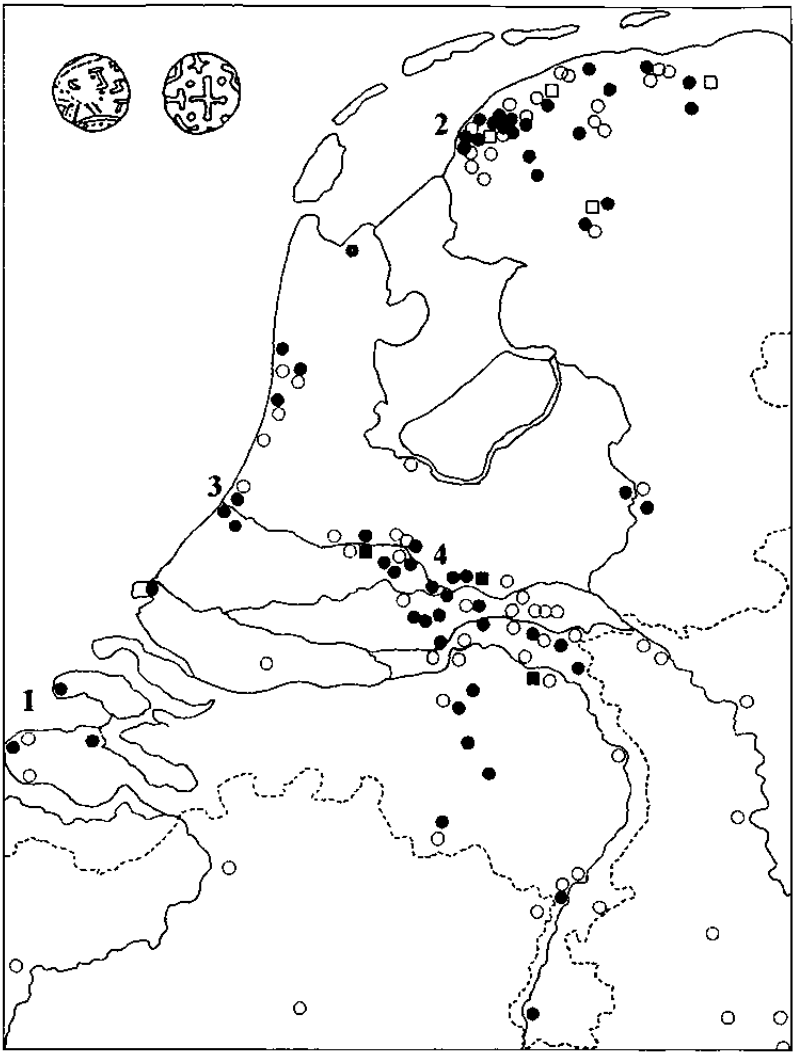


Figure 16. Finds of Type 2c sceattas in the Netherlands. Circles represent single finds of all types of sceattas, squares represent hoards. Solid dots and squares indicate finds of Type 2c. Productive sites have been identified, namely 1. Domburg and Westenschouwen, 2. The *terpen* area in the province of Friesland, 3. Katwijk, and 4. Wijk-bij-Duurstede.

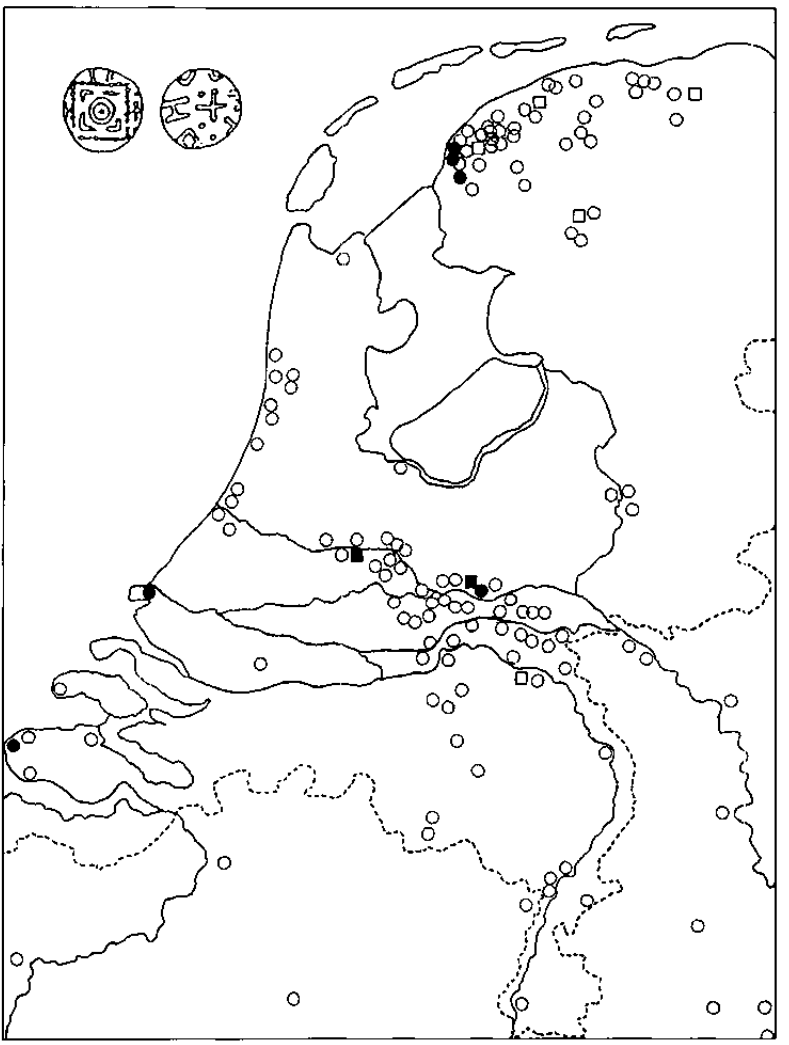


Figure 17. Finds of Type 8 sceattas in the Netherlands. Circles represent single finds of all types of sceattas, squares represent hoards. Solid dots and squares indicate finds of Type 8.

3 At the coast of Zuid Holland, near **Katwijk**, where the Old Rhine discharged into the North Sea, recently a total of 32 sceattas (both primary and secondary phases) were found, 30% of them being of Type 2c. Katwijk is located on the route of the Rhineland by way of Dorestad to the North Sea. The area around Katwijk (the second part of the village name is the Dutch word for 'wic') was already densely inhabited during the Roman occupation of the Low Countries. The remnants of a Roman fortress (Brittenburg) were found under the sea level for the coast of Katwijk.
4 At the location of the important medieval trade centre Dorestad (near the present city **Wijk-bij-Duurstede** (Wijk = 'wic' and Duurstede is the modern spelling of 'Dorestad'), a total of 99 sceattas were found, many of them during archaeological excavations in the 1980s.[94] Fourteen percent are of Type 2c. Perhaps the adjacent find complexes of Maurik and Rijswijk also belong to the sphere of influence of Dorestad.[95] Dorestad was the centre of the **Big rivers region**, the area between the Rhine and the Meuse.

Stray finds from England

There are over 200 stray finds of Series D recorded from England (Figure 18, p 98). Their regional distribution is discussed in a separate chapter below, where they are set into a context of all the other primary-phase sceattas from England. Negative evidence from archaeological excavations can create important perspectives for the monetary history of Series D. The virtual absence of Series D at Hamwic (Southampton), for example, is very securely attested.[96] The same is true of the Ipswich (Sf) excavations. The main reason seems to be that, although both Hamwic and Ipswich were certainly in existence, losses of sceattas were few in the primary phase. That is why it is safer, in the primary phase, to analyse the single finds on a regional basis. Modern excavations in London, at the Royal Opera House and elsewhere, are significant for the occurrence of Type 8.

Finds from outside the main circulation areas (Auslandsfunde)

Whereas the main axis of circulation of Type 2c was in the Netherlands, Friesland, and England, a few coins strayed outside that zone, and occur in small

94 NUMIS data-base.
95 Op den Velde (1982).
96 Metcalf (1988).

proportions in hoards from France, for example. Stray finds turn up also in Germany, Belgium, Denmark, and even Israel (Corpus no. 1198), where the odd coin was perhaps carried by a pilgrim. These *Auslandsfunde* are peripheral in every sense, and they are too few to permit much in the way of analysis. One interesting question is whether they were carried from the Netherlands, or from England. It can be argued that the Danish finds very probably originated from England; and the same is probably true for the material in Nice-Cimiez and the other French hoards, except perhaps that from Bais.

France

It is intriguing that the French hoards of Bais, Saint-Pierre-les-Etieux, Plassac, and Nice-Cimiez should each include a specimen of Type 8.[97] The Bais hoard is otherwise almost entirely composed of Variety 3, so far as Type 2c is concerned, and terminates with sub-variety 4b. All the specimens except one are of respectable weight.[98]

Germany

Finds of Series D from Germany tend to be relatively late within Series D. Many of them are grave-finds. Mainz was major commercial centre, already in the early eighth century. The site-finds from the Hilton Hotel site include only one sceatta of Series D, alongside three or four other primary-phase coins.[99]

Scandinavia

The first evidence that sceattas of Series D were carried to Scandinavia comes from the excavations at the manor house site of Dankirke, in Jutland. Among a total of 13 coins recovered, there were three of Madelinus (one in pale gold, the others in silver) and two of Series D. These two are of sub-variety 3h (corpus no. 905) and 4b (corpus no. 983). No. 905 is of the variety with a large annulet at each end of the radiate crown, and is arguably English. A die-duplicate and an obverse die-linked specimen passed through the hands of an English dealer in 1998, and one will suspect that they were acquired by him

97 Chabouillet (1890); Lafaurie (1969); Lafaurie (1981).
98 Corpus nos 95 (Type 8), 467, 477, 487, 601 (all sub-variety 3a), 650 (3c), 768, 770, and 775 (3d), 859 (3f, light weight), and 992 (4b).
99 Stoess (1994); Heinrichs (forthcoming).

on the same occasion, and in England. Other coins of English types were found at Dankirke, and there is a presumption that no. 905 reached Jutland from England. The other Dankirke find of Type 2c belongs late in the series. It is rather non-descript in style. It shares an obverse die with a coin from Bonn (corpus no. 984).

Another find of sub-variety 3h (corpus no. 906) came to light at the high-status site of Gudme. The same comments about its English origin apply, and indeed are strengthened by the second specimen.

From the key archaeological site of Ribe, in Jutland, 203 sceattas have so far been recovered in controlled archaeological excavations, and of these just four are of Series D.[100] Unfortunately their surface condition is too poor to describe them in detail. All four are from a remarkably well-stratified site within the town of Ribe, referred to as the Post Office site. Half a dozen other sites in Ribe, which together accounted for 148 sceattas, yielded none of Type 2c. The stratification of the Post Office site has been interpreted in terms of phases, of which the dates are well anchored by dendrochronology (a date of 710) and by thermoluminescence of pottery from the early layers. The relevant phases are A (before c. 705; no sceattas), B (c. 705 – c. 725; two sceattas of Series D, three porcupines, one Series J, one unique coin, and two of the locally minted Series X), and phase C (c. 725 – c. 760; 16 of Series X). This suggests that Series D may have been reaching Ribe in small quantities in the late primary phase, before the local issue of Series X began. Whether they continued to arrive, but were melted down and converted into Series X is in principle unknowable, but Series X is of secondary-phase date, i.e. it began after Series D had virtually disappeared from the circulation in both the Netherlands and England.

100 Feveille (2006).

Chronology

It seems that the beginning of the issue of Type 2c coincides quite closely with the earliest mention of King Radbod, in 690, and that it was completed some years before his death in 719. Historians and others are entitled to have the arguments upon which this assertion rests clearly explained, with an indication of the margins of uncertainty that attach to the suggested figures. The *relative* chronology of Type 2c is as clear as one could wish. That of Type 10 follows closely from it. But that of Type 8 remains debateable.

Absolute chronology is more problematic, resting as it does on a network of arguments concerning the dates of concealment of various hoards, in which English primary-phase sceattas are represented. A consensus among numismatists has been established since 1984, to within plus or minus five years (see p 25 and below). The arguments today rest on the same few fixed points as they did then, with very little supplementation. New hoards discovered in the future could strengthen the present consensus, although it is more likely that they will simply be inconclusive. They might even modify the consensus although that seems a rather remote possibility. Sceatta hoards were not concealed together with a message in a bottle, reading 'buried in 706', Attempts have been made to associate certain crucial hoards with known historical events: such insights remain to some extent conjectural, and could be over-precise.[101] We think that it is beyond doubt that the period of issue of Series D overlapped with the reign of Radbod, and that the whole of Type 2c lay within it. Whether Radbod had any part in the issue is another question. Stuart Rigold in a classic paper published in 1960/61 indicated the following fixed points:

c. 670	The Crondall hoard.[102]
673-685	Pale gold, post-Crondall thrymsas, struck during the reign of King Hlothere of Kent.
694	The Kentish King Withred pays a *wergild* of 30,000 (? shillings) to the West Saxons. This exhausted his kingdom's ability to strike gold. Silver sceattas of both Series A and B begin shortly after 694.

101 There is a cluster of English hoards from around 870 which have been associated with the ravages of the 'Great Heathen Army'. Close comparison of their contents suggests that they could have been put together over a period of two or three years.

102 Grierson & Blackburn (1986) p 126.

734 The Frisians were attacked by Charles Martel. This was the context for the loss of the Hallum hoard.[103] In France, Cimiez was sacked in the course of the Lombard wars, resulting in the loss of the Nice-Cimiez hoard.[104]

Rigold's conclusion was that the primary sceattas, Series A and B, were the coinage of the reign of Wihtred (c. 691-725). Since 1960, the Crondall hoard has been convincingly redated by J.P.C. Kent and others to the 640s, and Nice-Cimiez has, even more convincingly, been redated by Grierson and Blackburn to no later than c. 720. The Hallum hoard should also be pushed earlier, by c. 15 to 20 years. The intermediate dates need to be moved back too. Metcalf has suggested that Series A is the coinage, not of Wihtred, but of his predecessor King Hlothere, who died in 685. The years 685-691 were a time of instability in Kent. If there was a break in the coinage, either between Series A and Series C, or early in the sequence of Series C, that is historically the most plausible time for it. The early coins of Series C are stylistically very close to those of Series A. The later ones, with a taller pyramidal neck, could well have been produced after a break.

Those are the broad arguments for a chronology of the primary phase, as they stood in 1993. Not much has been added to them since then. The *wergild* of Mul, paid by Wihtred in 694, will have been paid in silver sceattas, not pale gold thrymsas. It may have been used, in part, to kick-start the minting of Series W in Wessex.

Series D, Type 2c copies the obverse of Series C, and must therefore have been introduced at a date later than the introduction of Series C. How much later is an open question. The best specimens of Type 2c, namely Variety 1, always have a pyramidal neck, although not an exaggeratedly tall one. That might be an argument to move them to after 691, or perhaps even a couple of years later than that, on the chronology summarized above.

We can now narrow the focus down, to look at a sequence of grave-finds, mainly from Kent, and containing sceattas of Series A, B, and C (but not Series D), published by Rigold in 1960/61. Finds I-V contain only A and BI. In Find VI (Southend-on-Sea) BII and C make their appearance, with just one remaining specimen of A, somewhat worn. Find VII (Birchington, 1848) contains BII and C, together with two specimens of Type 2c. Rigold himself remarks that

103 Rigold (1960/61) p 26: 'In 734 the Frisians, driven out of Gaul, were attacked by the sea; this suits Hallum, the earliest and most coastal of the hoards, well enough.'... 'Franeker, Terwispel, Kloster-Barthe, and Lutje-Saaksum ... are rather later than Hallum'.

104 Chabouillet (1890); Grierson & Blackburn (1986) p 142.

'there was a cemetery at Minnis Bay, but nothing to associate the coins with it or with a grave; ... analogies would suggest a burial.' The two specimens of Series D should, if associated, be from early in the Type. Corpus no. 981, however (identified from a plate in *Collectanea Antiqua*, published in 1848) is Variety 4, we do not believe in the integrity of this find.[105] Rigold also mentions a coin of Type 8 in the Maidstone Museum, but says that it 'seems too late to be a stray from the hoard.'

It seems clear that there are two successive phases in the currency of south-eastern England, characterized respectively by A with BI, and BII with C. A more recent find of 20 coins from Kings Lynn, 1991, which may be a grave-find, and of which the integrity is fairly secure, includes (for the first time) two examples of Type 2c and one of Type 8, alongside A3, BI, BII, B (imitative), C (four specimens), and an A/C mule.[106] The coins of Type 2c, Corpus nos 611 and 743, are of Variety 3. The find is dated by a secondary porcupine.[107]

In short, the grave-finds suggest that Series C began well after Series A, and that Series D does not show up in England for a further interval of time. It is, in Rigold's own words, 'a tight, but not impossibly tight programme'. If the broad framework is correct, the start-date of Type 2c is unlikely to be before c. 695. One possible flaw in the argument might be that merchants carrying Series D coins did not gain ready access to the south-east of England.

The absence of Type 8 from the grave-finds, prior to Kings Lynn, tends to show that it was not introduced at an earlier date than Type 2c – which was theoretically possible, since it does not copy Series C.

As regards the end-date of the issue of Series D, it seems clear that the full chronological sequence of stylistic varieties is represented in the Aston Rowant hoard, up to sub-variety 4c. Nothing that should be labelled 4d has been recognized among the single finds, either in England or the Netherlands. Sub-variety 4c already is on a well-defined single lower weight-standard. The issue of Type 2c has ceased by the date of concealment of Aston Rowant – or at most within one or two years after that date.

The Aston Rowant hoard, which is the touchstone of what series constitute the primary phase, is generally dated to c. 710. The reason is that the Cimiez hoard, which must be dated no later than c. 720, already includes a range of English secondary-phase series, namely J, N, and U, also the (?) Merovingian Series G, and the Danish Series X. Even if one or two of the coins in question

105 Blackburn (1984) p 166 already questioned its integrity.
106 Metcalf (1993b) p 193, and files.
107 Illustrated in Metcalf (1993b) p 230.

were intrusive, there would be no justification for doubting that the secondary phase was under way by c. 720. A similar comment applies to the Hallum hoard, which may be a year or two earlier than Cimiez.[108] It includes the secondary Series G, J, and X, and is well evidenced.

The general conclusion which seems inescapable is that the whole of Series D was issued in a remarkably short period of time, considering the very large number of dies employed. The best estimate that can be made is c. 695 – c. 710. One's instinct will be to try to stretch this as far as possible, simply to accommodate such a large volume of output, but unless there is some fault in the interpretation summarized above, it is frankly quite difficult to stretch the interval to two decades. The weakest point of the interpretation is probably the start-date of the English primary phase: the post-Crondall phase of pale gold thrymsas and the transitional coinages of Pada and Vanimundus might be compressed, allowing us to push back by a few years the beginning of Series A and, correspondingly, of Series C. Aston Rowant confirms the impression that by c. 710 Series A was old and on the way out. It had dwindled in the English currency vis-à-vis Series C. But this might win us at most an extra five years, giving just about two decades for the issue of Series D.

108 De Haan (1866); Nahuijs (1866); Dirks (1870); Grierson & Blackburn (1986) p 151.

Estimation of the volume of Series D

On the basis of official English mint-records from the fourteenth century, it is safe to say that, on average, an upper die was used to strike 15,000 to 20,000 coins, and the lower die 30,000 to 40,000. The eighth-century sceat was in high relief, but its area was only c. 40% of that of a fourteenth-century Edwardian penny. Whether the dies were as fully used as was technically possible is a moot point, but it can be argued that the minters are unlikely to have gone to the trouble and expense of making more dies than were required. For purposes of historical argument about the degree to which the economy of the Netherlands was monetized, we are well content to take a more conservative view, and think of a figure closer to 10,000. It is, in any case, the reverse die that we should look at in order to form a general impression of the output of the mints, because an obverse die remained serviceable for a very long time, if one chose to go on using it. For Type 8 the statistical estimation indicates 176 dies, and for Type 2c (and 10), a massive 2,670. These totals are critically scrutinized below, but we may point out, as a first reaction, that 2,670 multiplied by 10,000 is 26.7 million sceattas. Students of the English sceatta series, where various die-studies have been undertaken, will not be amazed. A global figure of 8,000 dies, for all sceatta series, has been offered as a rough approximation.[109] Even if the figure of 26.7 million is somewhat too high, it is so large that we can speak of a degree of 'overkill': the implications for the monetary history of the Netherlands would be much the same if, for example, the true figure were nearer to 20 millions or even 15.

Most Series D sceattas were struck in the Netherlands, and exported to England on a massive scale (page 109). But what proportion of the output of the Dutch mints was exported, and is reflected in the English single finds? We can in principle hope to work out an answer. There are English sceatta types, which were hardly exported, and for which an estimate of the total number of dies can be calculated. We know what proportion of the English stray losses of the period c. 690-715 they make up. From that information one can in principle extrapolate, and obtain a rough estimate of the total volume that circulated in England. That can then be set in comparison with the estimate of dies used for the whole of Type 2c. As an interim indication, we may mention that Series B, estimated to have been struck from c. 270 reverse dies, yielded 4.1 percent of the English single finds, cf. 6.4 percent of Series D.[109] Pro rata, the accumulated

109 Metcalf (1993a) pp 8-9.

quantities of Series D in England will have been equivalent to the output of c. 420 reverse dies. This needs to be confirmed by taking an average using several other English series.

Because it is found so little in the Netherlands, it seems that Type 8 was destined predominantly for the trade with England. Type 2c, on the other hand, circulated both in England and the Netherlands. If we make a guess that 90 percent of the output of Type 8 accumulated in England, it becomes possible to estimate what percentage of Type 2c did the same. The calculation is subject to margins of statistical variation, but the numbers are large, and a distinct comparison discounts most of the uncertainties. We can say that an estimated 156 upper dies of Type 8 (excluding 8Z) generated 98 single finds in England (using the Corpus, including the supplement). If Type 2c had been exported to the same extent, 2320 upper dies (excluding sub-varieties 3c and 3h) might have been expected to generate 78 × 2320/156, or 1160 single finds in England. In fact there are just 174. This suggests that 90 % × 174/1160, or 13.5 percent of the output of Type 2c accumulated in England. Thus, by the end of the primary phase, Series D had contributed the equivalent of the output of (156 × 90%) + (2320 × 13.5%), or 454 dies. If 454/2476 or 18 percent of the currency of the Netherlands, transferred to England, became 23 percent of the English currency, then the currencies of the two countries were, roughly comparable in size. Both were growing rapidly during the primary phase. Of course these figures should not be thought to be exact. But they give a rough idea of the monetary transfers: 454 dies × 10,000 average output per die would be 4,5 million sceattas, spent in the purchase of goods which flowed in the opposite direction.

The obverse/reverse die ratio

The estimates for obverse and reverse dies are calculated separately, and in the final column of Table 3 (page 45) there is given an approximate figure for the ratio between obverse and reverse dies, e.g. 1.5 or 2 reverse dies to each obverse. Such ratios are a familiar pattern from later in the middle ages. In thirteenth- and fourteenth-century England, for example, it was standard practice to supply mints with dies in sets of three – two upper and one lower. The lower or anvil die lasted longer than the upper or trussel dies. In Series D, so many varieties show similar ratios that we may be sure that, here too, there was a general practice of using more than one reverse die with each obverse. They need not have been kept together in sets; but the patterns of die-linkage (which can be studied in detail on Plates 1-33) are not extravagant – we do not find obverse dies linked with numerous reverses, as might have happened if a dozen or twenty reverse dies were stored in a chest overnight, and taken out at random in the morning. The spider's-web patterns of die-linkage that we see with the ninth-century Northumbrian stycas, or the Anglo-Scandinavian series, are not found in Series D.[110] Die ratios of 1.5 or 2 strongly suggest that the reverse dies, which wore out more quickly than the lower dies, were in general expected to be fully used.

Die-estimation is a powerful tool of analysis, which can be used to address a variety of questions, not just the total numbers of coins minted. The argument, above, that die-ratios suggest that reverse dies were in general fully used, to their technical capacity, is an example. Another example concerns Type 8. Table 3 (page 45) shows that the die-ratio is reversed, with more obverse (standard with tufa) than reverse (cross) dies, by a factor of 1.5. That is so much contrary to expectation that we have no hesitation in concluding that the 'obverse' of Type 8 was in fact engraved on the upper or trussel die, normally designated the reverse. The attribution of Type 8 to a different mint-place from Type 2c is discussed on pages 90-94. The switching of the 'cross-and-pellets' design from the lower die (in Type 8) to the upper die (in Type 2c) is, at first glance, a hint that two mints were involved. For practical reasons of economy, however, the more elaborate design (the radiate bust of Type 2c) was normally allocated to the lower die, where it would last longer. So the changeover could have been made within a single mint, quite sensibly. Something similar is

110 Pirie (1987) diagram at p 124; Malmer (1997).

observed in Series X, the Wodan/monster sceattas, where the insular imitations have a different die-ratio, being inverted.[111]

The imitative coins of Type 8Z, and the 'standard with wheel' variety (see pages 42-43), differ from Type 8 in showing a simple one-to-one die-ratio. Again the arguments for their attribution to a different mint-place will need to rely on distribution-patterns, metrology, alloy, and any other evidence that can be assembled. But an aberrant die-ratio is certainly one good argument.

When we look through the 19 sub-varieties of Type 2c, an aberrant die-ratio is a warning signal that the sub-variety in question may be from a separate mint-place. Thus, for example, Type 10 with its associated specimens of Type 2c shows a ratio of 3. This, together with the style of die-cutting of the Type 2c specimens, suggests that they are imitative. They do not tie Type 10 into the main series of Type 2c by die-linkage, as might at first have been imagined. There are two sub-varieties of Type 2c with reversed die-ratios, i.e. with the radiate bust design presumably on the upper die, namely sub-variety 3e, and 4a. When we see that 3e is laterally reversed, with the bust facing left, it seems obvious that it is an imitative issue from some other small mint-place, not the main mint (or mints) of Type 2c. Sub-variety 4a, in rather poor style, will fall under similar suspicion. For the global estimate, we should presumably prefer the figures of 140, and 126, bringing the grand total of reverse dies to 2,748. Sub-variety 3h, which has a distinctive obverse with two large annulets at the ends of the radiate crown, produces a quite abnormal die-ratio of 4. The stray finds are also exceptional, being more heavily concentrated in England rather than the Netherlands. In short, one should strongly suspect that 3h is an English imitation. Once that main point is established, one will be intrigued to notice two stray finds from Denmark, one from Belgium, and one from Germany among the total of 37 specimens. The estimate for sub-variety 3h is that it was struck from 324 reverse dies. Its production, somewhere in England, was therefore not a hole-and-corner, secret, underhand, or amateur operation. If the usual average output per die is applicable, we could well be looking at three million sceattas of sub-variety 3h.

The large estimates of 518, 395, 299, and 600 reverse dies for varieties 3a, 3d, 3f, and 4b are troubling. They tend to dominate the global total of 2,670, or even 2,748, mentioned above. One will inevitably ask oneself whether they could be exaggerated. Variety 3 is, generally speaking, struck from very ugly and clumsy obverse dies. Sometimes one can barely recognize a radiate bust. Could Variety 3 include large numbers of unofficial, imitative coins – of which many fewer were struck, on average, from each die? In response, it must be

111 Metcalf (1993b) pp 285-286.

said that Good's formula (which was originally devised for the study of bird populations) is designed to measure the original total output. The estimates are conventionally expressed in terms of numbers of dies, but these are 'equivalent' dies. Also, the parameters of weights, and also the alloy composition of Variety 3 are very much in line with the rest of Series D, whereas one would have expected unofficial coins to be somewhat inferior in their intrinsic value, so as to give the counterfeiter a margin of profit, by cheating on the alloy, or the average weight, or both. Again, Variety 3 was most certainly not a small, hole-and-corner production. There may very well be some counterfeits which have been given respectability by our scheme of classification, but we very much doubt whether they influence the die-estimation.

Margins of sampling error are a possible source of exaggeration in the estimates of 518, 395, 299, and 600. It seems unlikely, however, that all four should err substantially in the same direction. The relative size of those margins will always be greater when the number of surviving dies represented in the sample is small in relation to the estimated total of dies. In sub-variety 1a, for example, all but one of the 42 specimens in our Corpus are die-linked, and the estimated total of reverse dies (22) is well below the sample size. In such a situation, there is extremely little margin for sampling error. The estimated 518 dies of sub-variety 3a, on the other hand, are represented by only 219 specimens in the Corpus, from only 175 known reverse dies. Only one-third of all the dies that were used are known.

The survival rate

The 'survival rate' of reverse dies (i.e. specimens in the Corpus, per [estimated] reverse die), is potentially a very useful tool, in conjunction with the classification into varieties, to help us understand the monetary history of Series D correctly. It is necessary, however, to distinguish between the survival rate (or 'representation rate') in hoards, and among stray finds, as their evidence is quite different in character. The word 'survival' carries with it the idea of wastage of the older varieties, only a proportion of which survive in the currency. 'Representation' describes exactly the same ratio but is perhaps a more neutral term.

A hoard, such as Aston Rowant, concealed at approximately the end of the period of minting of Series D, will in principle reflect the composition of the currency at that date (and in England). The earlier sub-varieties of Type 2c, although still represented in the hoard, will perhaps have dwindled away, through natural wastage or through re-minting. Their representation rate per reverse die might in that case be lower. The later varieties should be fully represented in the hoard (except that the very latest may not yet have had time to reach England in its proper quantities – unless they were imitations struck in England). We can compare Aston Rowant with the Remmerden hoard, which should reflect the composition of the currency in the Netherlands at a slightly earlier date. If there are differences between the two hoards, they might somehow reflect the drift of currency from the Netherlands to England. Obviously, an exercise of this kind would be much more secure if it rested on a comparison of three or four large hoards from each country, rather than just one from each.

Table 7. Estimated survival-rates for the main varieties in the Remmerden and Aston Rowant hoards.

Variety	Rev. dies	Specimens		Survival × 100		Single finds		Survival × 100	
		Remm	A.R.	Remm	A.R.	NL	England	NL	England
8	156	3	14	2	9	19	57	12	36
1	68	30	7	44	10	35	12	51	18
2	131	24	6	18	5	62	21	47	16
3a-f	1435	98	80	7	6	135	71	9	5
3g-4c	1114	–	69	–	6	49	50	4	4

Table 7 shows the estimated survival-rates for the main varieties (coins per estimated reverse die) in both hoards. In the Aston Rowant hoard these are reasonably consistent throughout, in particular for Varieties 3 and 4, where the die-estimates are surprisingly high. Remmerden is more variable, with an exceptionally high figure in Variety 2. The equally low figure for Type 8 is consistent with the idea that it was an export-coinage – as is the contrast, for Type 8, between Remmerden and Aston Rowant. That is perhaps as far as one should press the analysis of the two major hoards.

Table 8. Survival rates. Explanation: Type 8, which was struck from an estimated 156 reverse dies (see Table 3, page 45), is represented in the Remmerden hoard by only three specimens, or c. 2 percent of the dies originally used.

Variety	Estimated Rev. dies	Specimens					Survival rate × 100				
		Hoards		Stray finds			Hoards		Stray finds		
		Remm	As Ro	Domb	NL	Engl	Remm	As Ro	Domb	NL	Engl
8	156	3	14	13	14	54	2	9	8	9	35
8Z etc	21	1	1	1	0	15	5	5	5	0	71
1a	22	12	5	5	12	4	54	23	23	54	18
1b	46	18	2	7	18	6	39	4	15	39	13
2a	32	4	0	5	3	4	13	0	15	9	13
2b	16	6	1	6	9	3	38	6	38	56	19
2c +10	23	3	0	1	7	5	13	0	4	30	22
2d	1	2	1	1	1	1	200	100	100	100	100
2e	21	5	1	4	13	2	24	5	19	62	10
2f	38	4	3	6	9	5	11	8	15	24	13
3a	518	54	38	33	40	26	10	7	6	8	5
3b	57	4	4	5	1	5	7	7	9	2	9
3c	26	3	3	1	4	7	12	12	4	15	27
3d	295	23	23	21	13	13	6	6	5	3	3
3e	140	5	4	8	9	7	4	3	6	6	5
3f	299	9	8	7	7	14	3	3	2	2	5
3g	13	4	1	5	3	6	30	8	38	23	46
3h	324	–	8	4	0	12	–	2	1	0	4
4a	126	–	18	5	4	3	–	14	4	3	2
4b	600	–	25	16	13	13	–	4	3	2	2
4c	51	–	17	3	2	4	–	33	6	1	2

Stray finds behave quite differently. Accidental losses were presumably occurring steadily year by year. The earliest varieties of Type 2c should be more

strongly represented, because they had had years longer in circulation in which to risk being accidentally lost. Conversely, the latest varieties should be under-represented among the stray finds. Because quite a few coins in the Corpus have no exact provenance, the exact totals of stray finds are to some extent a matter of opinion. In the last twenty or thirty years, coins sold by Dutch dealers are likely to have been mainly Dutch finds. and those sold by English dealers very probably English finds.[112] With coins of older provenance, one cannot be so sure. The figures in Table 8 are therefore to a certain degree subjective.

The finds from Domburg have been listed separately in Table 8, from the rest of the stray finds from the Netherlands. That was done in case it should appear that the currency of Domburg was measurably different in any way from that of the Netherlands – more open, for example, to contacts with England.

If we compare the single finds from the Netherlands and from England, again in terms of survival-rates, the rates decline in both countries, which is what one might expect if the early coins remained in circulation, and had a correspondingly greater chance of being lost.

The most dramatic discrepancy to emerge from Table 8 concerns Type 8, which is far more plentiful in England than in the Netherlands, prompting one to wonder, even, whether it could be English. That problem is discussed on pages 90-94. At the end of Series D, sub-variety 4c is particularly plentiful in the Aston Rowant hoard, although the same is not true of the stray finds of 4c. That suggests that the explanation lies in the date of deposit of the hoard. It may also be the case that 4c is an English imitative variety. Otherwise, the figures are not easy to interpret. They could be referred to in the discussion of the difficult question where the main mint or mints of Type 2c were located.

112 Some coins from the Aston Rowant hoard were offered by Dutch coin dealers.

The mint-place(s) of Series D

The country of origin of *BMC* Type 2c

Stray finds of Type 2c are very numerous and widespread in England as well as in the Netherlands. In England they make up something like 16 percent of all the stray finds, of many different sceatta types minted up to c. 710. Frequent instances of die-duplication between specimens found respectively in the Netherlands and in England, taken together with a stylistic classification of Type 2c into its many minor variations, prove that coins from the same mint(s) and the same range of style are found in both countries, in roughly matching proportions, and therefore that virtually the whole of Type 2c originated in the same country. There are two or three sub-varieties which are exceptions to the rule, being relatively much more plentiful in England – where, no doubt, they were minted in imitation of the Dutch prototype. But they do not amount to more than c. 10 percent of the volume of issue of Type 2c. For the rest, given that Type 2c accounts for roughly 90-95 percent of the Dutch finds from the period c. 690-710 (except perhaps at Domburg), compared with only 16 percent of the English finds, there need be no doubt that Type 2c originated in the Netherlands. This argument is perhaps not, as briefly stated, 100 percent conclusive, but taken in context we think that it is – partly because the opposite hypothesis would be extravagantly difficult to sustain. It was exported to England, where it accumulated in very large quantities, and remained in circulation massively until c. 710. It entered England at ports all up and down the east coast, as far as Humberside, in connection with the North Sea trade – in which, presumably, Frisian merchant-sailors were prominent.

The four groupings of stray finds in the Netherlands

The great majority of the specimens of Type 2c, then, of all except two or three of the sub-varieties, will have been minted somewhere in the Netherlands: but where? Die-chains repeatedly show that coins from the same mint were eventually lost all over the Netherlands – and also in England. The degree of mixing was evidently thorough: but how thorough? Evidence of residual localization has been set out above. Some sort of confirmation is that there is a measurable regional contrast, with residual localization, between the Hexagram sceattas,[113]

113 Formerly called 'Herstal' or 'Star of David' type.

which are found mostly in Friesland and were presumably minted there, but which turn up also in the region of the big rivers, and the Interlace type, which is certainly more southerly in its distribution but which is occasionally found in Friesland. These types are however later in date, belonging to a period when monetary circulation may have been become more localized.

The hexagram type

The interlace type Both × 2

The localization of the mint-place(s) of Type 2c in the Netherlands is necessarily based on the analysis of distribution of the stray finds. There are two rather clear natural regions of monetary circulation within the Netherlands, namely Friesland, and the region of the big rivers, with an area separating them which is relatively empty of stray losses (Figure 16, page 65). Further to the south, Domburg and Westenschouwen can be thought of as a third grouping, and the coastlands of Noord- and Zuidholland as a fourth. For each region we tabulate the numbers of single finds of Type 8 and of Type 2c, varieties 1, 2, 3, and 4 (Tables 9 and 10). There is a presumption that these four varieties of Type 2c are successive phases in the minting of Type 2c. At least, it is virtually certain that Variety 1 is early, and that Variety 4 is late. The sequence of Varieties 2 and 3 is less clear. The date of loss of individual coins is, of course, unknowable; a coin of Variety 1 may have been lost well after minting of that variety had ceased.

Table 9. Single finds from the Netherlands: chronological trends in their regional distribution, and comparison with English finds. A = Friesland, B1 = Domburg, B2 = the coastlands of Holland, C = the region of the big rivers. Source: Table 13.

	Numbers					Percentages				
	A	B1	B2	C	England	A	B1	B2	C	% England/ Netherlands
8	7	14	1	1	108	30	61	4	4	4.69
2c, var 1	14	12	3	6	12	40	34	9	17	0.34
/ var 2	18	22	7	8	16	33	40	13	15	0.29
/ 2c +10	1	2	1	4 or 5	5	13	25	13	50	0.63
/ var 3	32	84	15	16	93	22	57	10	11	0.63
/ var 4	6	24	1	6	28	16	65	3	16	0.76

The left-hand half of Table 9 shows numbers of single finds, the right-hand half the corresponding percentages taken by the four regions, in each successive variety. Note that the total numbers (left) are not necessarily a measure of the relative size of the currencies in the four regions: they merely reflect the intensity of searching, and modern survival-rates. Note also that if there are any regional contrasts in the percentages (right half) they should be sharpest in varieties of which the coins have had the least time to become diffused in circulation.
During the period of currency of Type 2c, Friesland shows a relative decline, whereas Domburg enjoys a growth in relative importance. One is halved, the other is doubled, roughly speaking. No trend is clear in the region of the big rivers. The coastal settlements decline in relative monetary importance. The trend in England is an increase in the successive varieties of Type 2c, in relation to the total for the Netherlands. From Varieties 1-2 to 3-4 the ratio approximately doubles.

Matrix analysis of the sub-varieties of Type 2c

We do not know whether Type 2c was struck at more than one mint-place. It has a very widespread distribution in the territory of the Northern Netherlands, but we need to consider that it could have been struck at Domburg, or in the region of the big rivers, or in Friesland, or in more than one of these places. Both in the hoards and the stray finds there is a mingling of Type 2c coins in a good style with coins struck from clumsy and coarsely engraved dies. So even the possibility of production by more or less official mint(s) in combination with private or irregular minting has to be considered.
Early medieval die-cutters were remarkably skilful in copying a design, as we may judge by considering later Anglo-Saxon coins. Minted at up to 70 different mint-towns, from dies which often were cut at half-a-dozen die-cutting centres, it would have been exceedingly difficult to understand the English coins properly, if they had not carried the name of their mint-place on the reverse. In principle, the only way to prove conclusively that Series D was minted in more than one mint-place is an empirical process of identifying small differences of style, and showing that the resultant stylistic groups of single finds generated different distribution patterns. Experience gained from studying later Anglo-Saxon coins warns us that the issues of different mints could quickly become thoroughly mingled in circulation, so that any residual localization of a stylistic variety in its region of origin was no more than a statistical tendency.
One does not know what to expect, in the way of residual localization of Type 2c. Consider, for example, the following argument: the existence of

reduced-weight coins in both Variety 4 (with the 'fish-bone' pseudo-runes) and in Variety 3 of Type 2c appears to show that Varieties 3 and 4 were to some extent concurrent. They are so different in style that it is inconceivable that a single mint-place would alternate between 'fish-bone' pseudo-runes and badly blundered *æpa*. The 'fish-bone' pseudo-runes are a new and distinctive design element, an elegant solution, one might almost say, reinterpreting an existing pattern by a die-cutter who could not read runes. The light-weight coins are absent from the Remmerden hoard, but present, in both Varieties 3 and 4, in Aston Rowant, a year or three later. It would seem that Variety 4 began production a very short time after the t.p.q.[59] of Remmerden – and at a different mint from Variety 3. Soon again after that, light-weight coins made their appearance, in both Varieties. Can we detect any residual localization of Varieties 3 and 4 in the Netherlands? The numbers of single finds, below (Table 10), in the four monetary regions (and also in England) generate ratios that are by no means even:

Table 10. Residual localization of Type 2c, Varieties 3 and 4, proportions of single finds in the Netherlands. Source: Table 13.

	% Friesland	% Domburg	% Coasts	% Big rivers
Variety 3	22	57	10	11
Variety 4	16	65	3	16
Var. 3 / Var. 4	1.38	0.88	3.33	0.69

Some 22 percent of the Dutch single finds of Variety 3 are from Friesland, as against 16 percent of Variety 4. The ratio between these percentages, 1.38, is distinctly higher than at Domburg or in the Big rivers region (0.88, 0.69), and this disparity is, so far as one can see, an index of residual localization. On the coasts of Holland, the ratio is much higher (3.33), which is difficult to understand; but the calculation rests on just three specimens of Variety 4 (Table 10), and may be erratic for sampling reasons. Might Variety 4, or part of it, be English? A simpler exercise (Table 11) encourages one to think that is, at least, not a major source of confusion:

Table 11. Ratios of Variety 3 against Variety 4 in England and in the Netherlands, among single finds. Source: Table 13.

	England	The Netherlands
Variety 3	93	147
Variety 4	28	37
Var. 3 / Var. 4	3.32	3.97

How conclusive is the argument that has been outlined above, and what are its weaknesses? Whereas Variety 4 is distinctive, it is far from certain that (the very large) Variety 3 is well defined. If, in spite of that, there is a clear statistical difference between the figures for Friesland and for the Big rivers region, it would seem that a part of at least of Variety 3 was minted in Friesland. That might be assessed at better than 70 percent conclusive, whereas the attribution of Variety 4 to the Big rivers region might be less than 60 percent conclusive, since it could conceivably be from Domburg.

Another, completely separate argument about the mint-place(s) of Variety 3 takes as its starting-point the runs of die-linked specimens, of that variety, in the Remmerden hoard. The Remmerden hoard is richer in duplicates, triplicates, and longer chains of die-linked specimens than is the Aston Rowant hoard (see page 31), and this suggests that Remmerden is 'closer to source'. It still contains little clusters of coins that have stayed together since they left the mint. These are particularly prominent in sub-variety 3a (four pairs, four triplets, a run of five, and a run of eight coins). Clusters are much less plentiful in Variety 2, presumably because Variety 2 is earlier and the coins had longer to become broken up. Aston Rowant yields a very different picture: among the coins of Variety 3 there is just one pair and one triplet (although there are quite a lot of cross-links to English single finds). In Remmerden there are no clusters in sub-varieties 3b, 3c, or 3e, but five in 3d. Might this be an argument to suggest that sub-varieties 3a and 3d were minted in the Big rivers region, whereas the other sub-varieties could be from Friesland or elsewhere? We should add the cautionary word that our classification of sub-varieties could be in some respects defective, in particular for sub-variety 3a, which is a large and not very coherent group stylistically, and that it could include the work of smaller mint-places.

These little clusters reflect die-duplicates that had been issued to some customer or other at the mint, and which had not yet become fully dispersed and broken up by the process of small payments. That they should be concentrated among the latest coins in Remmerden is easily understandable. There is a presumption, too, that they are from a mint in the Big rivers region (where Remmerden is located) rather than in Friesland. The alternative, which is not impossible, is that the clusters in question were minted in Friesland, but were quickly carried south in the course of trade. So we have an argument which is apparently in conflict with the previous one based on residual localization among stray finds. How should we rate this on the conclusiveness scale? It is possible that, prior to the introduction of Variety 4 at a mint-place probably in the Big rivers region (i.e. almost immediately post-Remmerden), Variety 3 was minted in that region as well as in Friesland? It is more than possible. The weakest point of

the argument is the lack of stylistic coherence in the very large Variety 3, which could easily be from more than one mint. The strength of a chain is only that of its weakest link, and in the present state of our numismatic knowledge, one would have to say that the argument from clusters of die-duplicates is hardly more than 50 percent conclusive. However, it is not necessarily in conflict with the argument from residual localization.

Some of the sub-varieties of Variety 3, or perhaps we should more modestly say, some of the coins of Variety 3, could be from one mint-place, and some from another. The same is true of the other main varieties. What we needed, therefore, is a method of analysis approximating to a simple matrix analysis of the sub-varieties, paying due attention to the margins of sampling error. One possible outcome of such an analysis is that no further residual localization can be detected. This turns out not to be the case. Fortunately it is also clear that there are distributional differences between Type 2c and Type 8. These can give us an idea of the extent to which the regional currencies of different regions within the Netherlands could remain distinct, and thereby help us to interpret Type 2c.

If we now look in more detail, at the individual sub-varieties, rather than combining them in large groups, we see (Table 13) that three or four sub-varieties are seriously discrepant, showing much higher England/Netherlands ratios. This suggests at first sight that they may be English imitations of the Dutch Type 2c. In particular sub-variety 3c shows a ratio of 2.33, which is several times greater than the norm. The obverse radiate bust on this sub-variety is normally laterally reversed – a classic sign of imitation. As to the whereabouts of the mint in England, the English finds are insufficient to localize it. There are just three scattered finds from the Netherlands (from Domburg, Katwijk, and Houten), which are however enough to add a second step to the argument, i.e. to show that coins of Type 2c were to some small extent carried from England to the Netherlands, against the prevailing trend.

Corpus no. 661 Corpus no. 888 Both × 2

Examples of sub-varieties 3c (left) and 3h (right).

Another sub-variety, with an even more anomalous ratio of 3.75, is 3h. It is stylistically distinctive, with a large annulet at each end of the radiate crown. The style is sufficiently uniform, to suggest that all or almost all of the recorded specimens are the work of a single mint. The one specimen that has been chemically analysed is of lower fineness than other coins of Variety 3 (Table 4 on page 57). There need be no doubt that sub-variety 3h is English, but one hesitates to say where in England the mint-place was: probably somewhere in the eastern coastlands. There are just four single finds of sub-variety 3h from the Netherlands, a modest counter-flow, and all four are from Domburg.

The ratios for sub-varieties 3f (1.17) and 4a (1.00) rest upon rather small numbers of specimens, and are in any case less anomalous. It will be prudent to reserve judgment on them. Sub-variety 4c has a reduced weight standard and is most likely late in date. It had, therefore, less time to become accidentally lost, and the stray finds are few. Its ratio of 1.67 rests upon small numbers, but this sub-variety is plentiful in the Aston Rowant hoard. It is perhaps also an imitative English issue.

In summary, sub-varieties 3c, 3h, and perhaps 4c would seem to be English. They amount to 63 specimens, or 7 percent of Type 2c. It is possible that other small clusters are buried in our classification. The English imitations may thus amount to c. 10 percent of the whole of Type 2c.

Leaving aside the sub-varieties with abnormal English/Netherlands ratios, the rest shows considerable variation in the proportions of single finds from our four regions. It is a matter for statistical judgement whether the degree of variation is compatible with the hypothesis that all these sub-varieties are, essentially, from a single mint. Margins of sampling variation will be relatively wide, when the number of provenanced single finds for a sub-variety is small. The problem is made more difficult, because one has very little idea what hypotheses one should be testing. Should one expect that there was one mint in Friesland and one in the Big rivers region, one in Domburg, one in Katwijk? Mints with a small output will be more difficult to detect, unless like sub-variety 2c/Type 10 they are distinctive. Most varieties circulated very freely throughout the Netherlands, being found both in Friesland and in the region of the big rivers.

If we attempt to compare those two regions, in sub-varieties where the combined sample (A + C) is greater than six (even then, statistically far too small!), the variability looks to be greater than could be explained by sampling error:

Table 12. Comparison of the occurrence of Type 2c sub-varieties single finds in Friesland and the Big rivers region.

Sub-variety	Sample size	Ratio in Big rivers region (Friesland = 1.00)
1a	9	0.82
1b	11	0.22
2e	9	0.50
2f	9	0.28
3a	24	0.28
3d	10	0.68
4b	11	1.2

The absolute numbers of single finds are usually greater in Friesland, but that is, of course, merely a function of modern recovery rates.

If there had been just one main mint at the coastal *wic* of Domburg (as was the norm in England: one *wic*, one sceatta type or series), from where the coins of Type 2c were dispersed to both Friesland and the Big rivers region, again the variability seems greater than is understandable. Moreover, very few *wics* were functioning, in terms of a plentiful local currency, in England in the primary phase.

The die-linked sub-variety 2c together with Type 10 has an unusual obverse: reverse die-ratio which is a strong argument for thinking that it is the production of a separate, small mint – which began by copying Type 2c and then developed its own type. The Escharen and Ven-Zelderheide finds suggest that the mint-place was probably in the region of the big rivers.[114] It seems, however, that these suggestions should be abandoned, because the historical and archaeological evidence indicates that Tiel was not founded until c. 950. No traces of earlier occupation have been found.[115] If this regional attribution is correct, it gives us an idea of the sort of ratio between Friesland and the Big rivers region which is to be expected if other varieties were similarly minted in the south. Unfortunately, the numbers of single finds are much too small to be statistically reliable. For what they are worth, the Friesland : Big rivers ratio is 1:3, or 1:2 if the two Ven-Zelderheide specimens (Corpus nos 324 and 331) are counted as a single find. The logical conclusion would be that the much

114 Metcalf (1984) p 194-195 suggested, on the basis of the legend, resembling TILV, that the mint-place was perhaps Tiel. This followed from an attempt to attribute early Carolingian coins reading BONA to Tiel (old Frisian *Tiel* = good).

115 Halbertsma (2000).

Table 13. The England/Netherlands ratio of numbers of single finds of Series D sceattas of each subvariety. A = Friesland, B1 = Domburg, B2 = the coastlands of Holland, C = the region of the big rivers

						Percentages				
	A	B1	B2	C	England	A	B1	B2	C	%England/ Netherl.
8	7	13	1	1	98	32	60	4	4	4.45
8Z	0	1	0	0	10					10.00
1a	5	5	1	4	5	33	33	7	27	0.33
1b	9	7	2	2	7	45	35	10	10	0.35
2a	1	5	1	0	4	14	71	14	0	0.57
2b	3	6	3	3	3	20	40	20	20	0.20
2c/10	1	2	1	4 or 5	5	13	25	13	50	0.63
2d	1	1	0	0	1	50	50	0	0	0.50
2e	6	4	3	3	2	38	25	19	19	0.13
2f	7	6	0	2	6	47	40	0	13	0.46
3a	19	33	9	5	25	29	50	14	8	0.38
3b	0	5	1	0	5	0	83	17	0	0.83
3c	0	1	1	1	7	0	33	33	33	2.33
3d	6	21	1	4	14	19	66	3	13	0.44
3e	3	8	2	3	6	19	50	13	19	0.38
3f	3	7	1	1	14	25	58	8	8	1.17
3g	1	5	0	2	7	13	63	0	25	0.88
3h	0	4	0	0	15	0	100	0	0	3.75
4a	1	5	0	0	6	17	83	0	0	1.00
4b	5	16	1	6	17	18	57	4	21	0.61
4c	0	3	0	0	5	0	100	0	0	1.67

Source: the Corpus.
Note: the figure 4 or 5, for 2c/10, region C, includes two coins from Ven-Zelderheide, which may be a mini-hoard.

lower ratios tabulated above, e.g. 1: 0.28, point us towards a Friesland origin for substantial parts of Type 2c. The argument may be judged to be rather tenuous, but it is the best that is available in a still very problematic area of interpretation

The place of production of *BMC* Type 8

BMC Type 8, which has affinities of design with one side of Type 2c, has therefore been associated with it under the rubric of Series D. That does not necessarily mean that it was minted in the same place, or even that it is from the

Netherlands, since designs were quite often imitated from one region to another. Nevertheless the general expectation is that a particular design belongs to a particular mint-place. One need not speculate about that: the acid test is where stray losses of Type 8 are found, and where they are found in the greatest concentration. In a comparative grid of the numbers of stray finds, the pattern is striking:

Stray finds	Type 8	Type 2c
In the Netherlands	23	308
In England	108	195

One hardly needs to calculate the ratios, to see that there is a sharp contrast. One's first reaction might well be to conclude that, whereas Type 2c is Dutch, Type 8 is English. However, if that were the case, Type 8 must have had a specific home-region somewhere in England. And that should show up in the relative regional concentrations of stray-finds, by a pattern of progressively diluted dispersion the farther away from the place of production. A regional analysis of the English finds of Type 8, below (pages 105-107) demonstrates fairly conclusively (better than c. 80 percent?) that that is not so. No region is an obvious candidate, except Yorkshire, where Type 8 enjoys a wide scatter across the chalk uplands of the Yorkshire wolds. Lindsey, curiously, does not share this pattern, in spite of equal access via the Humber estuary. If Type 8 had been minted in Yorkshire, one would have expected a decreasing dispersion southwards, and not such a strong representation as is in fact found in Suffolk, Essex, and the South-East.[116] Four possibilities deserve to be explored:

a) Type 8 is indeed English
b) Type 8 is earlier than Type 2c, and from the same continental mint-place
c) Type 8 was produced in multiple mint-places
d) Types 8 and 2c are from different continental mint-places

Possibility a), that Type 8 is English, is at first sight supported by the much higher 8/2c ratio for the English stray finds. The absence of a clear regional concentration of stray losses might be explained by parallel minting in several remote workshops. In the light of our knowledge of the manufacture of coins in England, where each kingdom produced its own predominant specific mint type, this is a far-fetched explanation.

116 The evidence from Suffolk, where Type 8 is also relatively plentiful, may be to some extent distorted by special circumstances at Coddenham. They occur in a group of coins acquired by J. Linzalone.

Possibility b) is that both Types 8 and 2c were from the same continental mint-place. In that case one might expect a more or less continuous inflow into England, with an intermediate ratio for the earliest varieties of Type 2c. However, there is a dip in the inflows into England, in the early stages of Type 2c, and a strong upturn with Type 2c variety 3 everywhere except in Yorkshire

Stray finds	Type 8	Type 2c/1 and 2	Type 2c/3
In England	78	23	75
In the Netherlands	20	111	145

and Suffolk. This pattern favours possibility d) and not b). Furthermore, not a single die-link has been found between Types 8 and 2c.[117] In the past, specimens have been published as 2c/8 mules,[118] because they share the distinctive pseudo-letter ⊓ with Type 8. We have catalogued these coins as Type 2c, sub-variety 2b. If Type 8 is earlier, sub-variety 2b may well be imitating it, but the quite different style of the cross sides of Types 2c and 8 does not support this. Sub-variety 2b has been tabulated separately above (Table 13 on page 90), it has a positive correlation with Type 8, but there is absolutely no evidence that it does imitate it. Possibility c), multiple origins of the main variety of Type 8 has little to be said in its favour. Die-links between specimens found in England, the Netherlands, Belgium, and France are plentiful. The finds from Yorkshire and from around the Wash, are die-linked into the whole. The (early?) variants of Type 8, namely the 'catapult' variety, and the variety with cross and four annulets, are both recorded from Wijnaldum and Domburg. However, the reverse design link mentioned above (page 15) could imply that Type 8 might have been imitated in England, at least on a small scale.

Type 8 'catapult' variety
Corpus no. 1

Type 8 variety with cross and four annulets
Corpus no. 11

both × 2

117 We found only one instance of an 8/2c near die-duplication, corpus nos 28 and 916, see page 15.
118 Corpus no. 280, see also corpus no. 915.

If possibility d) is the true answer, Types 8 and 2c could then have been contemporary. But there is no sign in Type 8 of the lower weight standard found in the later varieties of Type 2c, pleading for an initial and shorter period of minting of Type 8. The continental single finds of Type 8 are almost all from the Netherlands, the only exception being two from De Panne (Belgium), both found in 1960 and both from the scarce 'catapult' variety – possibly a mini-hoard. The Netherlands finds, moreover, show a very different distribution-pattern from the finds of Type 2c, especially within Friesland. As may be seen in Table 13, there is only one single find of Type 8 from the Big rivers region, against 39 of Type 2c. At Domburg there are 13 against 143, or 9 percent of the finds of Series D. And in Friesland there are 7 against 71, or 10 percent of Series D. It seems that we can rule out the Big rivers region as the home of Type 8. If we have to choose between Domburg and Friesland as the mint-place of Type 8, the main argument would seem to be that if it had been dispersed from Domburg, mainly to England, it is hard to imagine that coins would have reached Friesland while so few reached the Big rivers region. On the other hand, one can more easily imagine that, if it was minted in Friesland, Type 8 might have been carried to Domburg by coastal shipping (and from there to England), but that the balance-of-payments situation, which was so much in England's favour, meant that it did not penetrate inland, into the Big rivers region. Furthermore, there is an unexpected contrast within Friesland. Of the seven specimens of Type 8 on record, three are from Wijnaldum, and two from the adjacent villages Arum and Midlum. Five out of seven, or 71 percent, is an unusually tight localization. Two more specimens of Type 8 are recorded generally as being from Friesland. The single finds of Type 2c from Friesland (which may be, essentially, later losses than sceattas of Type 8) are much more dispersed (see Figures 16 and 17, pages 65-66).

Type 8 has generated seven single finds in Friesland, and 78 in England; Type 2c, Variety 1 has generated 14 single finds in Friesland, and 12 in England. This dramatic distributional contrast within Friesland between Type 8 and the early Variety 1 of Type 2c is very unlikely to have arisen if both had been struck in the same mint-place – or if Type 8 had been minted, for example, in Belgium or even Domburg – or for that matter, in England.

The contrast between the distribution patterns, within Friesland, appears to be statistically significant. Our impression is that Type 8 was minted in Friesland, essentially as an export coinage to be used for purchasing goods from England. Within Friesland Wijnaldum is a serious candidate, because archaeological examination there gave evidence of important economic activity, the processing of gold and silver, and perhaps even the location of a royal residence, while

three single finds of Type 8 came to light.[119] That might have happened at an early stage in relation to the period of minting of Type 2c, or even before it began. The coins of Type 2c that accumulated in England remained in circulation there (as we know from the Aston Rowant hoard) and the single finds could have been lost over a period of time, right up to c. 710. When one considers that chronology, the absence of Type 8 from the region of the big rivers is all the more remarkable. In conclusion, the most likely possibility is d). Type 8 was produced in a continental mint, possibly in Friesland (Wijnaldum?), and the coins were mainly used for import payments, so that few specimens entered the local circulation.

The relationships between Series D and Series E

Experience gained since 1993 in the regional analysis of sceatta finds in England suggests that it is prudent, if the data-base is large enough to permit it, to look at the proportions of a type as a percentage of all primary-phase sceattas (c. 680-710), or all secondary-phase sceattas (c. 710-760) (as the case may be), rather than of all sceattas.[120] This turns out to be prudent indeed in considering Series D, because extremely few of the single finds of porcupines (Series E) from the Netherlands are of primary date, whereas the whole of Series D was minted during the primary phase. The scarcity of primary Series E in the Netherlands is puzzling, given that it is so plentiful in England. It means that during the primary phase, Series D completely dominates the currency of the Netherlands

It would not be sensible to reach any final judgement on the mint-place(s) of Type 2c, without giving some thought also to the contemporary primary-phase Series E – the four varieties of primary porcupines.[121] Series D and primary Series E were certainly closely contemporary with each other: the whole range of varieties of Type 2c, and all four early varieties of Series E, are present in the Aston Rowant hoard. Type 2c was minted on a massive scale, millions of sceattas were produced. Series E, so far as we can judge, was equally massive or even more so. Both were exported to England on a very large scale. But Series D, Type 2c also circulated in the Netherlands, whereas E (and Type 8) did so only to a very limited extent. Where did all the silver come from? And what commodities were being exported from England to the Netherlands on a

119 Besteman e.a. (1999).
120 Metcalf (2001) p 35. This procedure has been regularly employed in subsequent research.
121 These four are the 'plumed bird', and 'VICO' varieties, and varieties G and D.

correspondingly large scale? We know from the data-base of single finds that there were two main regions of monetary circulation in the Netherlands, namely Friesland, and the region of the big rivers. Coins passed freely between them. Nevertheless, might not one have expected that Type 2c belonged essentially to one of these regions, and the primary porcupines to the other? The region of the big rivers stood between the North Sea and the Rhinelands, and was well-placed to profit from a commercial role as an intermediary. The goods exported from England to the Rhine mouths area may have been destined, in part at least, to be transferred onwards, into the Rhinelands. The silver to pay for them may correspondingly have reached the Netherlands from the middle Rhinelands and/or the old Merovingian territory of Austrasia. As regards Friesland, it is more difficult to understand the source of the region's wealth. It is not favoured in its soil or natural resources to anything like the same extent, nor was its geopolitical situation in the years c. 690-710 so favourable. If Type 2c belongs largely to Friesland, the questions are more acute, where did all the silver come from, and what happened to the goods imported from England into Friesland in exchange for it?

We come then to the astonishing fact that relatively very few primary porcupines have been found in the Netherlands, in any region. In England they outnumber Type 2c, making up over 25 percent of the English currency in the primary phase. Although a die-corpus remains to be undertaken, from which one might estimate the original total of dies, it is safe to assume that it was very large. How can this great mint-output fail to show up among the Dutch single finds? Were they minted elsewhere than the Netherlands? That seems inconceivable, especially since the Franeker-phase porcupines, some decades later, deliberately pick up the designs of the four primary varieties.[122] They were a restoration coinage, which one may tentatively connect with changes in the political frontier between Franks and Frisians in the region of the big rivers. Dorestad, as the single finds now show clearly enough, rose to commercial prominence in the Franeker phase: primary porcupines are absent or virtually absent there. Perhaps one should look a little nearer to the coast, for example to Utrecht, for a home for some or all of the primary porcupines. Perhaps the four designs are from a cluster of four mint-places (or three: variety D might have a different context) in the Big rivers region. Be that as it may, the stark fact is that primary porcupines make up an astonishingly small proportion of the Dutch single finds. It seems that they were an export coinage, which left the Netherlands as fast as they were minted.

122 Op den Velde (2001).

This is not the occasion for a thorough discussion of the primary porcupines. Enough has been said to offer some encouragement, we think, for an attribution of much of Type 2c to Friesland. If sub-variety 4a belongs to the region of the big rivers, it may be because there is a political context, somehow connected with changes in the frontier. As regards varieties 2f and 3f, scepticism seems appropriate, on the grounds that the numbers are too small to be statistically reliable, and that the apparent residual localization of those two varieties does not fit in with common-sense expectations about the monetary history of the Netherlands in the years around 700.

Summary

The identification of the mint-place(s) of Series D sceattas proved to be far from simple. Mainly based on a matrix analysis of the single finds we found sufficient evidence to conclude that the majority of the sceattas of *BMC* Types 8, 2c, and 10 were minted in the Netherlands. This notwithstanding a high English/ Netherlands ratio of the stray finds of Type 8. We have interpreted this by regarding Type 8 as an export coinage. Also the plentiful Type 2c was to a considerable extent an export coinage for the trade with England.

Within the Netherlands, the Series D sceattas were probably minted at an unknown number of different workshops. The scarce Type 10 was probably produced in a separate mint in the Big rivers region. The concurrent appearance of light-weight issues of Type 2c (e.g. in the Aston Rowant hoard) of both Variety 3 and Variety 4 suggests two major mint-places. Part at least of Variety 3 seems to be from Friesland (where it replaced the issue of Type 8?), while Variety 4 will be from further south. Contrary to this conclusion, the clustering of die-linked specimens in the Remmerden hoard points in the direction that some sub-varieties of our Variety 3 of Type 2c may also have been minted in the Big rivers region. For Type 8, production in Friesland is the most likely outcome, and Wijnaldum is a serious guess.

The distinct Variety 8Z, and Type 2c sub-varieties 3c, 3h, and possibly 4c are imitative and struck in England. The volume of English imitations amounts to roughly 10 percent of the total output of Series D.

Regional analysis and regression analysis of single finds of Series D in England

In so far as all the main stylistic varieties of Series D are already represented in the Aston Rowant hoard (t.p.q. c. 710)[59] it is clear that they were all being minted, or had been minted, before that hoard was concealed. Series D coincides in its date-range, therefore, with the English primary phase. If we are looking for an appropriate context in which to analyse the distribution of Series D in England, it will be very suitable to do so against the background of single finds of all primary-phase sceattas, rather than all sceattas. The basic objective will be to see whether Series D 'behaves' differently, to any extent, from the other primary sceatta types with which it mingled freely in circulation. At the last count there were now more than 925 reliably recorded single finds of primary sceattas (not counting grave-finds or small hoards), from over 390 localities in England.[123] Of these, Series D, Type 2c accounted for 149 coins in our data-base (plus 13 in grave-finds, etc.), Type 8 accounted for 62, and Types 8Z, etc. for 12. The related Type 10 was so rare among the English single finds that it could be left on one side without affecting the analysis at all. We shall also leave Type 8Z aside until the analysis is almost complete, on the grounds that there is no good reason to suppose that it is from the same mint-place as Types 2c or 8.

The survey counting 925 single finds is now three or four years out of date. The current total would be significantly higher. But until a comprehensive new survey is made, the earlier one gives the most reliable indication of the proportions of Series D in the English currency, both overall and locally. Adding in the more recent finds of Series D, but not of other types, would compromise the randomness of the sample.

In total, 211 coins of Series D amount to an astonishing 23 percent of all the primary single finds. That is no doubt a very good approximation to the proportion of Series D in the English currency, averaged over the time-span of the primary phase. In the Aston Rowant hoard, Series D accounts for an even more amazing 52 percent of the hoard's contents. The proportion indicated by the single finds is certainly more reliable, and some special theory is required to account for the composition of the hoard.

123 The check-list has 389 plus a few imprecise localities such as 'Somerset' or 'East Anglia'.

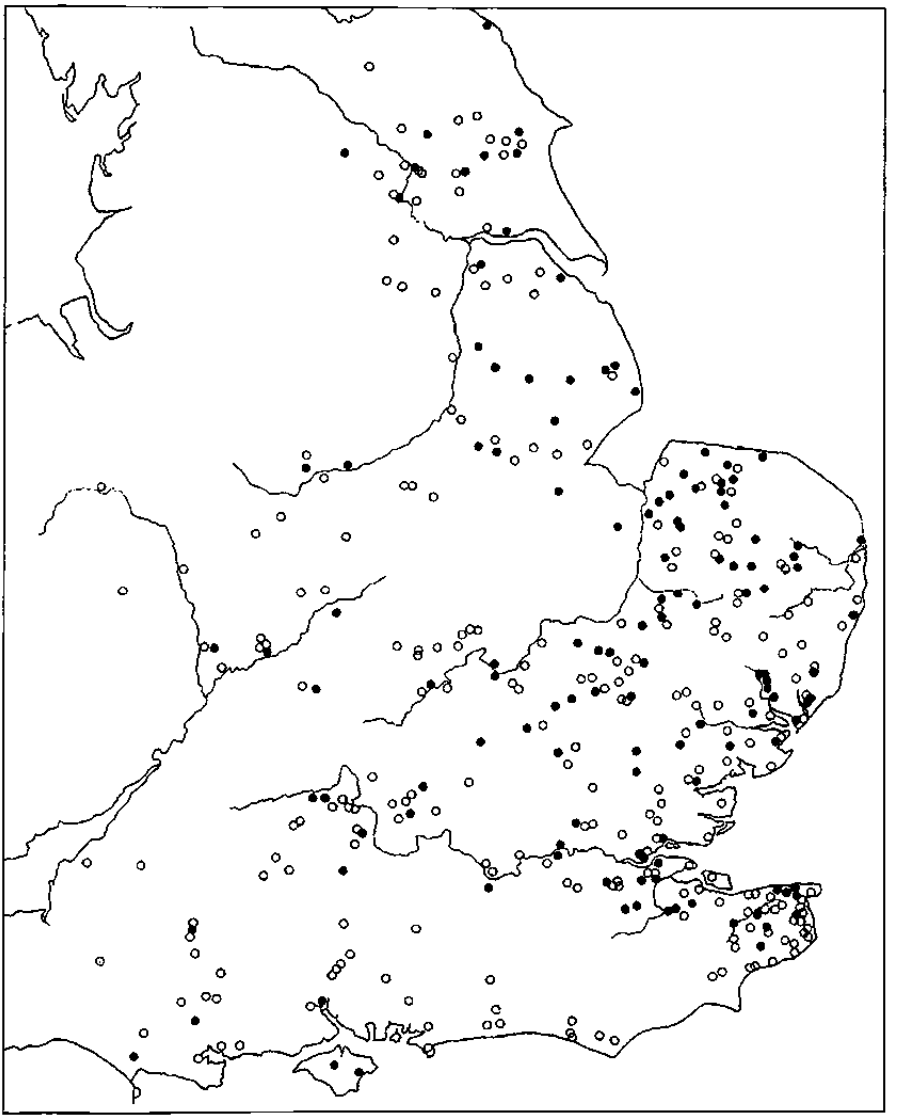


Figure 18. Map on which the find-spots of primary sceattas are marked by open circles, solid dots represent finds of Series D coins. Hoards are omitted.

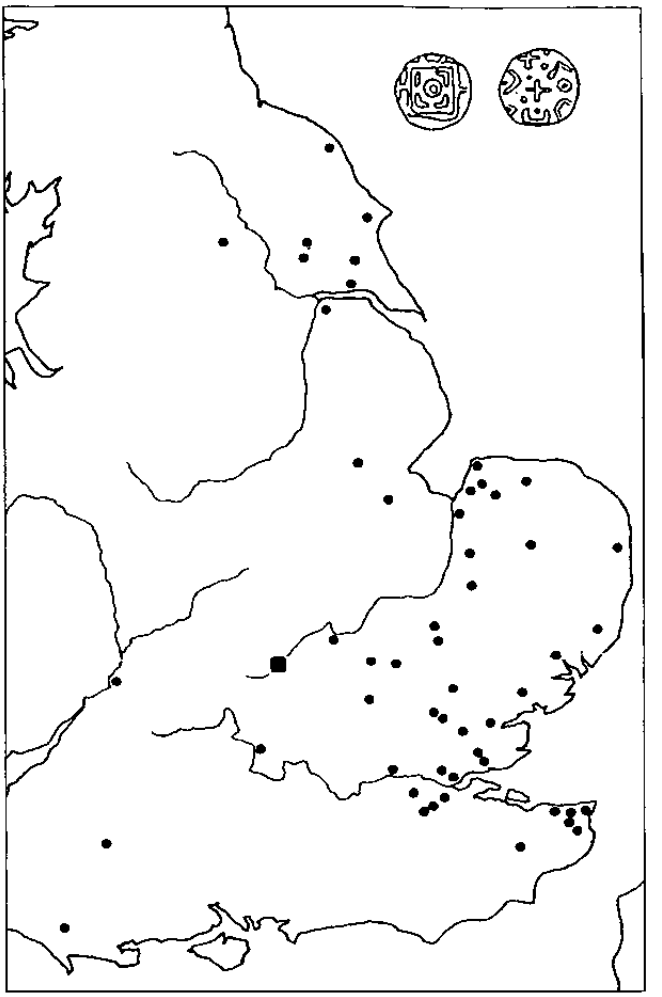


Figure 19. Map of the find-spots of sceattas of Type 8.
Finds of Type 8Z are omitted.

The question arises whether the proportion of single finds (23 percent) might be significantly distorted by the selective over- or under-reporting of Series D compared with other primary types. The more sophisticated metal detectorists are inclined to submit their unusual finds for expert examination, but not to

bother to report the common types. And the more ambitious collectors sometimes neglect the common types. However, the majority of the single finds were discovered by individuals who had only ever found one or two sceattas. We think that more assiduous inventorying might have raised the total from 925 to, say, 950 without throwing up any additional specimens of Series D, which would reduce the ratio from 22.8 to 22.2 percent. It may well be that the correct figure is nearer to 22 than to 23 percent, but that is the limit of any sampling error that we can envisage. It makes no difference to the general historical conclusions, namely that inflows of Series D into England, in the relatively brief period c. 690 to c. 710, had a major impact on the English currency.

Using a base-map on which the 389 localities are marked by open circles, we alter into solid dots the localities where the coin or coins are of Series D or include Series D. A glance at this map (Figure 18) is sufficient to show that Series D is found all over the area of England where primary sceattas are found, with no regional concentrations visible to the naked eye. For some historians, that may be about as much as they feel the need to know about Series D in England; and provided that they remember that we are talking about 22 or 23 percent, over all, of a currency measured in millions of coins, their idea will be correct as far as it goes. It is possible, however, to sharpen the focus and to discover historically significant new facts, by enquiring whether the proportions of Series D in the currency were in fact more or less the same everywhere, or whether there were any regional or local concentrations. One cannot judge that visually by looking at the map, because while most of the dots represent one coin each, some may represent as many as five or ten specimens of Series D from the same locality.

Those regions may suggest economic reasons for the monetary phenomena. It is, however, a labour-intensive form of analysis. Results which are useful if somewhat less precise can be secured with less effort by performing a regional analysis. This has been done for various other sceatta series in the primary phase, using 11 standard regions.[124] It will be convenient, for the consolidation of research, to use the same 11 regions here. The table (Table 14), which summarizes the same data as the maps in figures 18 and 20, derives from the data-base of 925 single finds. The boundaries of the regions are shown in figure 21.

124 Metcalf (2004).

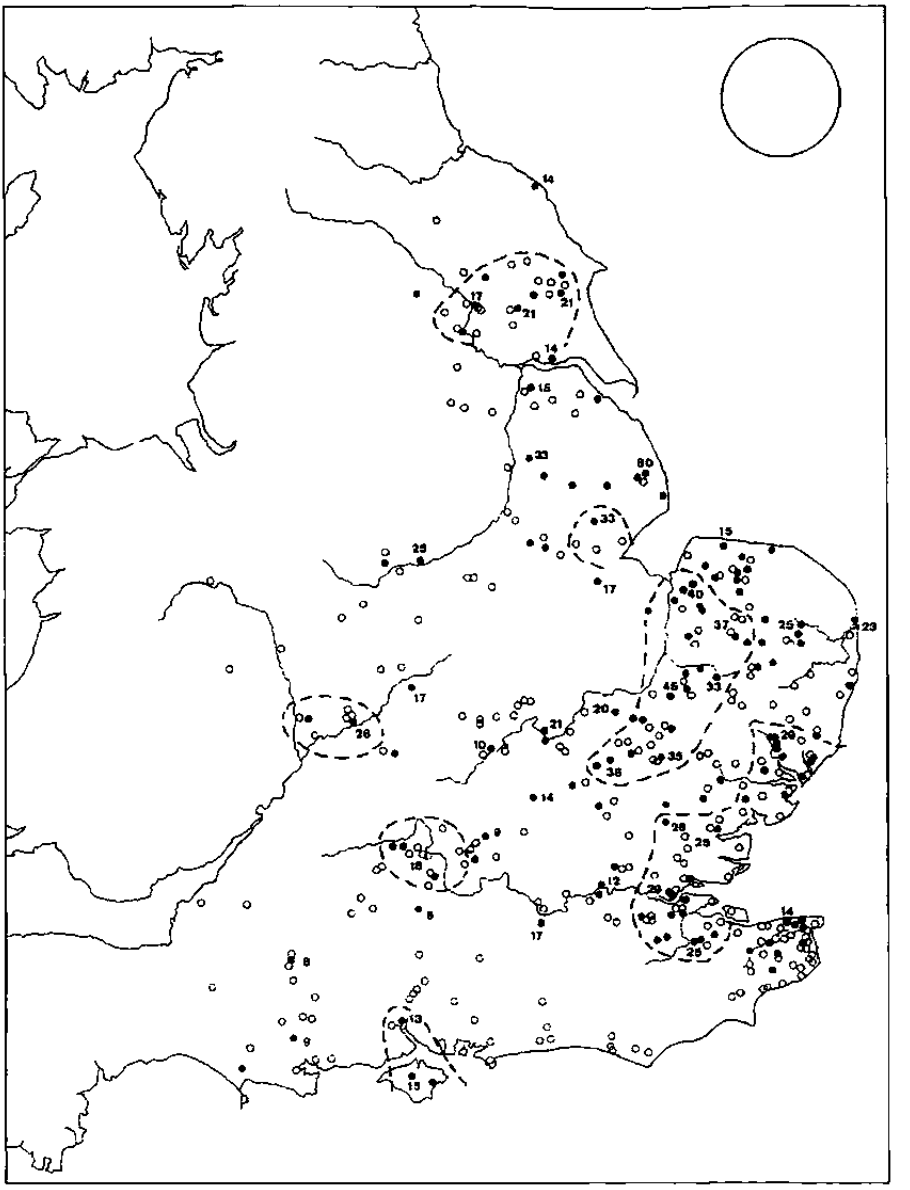


Figure 20. Regression analysis of Series D. Contours are sketched for the areas of greatest concentration. In many of the areas in between, the percentages are very low. The large circle represents an area of c. 2400 km^2.

Table 14. Quantities, and percentages, of single finds of all Primary phase sceattas, and of Series D. Source: data-base of 925 single finds.

		All primary		Series D	
		coins	%	coins	%
1	N. of Humber	54	5.9	14	26
2	Lindsey	53	5.8	11	21
3	Norfolk	108	11.7	36	33
4	Suffolk	124	13.5	29	23
5	Essex (north)	39	4.2	7	18
6	The South-East	212	23.0	30	14
7	Sussex	12	1.3	0	0
8	Wessex	58	6.3	9	16
9	Upper/mid Thames	55	6.0	11	20
10	Middle Anglia	100	10.9	24	24
11	Severn/Trent	105	11.4	33	31
	Not assigned	5		7	
	Totals	920		204	

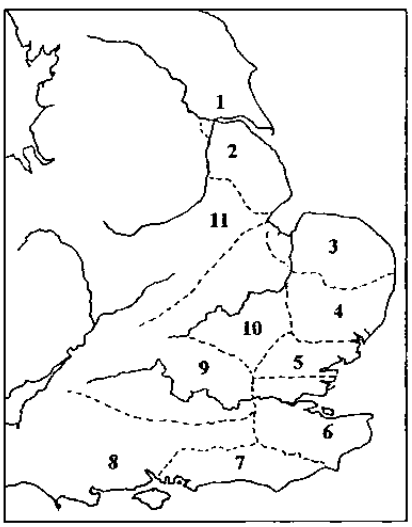


Figure 21. The boundaries of the 11 standard regions.

The proportion of Series D is, in most regions, sufficiently close to the overall average of 23 percent to be unremarkable. In the South-East, however, (the home of Series A, B, and C) it is distinctly lower at 14 percent, calling for some monetary explanation. Perhaps merchants from the Rhine mouths area

did better by going elsewhere with their money. And perhaps it was partly that the English coins were more plentiful in the South-East, with the result that the imports were less conspicuous. The proportion is also distinctly lower all along the south coast of England (Sussex, Wessex). Conversely, in Norfolk and in Yorkshire and on the north-west fringes of the circulation-area of sceattas, the proportions are above the over-all average. That could be for a variety of reasons, including the existence of local imitations in those regions, and it is a necessary preliminary task for the numismatist to examine the style of these coins, in order to satisfy himself that they do in fact belong to the same 'population'. It should not come as a surprise, however, to discover that the regional patterns for Series D are genuine in this respect, because a similar phenomenon has been observed in the distribution of Series E, the 'porcupines', which are the other major coin type imported from the Rhine mouths area. They are particularly plentiful at certain inland localities (which have been described as 'hot spots'), probably because continental merchants went there directly to spend their money. It seems that continental coinage did not necessarily arrive in England in the eastern coastlands, as one might have imagined, and from there gradually drift westwards through processes of local exchange. The big question that is looming behind these smaller ones is, what was all this continental money being used to buy? We should remember that we are talking about many hundreds of thousands of coins of Series D, even if our surviving sample is quite small, and that the purchasing power of one gramme of silver was closer to that of one gramme of gold today. The landscape in most of eighth-century England, and especially in the more northerly and the inland regions, was one of agricultural villages, with few (if any) small towns. Wool, and hides, are two commodities that come to mind. They are very difficult to detect archaeologically. Slaves may have entered into foreign trade in the seventh century, but were probably unimportant for the balance of payments by the early eighth.

Wics had not yet risen to prominence in the primary phase, but already there were a few inland 'productive sites', from which enough single finds are on record to give an approximate idea of the ratios of Series D to all primary sceattas – and thus, in principle, to show whether the currency at those sites was any different in its composition from that of the surrounding region. From the point of view of levels of statistical significance, the numbers of specimens of Series D in the equation are crucial, because they are the smallest numbers. If there are just two specimens of Series D from a site, there could purely by chance just as well have been one or three. What is particularly precious is the knowledge that, for certain productive sites, the information is absolutely secure and complete, because of the cooperation of highly responsible finders.

Thus these sites, marked * in the list below (Table 15), escape any uncertainty about the under- or over-reporting of common or uninteresting sceatta types. Also, because the finds have been faithfully reported year by year in the order in which they were found, one need have no anxiety that the statistics, overall, conceal unnoticed or ploughed-out mini-hoards.

Table 15. Data from reliably reported productive sites: Series D as a whole, and Type 8.

	Region	Primary	Series D	(D/Primary)%	Type 8	(8/Primary)%
*South Lincolnshire	11	57	21	37	7	12
Coddenham, Sf	4	42	11	26	5	12
*Bidford-on-Avon, Wa	11	23	8	35	1	5
Bawsey, Nf	3	16	5	31	0	0
East Tilbury, Ess	6	16	5	31	3	19
**Hamwic*	8	15	2	13	0	0
*Isle of Wight	8	10	2	20	0	0

A comparison with the preceding table suggests that there are no significant differences between the proportions of Series D at the 'productive sites' and in their surrounding regions, such as might have suggested that the sites operated in some degree of commercial isolation. Figures of 31 up to 37 percent underline what has been said above about the historical importance of the monetary inflows from the Continent.

Two questions remain to be considered, namely, whether the distribution-pattern for Type 8 in England is any different from that for Type 2c. The first question may have a bearing on the mint-place of Type 8. The second might, perhaps, show that regional concentrations of Type 2c in England varied during the decades when it was in circulation. An interesting supplementary question is whether the varieties of Type 2c that have been identified as English imitations – sub-varieties 3c and 3h – dominate Variety 3 in any regions. In order to explore these various questions there is no reason why we should not use the fullest and most up-to-date data-base available, consisting of our Corpus and the supplementary list of provenances (for comparisons of Type 8 with Type 2c as a whole) since no comparisons with sceattas of other series are involved.

In the chapter discussing the mint-place(s) of Series D, above, we said that Type 8 was relatively so much more plentiful in England than Type 2c, compared with the Netherlands, that one might well ask whether it was not English in origin; but that if one makes such a claim one has to be prepared to say where in England it was minted. One would expect that it should be more plentiful in its (English) home region, – and specifically, relatively more plentiful

there than Type 2c. The regions where Type 8 is more plentiful in the currency than in other regions are the East Riding of Yorkshire(1), the south Lincolnshire corridor between Mercia and the Wash (which was not part of the kingdom of Lindsey)(11), and, a long way away, in the South-East region(6) and Essex(5). This regional pattern seems to be best explained in the context of maritime trade along the eastern coasts of England – and originating on the Continent. If Type 8 had been minted in Yorkshire, for example, one would need to ask oneself why so much money from Yorkshire was being spent in the Mercian corridor to the Wash, and in Essex and the South-East. From where would so much silver have been available in Yorkshire? Moreover, there is a Yorkshire coinage minted during almost exactly the same period as Type 8, namely the sceattas of King Aldfrith of Northumbria. Their attribution is not in doubt; and we know what sort of a distribution they generate south of the Humber estuary.[125]

Table 16. The quantities and percentages of Type 8 and Type 2c, and the ratio's between the two types. Source: the Corpus plus the additional list of provenances.

		Type 8		Type 2c		
		coins	%	coins	%	8/2c ratio
1	N. of Humber	7	12	9	17	0.78
2	Lindsey	2	4	13	25	0.15
3	Norfolk	7	6	32	30	0.22
4	Suffolk	8	6	14	11	0.57
5	Essex (north)	3	8	6	15	0.50
6	The South-East	20	9	18	8	1.11
7	Sussex	0	0	2	17	–
8	Wessex	1	2	8	14	0.13
9	Upper/mid Thames	4	7	13	24	0.31
10	Middle Anglia	8	6	24	31	0.19
11	Severn/Trent	13	12	31	25	0.46

In order to reach a judgement as to whether Type 8 differs from Type 2c at all in its English distribution-pattern, the sensible strategy, taking account of all the evidence as fairly as possible, is to prepare maps for Type 2c and Type 8, based on Table 16 above, and place them side by side (Figures 22 and 23).

125 Metcalf (2006).

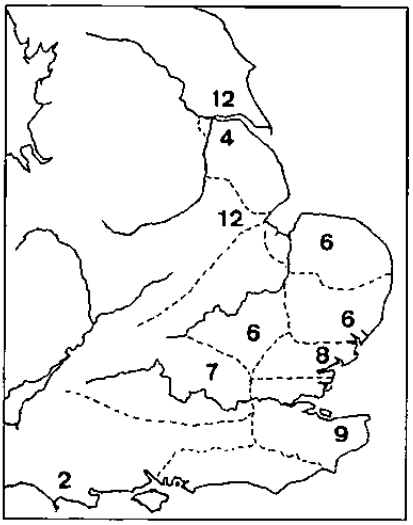


Figure 22. Regional proportions of Type 8

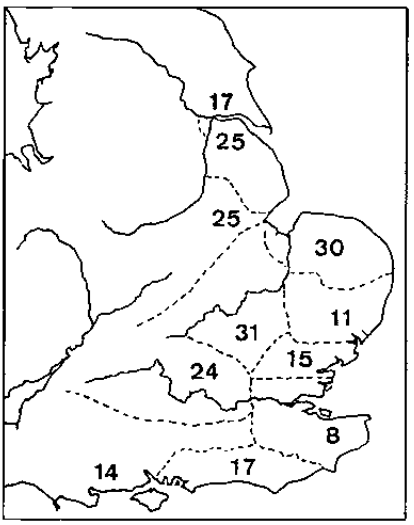


Figure 23. Regional proportions of Type 2c

The percentage figures placed in each region approximate to the proportion of the type in the currency of the region.[126] The most striking discrepancies, using a four-way comparison, are between Norfolk and Suffolk (6, 6 for Type 8; 30, 11 for Type 2c) and between North of Humber and Lindsey (12, 4 for Type 8; 17, 25 for Type 2c). Discrepancies as large as these call for an explanation. They make it difficult to suppose that Type 8 and Type 2c are substantially from the same mint-place. We say 'substantially' because the discrepancy north of Humber might be caused partly by English imitations of Type 8 originating there; and because Type 2c quite probably includes the production of some minor mints. This is not exact science: it is (perhaps) possible to frame hypotheses and then to test them against the data. But various hypotheses suggest themselves, with no obvious procedure for ranking them as to probability. Coming to the second question, whether any differences are discernible between Varieties 1-2 and 3-4 of Type 2, the practical conclusion is that the numbers are too small to be statistically worth-while. There are no striking differences.

126 The percentages are derived from up-to-date statistics for Types 2c and 8, set against the earlier data-base of regional totals for all primary sceattas. This is admittedly a flawed procedure, which will make the percentages a little too high, and may introduce slight regional distortions. But a straight comparison of the percentages for the two types, shown in the final column of Table 16, will be completely free of this procedural compromise.

The same limitation applies to the sub-varieties 3c and 3h, which are arguably English. There are hints that the regional occurrence in England of 3h, when measured against the rest of Variety 3, is northerly. One might wish to bear that in mind when considering the Type 8 – 3h design-link (see page 15).

BMC Type 8Z

Corpus no. 141 Corpus no. 151 both × 2

Examples of *BMC* Type 8Z.

Type 8Z, which is dated by its occurrence already in the Aston Rowant hoard, is recorded in ten specimens from England and only two from the Netherlands (one from Domburg and one in the Remmerden hoard). There need be no doubt of its English origin, as an imitation of Type 8.

Its regional distribution in England is not consistent with that of Type 8. Note the scarcity in Yorkshire, Norfolk, and Suffolk (Figure 24). Inspection of the map suggests that there is a regional concentration in the Cambridge area of Middle Anglia, with finds from Little Abington, Great Wilbraham, Royston, and (further south) Hatfield Broad Oak. This has remained an empty quarter in the mint-attribution of English primary series. The die-links in the Corpus indicate a very small output.

There are one or two additional coins, such as one excavated in London, which do not correspond closely in their designs, and are perhaps unofficial imitations.[127] The coins listed in the Corpus (nos 152-5), with a rather more elaborate design, could well however be part of the main group. They form a die-linked group.

The weights are in the same range as those for Type 8. No chemical analyses are available.

127 This coin (Corpus no. 1090) from the Royal Opera House, has a large, seriffed cross with pellets in the four angles. The reverse is obscure (weathered), but one can make out the central annulet, and bars, pommeé, on two or three sides. There seems to be symbols in the margins, inappropriate to Type 8Z. The coin is of base metal, weathered, and weighs 0.48 g. From an oyster spread in a gravelled yard.

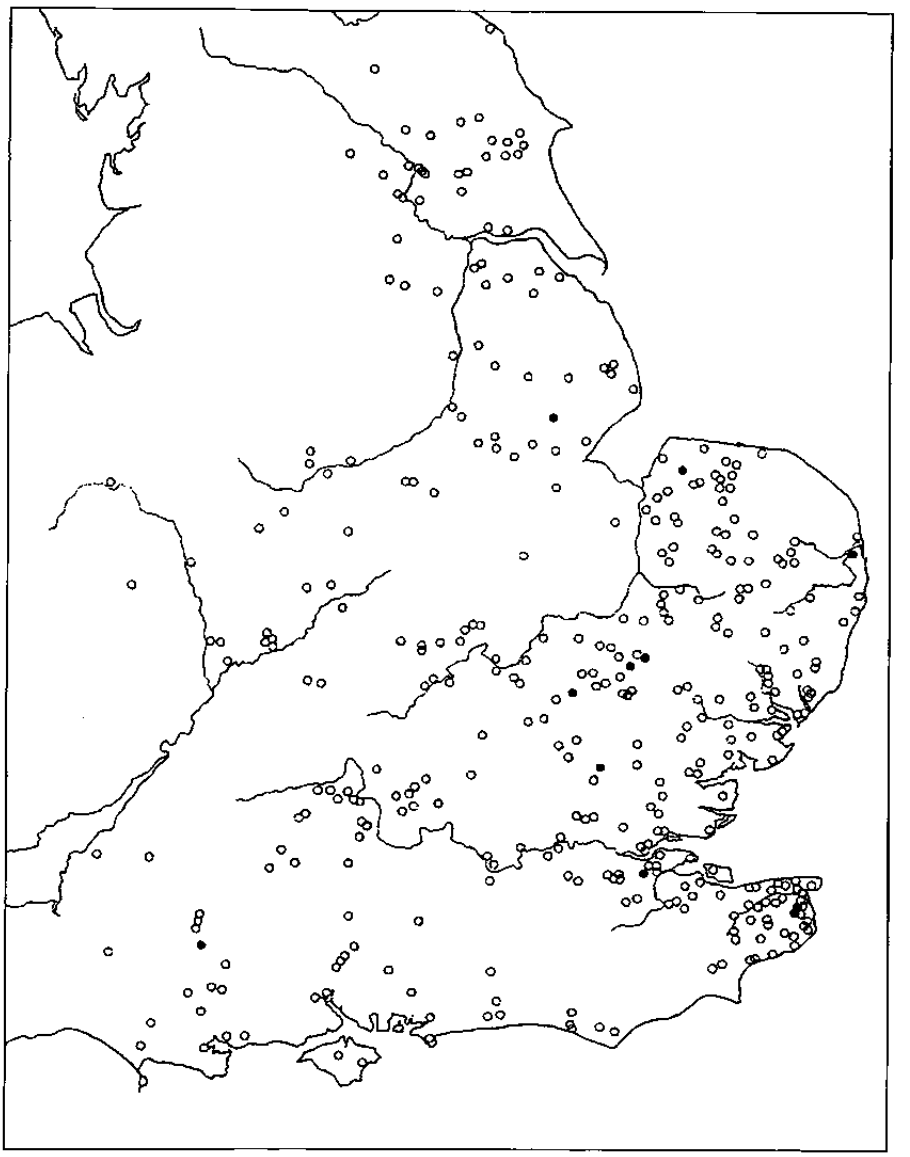


Figure 24. The distribution of the finds of Type 8Z in England.

Export coinages for the trade with England

In this study we have presented evidence that in the two decades c. 695-715, very large quantities of Type 2c were carried from the Netherlands to England, circulated there, and were accidentally lost, all over the country. They were even, on a modest scale, imitated there. Nationally they account for c. 16 percent of all single finds of sceattas in England, minted in the primary phase, more than any other series, except primary-phase porcupines (Series E^1).[128] The mint-place of Type 8 is less clear. There are far more single finds from England than from the Netherlands, which has prompted the idea that Type 8 might be English. In detail, its distribution-pattern in England seems to make that very unlikely: there is no region in England to which it could be convincingly assigned. Nor can we find a home for it anywhere on the Continent, except in the Netherlands. The only acceptable conclusion would seem to be that Type 8 functioned as an export-coinage, used primarily to pay for English exports. The rich harvest of metal-detector finds from the Netherlands in the last two or three decades has produced another, related surprise, with far-reaching monetary and historical implications. It has by now become unmistakably clear that, whereas sceattas of Series E^2, the so-called 'porcupines' of the secondary phase are found everywhere in the Netherlands, the four primary-phase varieties (Series E^1), which are exactly contemporary with Series D and which are very securely dated by their occurrence in the Aston Rowant hoard, are virtually absent from the Dutch single finds.[129] They are, on the other hand, widespread and very plentiful in England, where they even outnumber Series D.[130] This is so much at variance with the normal rule, namely that a sceatta type achieves its highest relative representation in the region where it was minted, dwindling in its proportions as one goes further away, that one must even ask oneself whether the primary-phase porcupines could be English. Again, this idea is difficult to accept, because there seems to be no available home region or regions to which they could be attributed. Moreover, the designs of the four primary porcupine varieties are taken up again in the late secondary ('Franeker') phase, on coins which are unquestionably from the Netherlands. There seems to be no alternative but to regard the primary-phase porcupines also as an export-coinage. It is truly astonishing to contemplate the idea that there were three

128 Metcalf (1993a) p 8: D = 6.4%, Primary + D + E^1 = 29.1%.
129 NUMIS database.
130 Early Medieval Coins database.

major coin-types minted in the Netherlands, in the decade around 700, of which one (Type 2c) circulated freely throughout the Netherlands (and also in England), while the two others (Type 8 and Series E^1), which together were even more plentiful in England, were hardly to be found in the Netherlands.

The concept of an export coinage is not new to Dutch monetary history. There are far more finds of the 11th century pennies struck at Tiel in Baltic countries than in the Netherlands, implying that these silver coins were mainly produced to be exported.[131, 132] Another example of an export coinage are the Dutch lion dollars (*leeuwendaalders*), struck from the 1590s onwards. They were extensively used in the developing trade with the Ottoman Empire.[133]

In 1993 it was tentatively proposed by one of us that Series D belonged to Domburg (where it accounts for an exceptionally high proportion of the primary-phase finds) while Series E^1 was from the great river-port of Dorestad. The growing tally of finds from Wijk-bij-Duurstede has by now made it clear that E^1 is not found there, certainly not in such a way as to support the hypothesis that it was minted there. In the secondary and late secondary phases the situation may have been different.

It has become completely clear, then, that Series D was not in competition with E^1 in the primary-phase currency of the Netherlands. If it had been, one could have used the technique of regression-analysis to discover the regions where the two types were each relatively most plentiful. But Type 2c was unchallenged everywhere. One can up to a point use regression-analysis to localize Type 8 vis-à-vis Type 2c, but the numbers of single finds of Type 8 are so few that it is a sketchy exercise.

This is wholly unlike the situation in England, where Series D was in competition with Series A, B, C, E^1, and F. Region by region, the proportion of Series D among all primary-phase sceattas varies, sometimes reaching 30 percent, elsewhere only 10 percent. The proportion of Type 8 to Type 2c shows little significant variation in the different regions in England. A consideration of the geographical character of those regions where Series D was particularly plentiful can give some idea about its commercial context.

English primary sceattas reached Domburg and Katwijk-aan-de-Rijn, but even here, rather a high proportion of the finds are imitative. Penetration of the English types into Gelderland and Utrecht provinces was minimal. Some coins of Series A, which seems to be over-represented, may have entered the

131 Hatz (1968); De Wit (1989).

132 Around 900 Tiel had taken over the function of major commercial transit centre from Dorestad, that was destroyed by Viking attacks.

133 Kool (2002).

Netherlands before the minting of Series D began. There is an interesting grave-find of five coins of Series C, mostly imitative, from the coastlands of Noordholland, at Limmen.[134] English material, even imitative, seems to be distinctly under-represented in Friesland. In short, the monetary traffic across the North Sea in these years was almost entirely one-way.

Together, Series D and E[1] accounted for half the currency in England by c. 710. By using die-estimates for other sceatta series that were confined to England, one can say on a *pro rata* basis that the accumulated inflows from the Rhine mouths area were equivalent to the output of many hundreds of dies. Counter-flows of sceattas from English currency in the opposite direction were by comparison on a very modest scale. The balance of payments between England and the Low Countries was heavily in England's favour. That can only be because there was a counter-flow of exported goods. We do not know what England was exporting to the Continent, but we can see from the great relative volume of the Dutch sceattas in England that the trade played a dominant part in English commercial affairs. Various different commodities were no doubt included in the total. Wool and hides leave few traces for archaeologists to discover. The best clues to the components of English exports may well come from the varying relative concentrations of Series D (and E) in different geographical regions in England. The finds are, however, pervasive, and testify to widespread commercial enterprise in the North Sea coastlands by merchants whom we generally imagine to have been Frisians: let us say, rather, merchants from Friesland or from the Rhine mouths region (whether Frisians or Franks). Once sceattas of Series D and E had been spent by these foreign merchants visiting England, they entered a lively monetary circulation (as evidenced by the diffusion of English sceatta types from various different mint-places), and they may well have been lost elsewhere than at their place of entering the English currency. Any regional patterns still visible, arising out of the particular commodities being traded, will thereby have tended to become blurred, and the original contrasts softened. We are entitled to imagine rather stronger regional differences originally.

England was certainly the main but not the only foreign destination of the sceattas of Series D. They have been found in the lower Rhinelands as far south as Mainz, reminding us of the geopolitical position of the eight-century Netherlands at the northern end of the Rhine route way. They penetrated also into Belgium and northern France. They dominated the early commercial development of Jutland, which seems to have begun only towards the end of the period when Series D was available (there are four finds of Type 2c from Ribe,

134 NUMIS database, and see illustration on page 5.

two from Dankirke, and one from Gudme recorded). The *wic* of Ribe essentially post-dates its period of currency (but the evidence could be misleading if there was a deliberate policy at Ribe of reminting inflows of foreign silver coins into the local Series X, i.e. there might have been substantial flows of Type 2c to Ribe which are now invisible in the archaeological evidence). One find in Israel is a curiosity, perhaps it was carried there by a pilgrim to the Holy Places.

If Series D and E[1] were to a significant extent an export-currency, the question naturally arises, what proportion of the mint-output remained at home, and what proportion was exported. It is difficult to find evidence, because coins from the self-same dies are routinely found both in the Netherlands and abroad. Although there are far more single finds from the Netherlands (other than at Domburg itself) one should not assume a direct correlation between numbers of single finds and the size of the currency. The finds will reflect the intensity of searching, the completeness of reporting and recording, the geographical extent over which the coins were lost, and other extraneous (modern) factors.

Another, even more difficult question concerns the source of the silver for such a large volume of coinage. As a very rough guide, one may say that a hundred pairs of dies were technically capable of coining a million coins. At an average weight of 1.25 g, that equates with one and a quarter tonnes of silver. Dies might, in principle, have been under-used; but why go to the trouble and expense of making many more dies than were needed, when hundreds of (formally) identical dies were being used? (unless one accepts the possibility that several relatively small mints or even individual silversmiths occasionally struck a limited number of coins). The multiplier of 10,000 coins per die, on average, is purely a guess, but there is ample documentary evidence from later in the middle ages which proves that an average output of 15,000 to 20,000 coins from a single reverse die was routine. And the small diameter of the sceattas should mean that a hammer-blow of less force was needed to strike them, than for the silver pennies from which we have documentary information, admittedly in less high relief, but with a surface area more than twice as great.

What were the commercial and productive consequences of this monetary boom, for the Netherlands, and also for the regions to which the sceattas were exported? What were the political circumstances on Walcheren in those years? Why were there such copious issues of secondary-phase porcupines, but apparently no secondary phase Series D? These should be questions of lively interest to the historian. It is not to be expected that detailed numismatic research by itself can answer them, but it certainly establishes a body of systematic information, very reliably attested, which creates parameters within which answers must be sought.

Historical perspectives created by the sceattas of Series D

Monetary circulation in the period c. 690 - 715

During the period lasting for only about twenty years, or at most thirty, that is c. 690 – c. 715, monetary circulation in the territory of the present-day Netherlands was completely dominated by silver denarii (known to collectors as sceattas) of one particular type, *BMC* Type 2c, the Continental runic type. The number of reverse dies that were used to strike them is estimated at about 2,750. The average output of a reverse die is controversial, and not all numismatists would accept a figure of 10,000, although that was almost certainly within the technical capacity of the dies. There should however be no doubt that many millions of coins of Type 2c were produced in these two or three decades. By the date when their production ceased, the total output of the mints, on a reasonably conservative estimate, could have been as high as 27 million sceattas of Type 2c. Even if one preferred a figure only half as large, the general historical implications for the monetization of the economy would be much the same. Hoards demonstrate by their age-structure that by the date when the production came to an end the earlier issues of Type 2c were still in circulation, both in the Netherlands and in England. And one has to realize that Type 2c, although dominant, was not the only type of coin in circulation at that time. The scale of the currency, in relation to the estimated population of the Netherlands, suggests that the availability of coinage was in no sense restricted. The purchasing power of the sceattas is difficult to estimate at all accurately, but they were made of high-quality silver. Each coin probably represented something like a day's wage.[135] These millions of coins circulated very freely throughout the Netherlands, as we may judge from a map showing the find-spots of stray losses. More than 300 single finds of Type 2c are now reliably on record, many of them having been found in recent years by metal-detectorists. They come from something like a hundred different localities. Domburg is a major source, partly through the accidents of marine erosion but doubtless also because it was an important *wic* or trading emporium; and there are several other commercial centres, such as Wijnaldum, on the coast of Friesland, or Katwijk-aan-de-Rijn on the coast of Zuidholland, or Dorestad (Wijk-bij-Duurstede), which have yielded a good number of finds. But the great majority of find-spots

135 Henstra (2000) p 285: The habitual conpensation (wergeld) for homicide was, according to the *Lex Frisionum*, c. 1900 silver pennies in around the year 800.

must have been just villages or small settlements, or regional market places, simply because there are so many of them. The Netherlands at this time evidently enjoyed a widespread monetized economy, that reached into the everyday life of most inhabitants. Moreover, the frequency with which die-duplicate specimens, i.e. coins certainly originating in the same place, turn up as stray losses in distant locations from each other (as documented in our die-corpus), indicates that coins were changing hands between regions and with high velocity, and not just in local transactions. That is not to deny that the motor driving this monetary economy was long-distance trade, and trade across the North Sea. But the economic impact of such trade was complex and pervasive.
The sceatta-finds need to be set into a context of understanding of the relative prosperity and influence of the places that are being compared. There are indeed indications for thorough alterations in the mercantile relations of the four major productive sites in the Netherlands. A plot of the quantity of stray finds of coins, minted in various periods, expressed as percentage of all recovered coins struck between 600-850, is shown in Table 17.

Table 17. The percentage of stray finds of coins minted in various periods, expressed as percentage of all recorded coins struck between 600 – 850. Source: NUMIS database.

period	600–680	680-710	710-750	750-850
		sceattas		
	tremisses	primary	secondary	Carolingian pennies
Wijnaldum	21.2	31.8	27.1	20.0
Katwijk	14.6	39.0	9.7	14.6
Domburg[136]	10.3	28.2	59.3	2.2
Dorestad[137]	6.9	6.4	28.8	58.0

At first, there were important contacts with the Rhineland, Scandinavia, northern Gaul, and England. Around 680 this was extended to the entire Frankish realm, and Frisia was central into something like a monetary continuum with

136 It is possible that a certain quantity of the tremisses and/or sceattas found at the beaches of Domburg are not stray losses but a scattered hoard. Furthermore, the gradual crumbling aways of the dunes may have exposed a relatively great quantity of all sceattas present in the soil. Probably much more for example than were found in the few archaeological trenches dug during the Wijnaldum excavations. So a direct relationship between the number of coins recovered and the size of the *wic* would be fallacious.

137 The two Carolingian hoards found at Wijk-bij-Duurstede are not included.

Central Merovingia. From c. 710 onwards the contacts with Merovingia declined, but large scale transit trade with Britain increased substantially. The Frisian merchants now penetrated once more the commerce around the Baltic From c. 730 there was a steady increase of the political influence of the Franks, and Frisian trade was curtailed and was more and more restricted to the Rhineland and Scandinavia. The decrease of commercial activity around Domburg in the second half of the 8th century is mirrored by an increase of trade in Dorestad.

The political and economic context for the minting of Series D

The political context for the minting of the sceattas of Series D in the Netherlands is unfortunately rather speculative, because the written sources relating to the years c. 690 - c. 715 are very few, and are sometimes open, topographically, to more than one interpretation. What one could say without any qualification is that the period of issue of Type 2c overlaps extensively with the years of Radbod's rule; and also that the main areas of circulation of the coins, where they dominated the currency, coincide quite closely with the presumed boundaries of Greater Frisia. That might seem to be tantamount to saying that Series D is Frisian. But these years (c. 690 – c. 715) were a time of conflict between Frisians and Franks. Various districts within Greater Frisia were conquered and reconquered. In particular, the region of the big rivers, which included the remains of the old Roman fortifications of the *limes*, was contested, and it seems that the political boundary between the two nations fluctuated. It is by no means certain, on a year-to-year basis around 700, who held Utrecht – or even who held Dorestad. Friesland was almost certainly ruled by Radbod up until his death, and the population was predominantly Frisian. Even in the south of the Netherlands, the users of the Series D sceattas were ethnically Frisian – whether the issuing authority of the coins was Frisian of Frankish. It may even be that this is an inappropriate way to formulate the question, and that the monetary initiative lay in practice with the merchants of the *wic* (or *wics*) where the coins were struck. They presumably paid for the privilege, to whichever ruler was in power.

One can see that the economic context for the dramatic rise in mint-output in the 690s may well have lain in an interaction of Frankish and Frisian interests, following Pepin II's victory over Radbod in c. 692, through the closer integration of Greater Frisia with the Frankish kingdoms, and easier access to the Rhinelands, and to long-distance trade flowing along the Rhine. Certainly, there is a major problem in understanding where all the silver came from, to manufacture up to 20 to 30 million sceattas of Series D (not to mention the equally prolific

issues of primary-phase Series E), over a relatively short period of a couple of decades. Silver flowed out of the Netherlands in great quantities towards England, and millions of specimens of Series D (and E) accumulated there. From where did the even larger quantities flow into the Netherlands, to feed the work of the mints? One can only imagine that most of it came from further south, in the Rhinelands.

From Mainz we have an important group of 20 sceattas, plus two Merovingian denarii, all stray finds from the Hilton Hotel building site. Most are secondary-phase porcupines, minted after c. 715, but there is one coin of Series D, Type 2c, and three to four primary-phase porcupines.[138] From this random sample (which also includes two earlier gold tremisses), what may we safely conclude? How do we compare one specimen of Series D with several hundreds from the Netherlands, and several hundreds more from England? Is the modest proportion of primary-phase sceattas at Mainz an indication that the Frisian trade along the Rhine became important only after c. 715? Or does it merely reflect the dominant direction of balance-of-payments transfers in the years c. 690 – c. 715, in the same way that sceattas minted in England in these years are very scarce in the Netherlands? No unambiguous answer can be given, although we may note, tentatively, that single finds of Type 2c from Germany generally tend to be of the later varieties within the type.[139]

What should one say, then, about the virtual absence of sceattas of Series D in the Meuse basin upstream from Nijmegen? Lebecq, following Despy, has discussed the virtual absence of archaeological evidence of the activity of the Frisians in the Meuse basin: "*curieusement, la vallée de la Meuse, qui aurait dû assurer la liaison entre le coeur de l'État mérovingien et la Frise rhénane n'a guère livré de traces de la présence frisonne ..... je suis bien près de penser que la ligne de partage des eaux la Meuse et le Rhin constituait une importante frontière économique*".[140] Should one again keep open the possibility that the surviving evidence from c. 690 – c. 715 (of which there is little enough) may seem to be negative merely for balance-of-payments reasons? Or should one accept Lebecq's verdict, that Frisian *negociatores* were 'present, but not active' in the Meuse basin?[141] Much of the evidence available to Lebecq and his predecessors was episodic in character, whereas stray losses of coins, if handled with discretion, offer systematic evidence, which can be roughly quantified.

138 Sloess (1994) nos 6, 7, 8,?9, and 22.

139 A random sample of sufficient size would be needed for this conclusion to be secure, especially given the relative abundance of Varieties 3 and 4 in Germany.

140 Lebecq (1983) p 14; Despy (1968).

141 One should take into account the primary-phase porcupines also. Cf the map of cemeteries in Zedelius (1987).

With these general ideas for guidance, in particular the economic benefits of Frankish and Frisian integration, and the ambiguities of the evidence for regional balance-of-payments transfers, we turn to the written sources, in order to consider whether the political geography of the Netherlands in the years c. 690 – c. 715, and the chronology of political events within that period, can usefully throw light on the minting of sceattas of Series D (Types 2c and 8), with particular reference to Radbod and to the two regions where single finds are thickest on the ground, namely Friesland, and the region of the big rivers. Three sources deserve attention, namely the *Lex Frisionum*, the *Liber Historiae Francorum*, and the *Annales Mettensies Priores*.[142]

The *Lex Frisionum*, judged to have been assembled in its present form in the early ninth century, but arguably reflecting earlier conditions as well, distinguishes three regions within Greater Frisia, where different legal provisions to some extent applied: one may think of them as socio-political regions with differing interests and traditions. The region described by the legal code as lying between Lauwers and the River Weser marked an extension of Frisian influence towards Jutland. Secondly, the region between Vlie and Sincfal (in modern terms, the provinces Noord- en Zuidholland, and southwards to the shores of the Scheldt estuary, thus including Domburg) also had certain legal provisions of its own. Thirdly, the region between Vlie and Lauwers (the historic Friesland) set the legal norm, and was possibly also the cultural and political heartland of Frisia. In light of various uncertainties in localizing place-names mentioned in other texts, which have opened the way to some controversial contributions to the scholarly literature, the *Lex Frisionum* is valuable because it establishes beyond reasonable doubt the perimeters of Greater Friesland in the early ninth century and, we may accept, for several generations previously. One may add that the boundaries of the diocese of Utrecht correspond, except in the north-east, with the regions implied in the *Lex Frisionum*. Diocesan boundaries are normally very stable throughout the centuries (except for what was lost, in this case, to Saxony), and one may feel confident that those of Utrecht have substantially persisted since the eighth century.

The *Liber Historiae Francorum*, which was written in 727, probably in Soissons, is our major source. It is supplemented by the *Annales Mettenses Priores*, which have a more particular interest in the north-east parts of the Merovingian realms and in the emergence of the Carolingian dynasty. First, however, we learn from Stephanus in the *Vita Wilfridi* that by 678 Frisia had a pagan king, Aldgisl. His successor Radbod was defeated by Pepin II at the fortress of Dorestad (*castro Duristate*), in c. 692. Radbod lost control over Dorestad and Utrecht,

142 Halbertsma (2000); Henstra (2000); Wood (1994).

and was forced to start peace negotiations. Radbod was able to hold a certain position, but was obliged to pay a tribute. Dorestad had already begun to develop (under Merovingian initiative?) but it seems that control of it may have then passed to the Frisians, under whom it enjoyed a phase of more rapid development. Pepin's objective in c. 695 will presumably have been to regain control of the line of Roman fortifications, stretching along the Rhine from the coast, and as far as Nijmegen or even Cologne. Willibrod became the missionary bishop of the Frisians in 695.[143]

The Metz annals speak, under the year 697, of Pepin continuing his war against the Frisians. By 711, nevertheless, a sufficient accommodation had been reached for Radbod's daughter Theudesinda to be married with Grimoald, Pepin's eldest son, and mayor of Neustria. The history does not mention sons of Radbod, able to become his successor. The marriage of his daughter opened the possibility of a silent transfer of Frisia to the Franks by hereditary succession. However, Grimoald was murdered in 714, and Pepin died in that same year. Radbod took advantage of the ensuing turmoil and confusion around the succession of Pepin in the Frankish realm, and reconquered Utrecht and Dorestad. And even, in 716, Viking-style, he sailed up the Rhine as far as Cologne, leaving a trail of destruction. The Frankish succession struggle was won by Charles Martel, a bastard son of Pepin. Charles Martel defeated the Frisians in 718 and occupied a considerable part of the region north of the Rhine.

It seems plausible that, throughout the reign of Childebert III (694-711), and throughout the period of issue of Series D (almost the same dates), the Rhine was the defended boundary between Francia and Frisia. It was not until the death of Radbod in 719 that Utrecht fell into the hands of Charles Martel. When Boniface arrived at Dorestad in 716, he had gone from there to Utrecht (some 15 km to the north) in order to speak with Radbod. We may understand that, in crossing the Rhine, he crossed into Frisia.[144] By 719, but probably not long before, Charles Martel had already secured Kennemerland (the modern province of Noordholland) and the shores of the Aelmere (predecessor of the IJsselmeer). Friesland between Vlie and Lauwers was not conquered by Charles until 734.

But in any case, the sceattas of Series D circulated freely both north and south of the Rhine, throughout greater Frisia – that is, in our judgement, in both

143 Lebecq (1983) p 86 and note 86; Halbertsma (2000).

144 Lebecq (1983) p 133 states that Frisia citerior was lost to the Franks at some date after the conquest of c. 695, and had to be reconquered between 714 and 719. This claim is rather crucial to the question whether Series D was produced under Frankish or Frisian control. While it is obviously true that Frankish control of Frisia citerior was still fragile, the sources hardly justify the idea of a reconquest in the 700s.

Frankish and Frisian-controlled territory. Where the coins were minted is a question that we have discussed at length, without reaching completely firm conclusions. We suggest that Type 8 was probably minted at Wijnaldum. We are inclined to think that it was issued concurrently with the earlier part of Type 2c, but came to an end sooner, as it shows no sign of a weight-reduction. Type 10 was almost certainly minted in the Big rivers region. The evidence points us towards a Friesland origin for a substantial part of Type 2c, and an English origin for a few sub-varieties. There is therefore no simple answer to the question whether Series D was Frisian or Frankish. It seems to be both. The high survival-rate of material from Domburg should not be accepted uncritically as evidence for the existence of a mint there, and Dorestad also remains problematic.

Literature

BATTELY, O. *Antiquitates Rutupinae.* (Oxford 1745).

BELFORT, A. De. *Description générale des monnaies mérovingiennes.* 5 vols (Paris 1892-1895).

BENDIXEN, K. Sceattas and other coin finds. In: Bencard, M. (ed) *Ribe Excavations.* Vol. I. (Esbjerg 1981) 63-101.

BENDIXEN, K. Finds of sceattas from Scandinavia. In: Hill, D., Metcalf, D.M. (eds) *Sceattas in England and on the Continent.* British Archaeological Reports Series 128 (Oxford 1984) 151-158.

BESTEMAN, J.C., BOS, J.M., HEIDINGA, H.A. *The excavations at Wijnaldum.* Vol 1 (Franeker 1999).

BLACKBURN, M. A chronology for the sceattas. In: Hill, D., Metcalf, D.M. (eds) *Sceattas in England and on the Continent.* British Archaeological Reports Series 128 (Oxford 1984) 165-174.

BLACKBURN, M. A survey of Anglo-Saxon and Frisian coins with Runic inscriptions. In: Bammesberger, A. (ed) *Old English Runes and their continental background.* (Heidelberg 1991) 137-189.

BLACKBURN, M.A.S., BONSER, M.J. 'Single finds of Anglo-Saxon and Norman coins – 1', *British Numismatic Journal* 54 (1984) 63-73.

BLACKBURN, M., BONSER, M. Single finds of Anglo-Saxon and Norman coins – 2. *British Numismatic Journal,* 55 (1985) 55-78.

BOELES, P.C.J.A. *Friesland tot de elfde eeuw.* (The Hague 1927).

BOELES, P.C.J.A. *Friesland tot de elfde eeuw.* (The Hague 1951).

BONSER, M. 'Fifteen years of coin finds from productive sites', *Yorkshire Numismatist* 3 (1997) 39-45.

CAMDEN, W. *Britannia.* (1695).

CANNEGIETER, H. *Manuscript Domburgse oudheden.* Universiteitsbibliotheek Leiden, signatuur BPL 953 VI (1735-1741).

CONBROUSE, G. *Atlas des monnaies nationales de France.* (Paris 1840/41). (The author's name is often written as Combrouse).

CARCASSONNE, C., HACKENS, T. (ed). *Statistique et numismatique* (= Pact, vol 5) (Paris 1981).

CHABOUILLET, A. *Catalogue raisonné de la collection des deniers mérovingiens des VII^e et VIII^e siècles de la trouvaille de Cimiez.* (Paris 1890).

COUPLAND, S. 'Trading places: Quentovic and Dorestad reassessed', *Early Medieval Europe* 11 (2002) 209-232.

CUMONT, G. 1907. Monnaies trouvées dans les gisements côtiers de la Panne (Flandre occidentale). *Annales de la Société d'Archéologie de Bruxelles,* 21, 73-79.

DE BOONE, W.J. De oudste afbeeldingen van "sceattas". *Westerheem* 29 (1979) 159-167.

DE BOONE, W.J. Cannegieter, Domburg, trienten en sceattas. *Westerheem* 30 (1980) 72-81.

DE HAAN, F. *Angelsaksische munten, in 1866 gevonden in Friesland, beschreven en historisch toegelicht.* (Leeuwarden 1866).

DE LOË, A. *La Belgique Ancienne* vol 4: *La période franque.* (Brussels 1939).

De Man, M.G.A. Sceattas anglo-saxons inédits ou peu connus. *Tijdschrift voor Munt- en Penningkunde* 3 (1895) 117-146.

De Man, M.G.A. Que sait-on de la plage de Dombourg? *Tijdschrift voor Munt- en Penningkunde* 7 (1899) 1-61, 85-116, 153-173.

Despy, G. Villes et campagnes aux IX^{e} et X^{e} siècles. L'exemple du pays mosan. *Revue du Nord* 50 (1968) 145-168.

De Wit, G.W. De muntslag in Tiel. *De Beeldenaar* (1989) 75-80.

Dirks, J. 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).

Evans, J. On some Anglo-Saxon sceattas found in Friesland. *Numismatic Chronicle* NS 4 (1864) 24.

Evans, J. On a small hoard of Saxon sceattas found near Cambridge. *Numismatic Chronicle* 3rd Series 14 (1894) 18-28.

Feveile, C. The coins from the oldest phases at Ribe – survey and status 2001. Cambridge Sceatta Symposium 2006 (forthcoming).

Feveile, C. Mønterne fra det ældste Ribe, in Feveile, C. (ed) *Det ældste Ribe. Udgravningen på nordsiden af Ribe Å 1984-2000*, vol. 1, (2006) 279-312.

Gannon, A. *The Iconography of Early Anglo-Saxon Coinage: Sixth to Eighth Centuries.* (Oxford 2003).

Graafstal, E.P., Pol, A. Een schatvondst uit de tijd van Bonifatius. *Muntkoerier* 33 (2004) 18-22.

Grierson, P., Blackburn, M. *Medieval European Coinage.* Vol. 1. *The Early Middle Ages (5th-10th centuries).* (Cambridge 1986).

Halbertsma, H. *Frieslands oudheid* I en II. New edition (Utrecht 2000).

Hatz, G. Tieler Denare des 11. Jahrhunderts in den schwedischen Münzfunden. *Commentationes de nummis in Suecia repertis II.* (1968).

Hatz, G., Pernicka, E. *Der Münzfund vom Goting-Kliff/Föhr.* Numismatische Studien, Heft 14. (Hamburg 2001).

Hawkins, E. *The Silver Coins of England.* (London 1841).

Heinrichs, J. Friesische Münzen in den Rheingebieten ausserhalb der Niederlande. *Kölner Jahrbuch* (forthcoming).

Henstra, D.J. *The Evolution of the Money Standard in Medieval Frisia.* (Groningen 2000).

Hill, D. *Sceattas from the Low Countries. Coins of the Cabinet des Medailles, Bruxelles.* (Private edition 1974).

Hill, P.V. Anglo-Saxon and Frisian sceattas in the light of Frisian hoards and site-finds. *Jaarboek voor Munt- en Penningkunde* 41 (1954).

Hill, P.V. *A brief survey of Anglo-Saxon sceattas.* Congrès internationale de numismatique. (Paris 1957) 321-324.

Hill, P.V. Anglo-Frisian trade in the light of eight century coins. *Transactions of the London and Middlesex Archaeological Society* 19 (1958) 1-9.

Hill, P.V. Saxon sceattas and their problems. *British Numismatic Journal* 26 (1959-51) 129-154.

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

Kent, J.P.C. The Aston Rowant treasure trove. *Oxoniensia* 37 (1972) 243-244.

Kool, R. The circulation of Dutch leeuwendaalders in 17th century Ottoman Palestine. *Jaarboek voor Munt- en Penningkunde* 89 (2002) 47-68.

LEBECQ, S. *Marchands et navigateurs frisons du haut moyen âge*, 2 vols. (Lille 1983).

LAFAURIE, J. Monnaies d'argent mérovingiennes des VII[e] et VIII[e] siècles: Les trésors de Saint-Pierre-Les-Étieux (Cher), Plassac (Gironde) et Nohanent (Puy-de-Dôme). *Revue numismatique* 11 (1969) 98-219.

LAFAURIE, J. *Catalogue des deniers mérovingiens de la trouvaille de Bais (Ille-et-Vilaine)*, by M. Prou and E. Bougenot 1907, (reprinted with important new introduction) (Paris 1981).

LAFAURIE, J., PILET-LEMIÉRE, J. *Monnaies du haut Moyen Âge découvertes en France (V[e]-VIII[e] siècles)* (Paris 2003).

LE GENTILHOMME, P. La circulation des sceattas dans la Gaule mérovingienne. *Revue Numismatique* 2 (1938) 23-49.

LE GENTILHOMME, P. The circulation of sceats in Merovingian Gaul. *British Numismatic Journal* 24 (1944) 159-210 (translation of Le Gentilhomme 1938).

LELEWEL, J. *Numismatique du moyen-âge, considérée sous le rapport du type.* (Paris 1835).

LINDSEY, J. *A View of the Coinage of the Heptarchy.* (Cork 1842).

LOFFENS, K. Résumé de nos études dans les dunes et la plaine maritime aux environs de Coxyde. *De Duinen* 1 (1960).

MALMER, B. *The Anglo-Scandinavian Coinage, c. 995-1020.* (Stockholm 1997).

METCALF, D.M. Chemical analyses of English sceattas. *British Numismatic Journal* 48 (1978a) 12-19.

METCALF, D.M.. Another modern forgery of a sceat. *British Numismatic Journal* 48 (1978b) 107.

METCALF, D.M. The coins. In: Andrews, P. (ed) *Southampton finds.* Vol.1: *The Coins and Pottery from Hamwic.* (Southampton 1988) 17-24.

METCALF, D.M. Twenty-five notes on sceatta finds. In: Hill, D., Metcalf, D.M. (eds) *Sceattas in England and on the Continent.* British Archaeological Reports Series 128 (Oxford 1984) 193-204.

METCALF, D.M. *Thrymsas and Sceattas in the Ashmolean Museum Oxford. Vol. I. Thrymsas and primary sceattas.* (Oxford 1993a).

METCALF, D.M. *Thrymsas and Sceattas in the Ashmolean Museum Oxford. Vol. II. Continental sceattas.* (Oxford 1993b).

METCALF, D.M. *Thrymsas and Sceattas in the Ashmolean Museum Oxford. Vol. III. The 'secondary phase'.* (Oxford 1994).

METCALF, D.M. *An Atlas of Anglo-Saxon and Norman Coin Finds, 973-1086.* (London 1998).

METCALF, D.M. Runes and literacy: pondering the evidence of Anglo-Saxon coins of the eighth and ninth centuries. In: Duwel, W., Nowak, S. (eds) *Runeninschriften als Quellen interdisziplinären Forschungen.* Proceedings of the Fourth International Symposium on Runes and Runic inscriptions in Göttingen, 4-9 August 1995 (Berlin 1998) 434-438.

METCALF, D.M. Determining the mint-attribution of East-Anglian sceattas through regression analysis. *British Numismatic Journal* 70 (2000) 1-11.

METCALF, D.M. 'As easy as A, B, C': the mint-places of early sceatta types in the south-east. *British Numismatic Journal* 71 (2001) 34-48.

METCALF, D.M. Variations in the composition of the currency at different places in England. In: Pestell, T., Ulmschneider, K. (eds) *Markets in Early Medieval Europe. Trading and 'Productive' Sites, 650-850.* (Macclesfield 2003) 37-47.

METCALF, D.M. Monetary circulation in England, c.675-c.710: the distribution patterns of Series A, B, and C – and F. *British Numismatic Journal* 74 (2004) 1-19.

METCALF, D.M. The coinage of king Aldfrith of Northumbria (685-704) and some contemporary imitations. *British Numismatic Journal* 76 (2006) 147-158.

METCALF, D.M. Sceattas: twenty-one years of progress. Cambridge Sceatta Symposium 2006 (forthcoming).

METCALF, D.M., HAMBLIN, L.K. A modern forgery of a sceat. *British Numismatic Journal* 37 (1968a) 190-191.

METCALF, D.M., HAMBLIN, L.K. The composition of some Frisian sceattas. *Jaarboek voor Munt- en Penningkunde* 55 (1968b) 28-45.

METCALF, D.M., MERRICK, J.M., HAMBLIN, L.K. *Studies in the Composition of Early Medieval Coins.* (Newcastle 1968).

MULLER, F. (Auction) *Cabinet des monnaies Joh. W. Stephanik* (Amsterdam 1904).

NAHUIJS, M. Considérations sur quelques monnaies Anglo-Saxonnes. [On the coins of the Hallum hoard]. *Revue belge de numismatique*, 4-6 (1868) 65-75.

OP DEN VELDE, W. De in Nederland voorkomende sceattas. *De Beeldenaar* 6 (1982) 40-52, 83-96.

OP DEN VELDE, W. Sceattas gevonden bij Maurik en Rijswijk. *Jaarboek voor Munt- en Penningkunde* 69 (1982) 5-19.

OP DEN VELDE, W. Escharen 1980. *Jaarboek voor Munt- en Penningkunde* 72 (1985) 5-12.

OP DEN VELDE, W. De muntvonst Franeker van 1868 opnieuw bezien, *Jaarboek voor Munt- en Penningkunde* 88 (2001) 33-72.

OP DEN VELDE, W., DE BOONE, W.J., POL, A survey of sceatta finds from the Low Countries. In: Hill, D., Metcalf, D.M. (Eds). *Sceattas in England and on the Continent.* British Archaeological Reports, Series 128 (Oxford 1984) 117-146.

OP DEN VELDE, W., KLAASSEN, C. J. F. *Sceattas and Merovingian Deniers from Domburg and Westenschouwen.* Koninklijk Zeeuwsch Genootschap der Wetenschappen, vol 15. (Middelburg 2004) (Nos. 80-295a and 940 edit and illustrate coins of Series D).

PEDERSEN, A. En runensceatta fra Gudme. *Nordisk Numismatisk Unions Medlemsblad* (1997) 21-23.

PIRIE, E.J.E. *Catalogue of the Early Northumbrian Coins in the Museum of Antiquities, Newcastle upon Tyne* (Newcastle upon Tyne 1982).

PIRIE, E.J.E. Phases and groups within the styca coinage of Northumbria. In: Metcalf, D.M. (ed) *Coinage in Northumbria.* (Oxford 1987) 103-145.

POL, A. Remmerden 1988: een vondst van vroeg-middeleeuwse munten bij Rhenen. *De Beeldenaar* 13 (1989) 39-47.

RETHAAN MACARÉ, C.A. *Verhandeling over de bij Domburg gevondene munten.* (Middelburg 1838) Reprinted by the Zeeuwsch Genootschap 1992.

RETHAAN MACARÉ, C.A. *Tweede verhandeling over de bij Domburg gevondene munten.* (Middelburg 1856) Reprinted by the Zeeuwsch Genootschap 1992.

RIGOLD, S.E. The two primary series of sceattas. *British Numismatic Journal* 30 (1960/61) 6-53.

RIGOLD, S.E. The principal series of English sceattas. *British Numismatic Journal* 47 (1977) 21-30.

RIGOLD, S.E. The incidence of imitation among Anglo-Saxon sceattas in the light of archaeological excavations. In: Gedai, I, Biró Sey, K. (eds) *Proceedings of the International Numismatic Symposium.* (Budapest 1980) 185-191.

RIGOLD, S.E., METCALF, D.M. A revised check-list of English finds of sceattas. In: Hill, D., Metcalf, D.M. (eds) *Sceattas in England and on the Continent.* British Archaeological Reports Series 128 (Oxford 1984) 245-268.

RUDING, R. *Annals of the Coinage of Great Britain and its Dependencies.* (edited by J. Young Akerman) (London 1840).

SPUFFORD, P. *Money and its Use in Medieval Europe.* (Cambrigde 1988).

STEPHANIK, J.W. See MULLER, F.

STEWART, I. The early English denarial coinage. In: Hill, D., Metcalf, D.M. (eds) *Sceattas in England and on the Continent.* British Archaeological Reports, Series 128 (Oxford 1984) 5-26.

STOESS, Ch. Die Münzen. In: Wamers, E. (ed) *Die frühmittelalterlichen Lesefunde aus der Löhrstrasse in Mainz.* (Mainz 1994).

SUTHERLAND, C.H.V. Anglo-Saxon sceattas in England: Their origin, chronology and distribution. *Numismatic Chronicle* 2 (1942) 42-70.

VAN DER CHIJS, P.O. *De munten der Frankische- en Duitsch-Nederlandsche vorsten.* (Haarlem 1866).

VANHOUDT, H. De muntvondsten in België uit de Merovingische periode. *Revue belge de numismatique* (1988) 41-87.

WITHY, R., RYALL, I. *Twelve Plates of English Silver Coins.* 1756.

WOOD, I. *The Merovingian Kingdoms, 450 – 751.* (London 1994).

ZEDELIUS, V. Neue Sceattas aus dem Rheinland – Bonn und Xanten. *Zeitschrift fur Archäologie des Mittelalters,* 8 (1980) 139-152.

ZEDELIUS, V. Eighth-century archaeology in the Meuse and Rhine valleys: a context for the sceatta finds. In: Metcalf, D.M. (ed) *Coinage in Ninth-Century Northumbria. The Tenth Oxford symposium on Coinage and Monetary History.* (Oxford 1987) 405-413.

Appendix I.
Corpus of die-links of Series D sceattas

All the specimens in each group enclosed by square brackets are die-linked, either by their obverse or their reverse die or both, e.g. Nos 3, 4, and 5 are die-duplicates. The exact nature of the die-links is recorded on Plates 1 – 33.
Note that all specimens in Metcalf (1993a,b, 1994) *Thrymsas and Sceattas in the Ashmolean Museum Oxford* (T&S) are photographically illustrated, as are almost all of those in the EMC data-base. Specimens illustrated in this monograph are indicated by an *.

Abbreviations	BAR	British Archaeological Reports
	BNJ	British Numismatic Journal
	CR	Coin Register, British Numismatic Journal
	DMM	personal files of D.M. Metcalf
	EMC	European Medieval Coins database (www.medievalcoins.org)
	MEC	Grierson & Blackburn (1986) Medieval European Coinage
	n.r.	not registered
	NUMIS	database of Dutch coin finds (www.geldmuseum.nl)
	p.s.	productive site
	RN	Revue Numismatique
	'silver'	content of silver + gold + lead (Au, Ar, Pb)
	T&S	Metcalf (1993a, 1993b, 1994)

English counties (pre-1974 boundaries, standard abbreviations of the English Place-Name Society)	Brk	Berkshire
	C	Cambridgeshire
	Do	Dorset
	ERY	East Riding of Yorkshire
	Ess	Essex
	Ha	Hampshire
	Hrt	Hertfordshire
	K	Kent
	L	Lincolnshire
	Nf	Norfolk
	NRY	North Riding of Yorkshire
	O	Oxfordshire
	Sf	Suffolk
	Sr	Surrey
	Sx	Sussex
	W	Wiltshire
	Wa	Warwickshire
Dutch provinces	Fr	Friesland
	Gr	Groningen
	Gld	Gelderland
	U	Utrecht

Z	Zeeland
L	Limburg
NB	Noord Brabant
ZH	Zuidholland
NH	Noordholland

BMC Type 8 catapult variety

1	1.21 g	South Lincolnshire p.s. EMC 2000.0505 * **p 92**
2	0.97 g	DOMBURG (Z) 280
3	1.00 g	┌ WIJNALDUM (Fr) NUMIS 1033934
4	n.r.	│ IGTHAM (K) EMC 1996.0078 * **p 42**
5	n.r.	└ DE PANNE (Belgium) Loffens (1960)
6	n.r	Unknown. Auction L. Schulman (1995) 328
7	1.23 g	DE MEERN (U) hoard
8	n.r.	┌ England? P. Finn list 4-18 (1995)
9	1.11 g	│ SKEGNESS (L) EMC 2001.0723
10	n.r.	└ DE PANNE (Belgium) Loffens (1960)

BMC Type 8 cross with four circles variety

11	0.82 g	┌ WIJNALDUM (Fr) NUMIS 1034048 * **p 92**
12	0.78 g	│ NORTH FERRIBY (ERY) EMC 1997.8150
13	1.04 g	└ South Lincolnshire p.s. EMC 2000.0506
14	0.84 g	DOMBURG (Z) 281
15	n.r.	HOLME-NEXT-THE-SEA (Nf) EMC 1999.0130
16	n.r.	┌ EAST TILBURY (Ess) DMM
17	1.0 g	└ England? In private collection * **p 42**

BMC type 8 main variety

18	1.03 g	ROYSTON (Hrt) EMC 1989.5169 * **p 41**
19	1.18 g	┌ BIDDENHAM (Bd) EMC 1990.5018
20	n.r	└ Hampshire hoard 8 DMM
21	1.24 g	┌ ASTON ROWANT (O) hoard. British Museum 1971-12-16-65
22	1.21 g	│ ASTON ROWANT (O) hoard. British Museum 1971-12-16-66
23	1.18 g	└ CHERTSEY (Sr) EMC 1995.0079
24	1.20 g	┌ Unknown. In private collection * **p 41**
25	n.r.	└ ASTON ROWANT (O) hoard. Auction Sotheby (1985) ex 505
26	n.r.	STOKE FERRY (Nf) EMC 2001.0613
27	1.22 g	┌ England? Hunterian Museum 53
28	n.r.	│ ASTON ROWANT (O) hoard. Auction Glendining (1975) 235
29	n.r.	│ Unknown. Holleman List 91-439 (1992)
30	1.11 g	│ TRIMLEY ST MARTIN (Sf) EMC 1998.0122
31	n.r.	└ EAST TILBURY (Ess) DMM

32	n.r.	RECULVER (K) BNJ (1988) p 127
33	1.29 g	England? Hunterian Museum 50
34	1.12 g	┌ CAMPSEY ASHE (Sf) EMC 1988.0010
35	0.77 g	│ NORTH FERRIBY (ERY) BAR (1984) pl 11-11
36	1.2 g	│ England? In private collection
37	1.27 g	└ SAINT PIERRE LES ETIEUX (France) hoard. Lafaurie (1969) pl XVI 100
38	1.04 g	┌ BIELBY (ERY) EMC 1998.2060
39	n.r.	│ South Lincolnshire p.s. EMC 2004.0155
40	1.34 g	└ Oxfordshire EMC 2006.0045
41	1.29 g	┌ ASTON ROWANT (O) hoard. British Museum 1971-12-16-69
42	n.r.	│ KETTLESTONE (Nf) EMC 1987.0062
43	1.23 g	│ GIPPING VALLEY (Sf) EMC 1987.0051
44	1.25 g	│ Unknown. In private collection
45	n.r.	│ Unknown. Auction Coin Investment 39-314 (1992)
46	n.r.	│ Unknown. Holleman list 91-440 (2002)
47	n.r.	│ CODDENHAM (Sf) DMM XLII
48	1.22 g	└ POCKLINGTON (ERY) EMC 1996.0079
49	n.r.	WIJNALDUM (Fr) Zijlstra (1990)
50	1.15 g	England? SCBI 16-71 ex Lockett collection
51	1.15 g	ASHWELL (Hrt) EMC 1992.0217
52	0.9 g	England? In private collection
53	n.r.	CODDENHAM (Sf) DMM XLIII
54	1.17 g	DOMBURG (Z) 286
55	1.1 g	England? In private collection
56	n.r.	'Hampshire' hoard 2 DMM
57	n.r.	'Hampshire' hoard 12 DMM
58	1.21 g	┌ LASHLEY WOOD (Ess) EMC 2005.0095
59	1.09 g	└ SPALDING (L) DMM
60	1.10 g	┌ REMMERDEN (Gld) hoard V033 * **Plate 34**
61	1.16 g	│ RYTHER (NRY) EMC 1996.0061
62	1.26 g	└ England? Hunterian Museum 51
63	0.45 g	┌ DOMBURG (Z) 285
64	1.04 g	│ BIRCHINGTON (K) EMC 1992.7471
65	1.16 g	└ ASTON ROWANT (O) hoard. British Museum 1971-12-16-71
66	0.86 g	┌ DOMBURG (Z) 290
67	1.23 g	│ PLASSAC (France) hoard. Lafaurie (1969) 164
68	1.10 g	└ Unknown. Cabinet des medailles Brussels BBR 19
69	0.69 g	┌ DOMBURG (Z) 289 = Van der Chijs V-50 = Dirks F-8 = De Belfort 5826
70	1.1 g	└ HITCHIN (Hrt) EMC 1993.0154
71	n.r.	┌ Friesland. In private collection
72	1.23 g	│ DOMBURG (Z) 282
73	1.13 g	│ REMMERDEN (Gld) hoard V 277 * **Plate 34**
74	1.16 g	│ LEADEN RODING (Ess) EMC 1997.0054
75	n.r.	└ England? Lindsey (1842) pl 1-7
76	n.r	┌ CODDENHAM (Sf) DMM XLIV
77	n.r.	│ Unknown. Auction Coin Investment (1992) 315
78	0.97 g	│ DOMBURG (Z) 288 = Dirks (1870) F-20
79	n.r.	│ England? Ex Lockett collection * **p 41**
80	n.r.	└ HOTHFIELD (K) EMC 2006.0036

81	1.20 g	England? British Museum 10
82	1.23 g	England? British Museum 11
83	1.23 g	England? Hunterian Museum 52
84	n.r.	France? Lelewel (1842) pl 1-1
85	n.r.	Friesland. In private collection
86	n,r.	Unknown. Holleman list 100-900 (1994)
87	1.30 g	NICE-CIMIEZ (France) hoard. Le Gentilhomme (1938) 53
88	n.r.	Unknown. Auction L. Schulman (1993) 342
89	1.19 g	KINGS LYNN (Nf) T&S p 193
90	n.r	CODDENHAM (Sf) DMM XLI
91	1.08 g	England? P. Finn list 15-52 (1999)
92	n.r.	Unknown. Auction L. Schulman (1997) 454
93	n.r.	EAST TILBURY (Ess) DMM
94	n.r.	South Lincolnshire p.s. DMM CXXXVIII
95	1.11 g	BAIS (France) hoard 310
96	1.11 g	ASTON ROWANT (O) hoard. British Museum 1971-12-16-70
97	1.35 g	England? Hunterian Museum 54
98	1.16 g	BIDFORD-ON-AVON (Wa) DMM XXXIV
99	1.17 g	WEST WINCH (Nf) EMC 1989.0065
100	n.r.	"Hampshire" hoard 1 DMM
101	1.27 g	ASTON ROWANT (O) hoard. British Museum 1971-12-16-68
102	1.12 g	DOMBURG (Z) 284
103	0.88 g	DOMBURG (Z) 278
104	1.10 g	LAKENHEATH (Sf) DMM XI
105	1.2 g	LONDON (Maiden Lane) EMC 1991.0203
106	1.22 g	REMMERDEN (Gld) hoard V039 * **Plate 34**
107	n.r.	Unknown. Holleman list (1991) 438
108	1.12 g	WATLINGTON (O) DMM
109	0.64 g	DOMBURG (Z) 293
110	n.r.	England? EMC 2001.0675
111	n.r.	SLEAFORD (L) EMC 2003.0175
112	1.33 g	ASTON ROWANT (O) hoard. British Museum 1971-12-16-64
113	1.18 g	ASTON ROWANT (O) hoard. T&S 184. 95% 'silver' * **p 14**
114	1.23 g	ASTON ROWANT (O) hoard. British Museum 1971-12-16-63
115	1.22 g	Unknown. SCBI Copenhagen 37
116	1.21 g	ASTON ROWANT (O) hoard. British Museum 1971-12-16-67
117	1.21 g	ASTON ROWANT (O) hoard. T&S 185 87% 'silver'
118	0.9 g	England ? In private collection
119	0.62 g	ASTON ROWANT (O) hoard. T&S 186 plated, surface 85% 'silver' * **p 13**
120	n.r.	DORCHESTER (Do) EMC 2005.0251
121	1.32 g	England? T&S 183. 94% 'silver' * **p 7**
122	1.16 g	WEST WINCH (Nf) EMC 1993.0152
123	1.11 g	DOMBURG (Z) 279 = Dirks (1870) E-q * **p 41**
124	n.r.	MIDLUM (Fr) Auction Coin Investment (1997) 340
125	1.2 g	England? Vosper (June 2006)
126	n.r.	HORTON KIRBY (K) EMC 1996.0077
127	1.13 g	Unknown. SCBI Copenhagen 36

128 1.11 g HEYBRIDGE (Ess) EMC 1991.0100
129 1.13 g ┌ THWING (ERY) EMC 1997.8149
130 1.02 g └ Unknown. Auction J. Elsen (March 2005) 1038 & (2006) 236
131 1.04 g ┌ DOMBURG (Z) 287
132 1.2 g └ MINSTER-IN-THANET (K) EMC 1994.0135
133 n.r. England? Ex Lockett collection
134 1.18 g ROYSTON (Hrt) EMC 1989.5171

BMC type 8 imitations

135 1.09 g ROYSTON (Hrt) EMC 1986.0008 * **p 42**
136 1.12 g BURNHAM MARKET (Nf) DMM XIV
137 1.12 g COLCHESTER (Ess) EMC 1996.0096

BMC type 8Z

138 1.04 g REMMERDEN (Gld) hoard V185 * **Plate 34**
139 1.24 g ┌ ASTON ROWANT (O) hoard. British Museum 1971-12-16-174
140 1.26 g └ COBHAM PARK (K) BNJ (1988) no 109 (p 148)
141 1.23 g HATFIELD BROAD OAK (Ess) EMC 2000.0018 * **p 107**
142 1.15 g ┌ LITTLE ABINGTON (C) EMC 1993.0153 * **p 42**
143 n.r. └ WOODNESBOROUGH (K) CR 1999.89
144 1.2 g GREAT BIRCHAM (Nf) EMC 1985.0093
145 1.07 g ┌ EAST KNOYLE (W) EMC 1994.0136 * **p 42**
146 1.10 g │ DOMBURG (Z) 283
147 1.21 g └ Unknown. In private collection
148 n.r. ┌ EASTRY (K) EMC 20001.0563
149 1.15 g │ BURGH CASTLE (Sf) EMC 1993.0155
150 n.r. └ ROYSTON (Hrt) CR 1988-93C
151 1.21 g GREAT WILBRAHAM (C) EMC 2001.0055 * **p 107**

BMC type 8 Standard with wheel

152 1.28 g ┌ NICE-CIMIEZ (France) hoard RN (1938) 54
153 n.r. │ England? DMM * **p 43**
154 n.r. │ South Lincolnshire p.s. DMM CLII
155 0.98 g └ Essex. EMC 1993.0185

BMC Type 8 Mules

156 1.2 g England? In private collection D/E VICO mule
157 0.65 g BAWSEY (Nf) T&S 189 D/E Type 6 var. K mule, see also No. 1071

BMC Type 2c

subvariety 1a

158 1.14 g ┌ HORNCASTLE (L) EMC 2000.0229
159 1.18 g │ England? P. Finn list 10-23 (1997)
160 1.26 g │ ASTON ROWANT (O) hoard. British Museum 1971-12-16-93
161 1.12 g │ REMMERDEN (Gld) hoard V156 * **Plate 34**
162 n.r. │ DONGJUM (Fr) NUMIS 1052032 Auction J. Schulman (Nov. 1996) 573
163 1.14 g │ MIDLUM (Fr) NUMIS 1020537 * **p 5**
164 1.03 g │ REMMERDEN (Gld) hoard V057 * **Plate 34**
165 n.r. │ Friesland. In private collection
166 1.06 g │ REMMERDEN (Gld) hoard V063 * **Plate 34**
167 1.12 g │ REMMERDEN (Gld) hoard V143 * **Plate 34**
168 0.73 g │ England? MEC 642 90% 'silver'
169 1.07 g │ REMMERDEN (Gld) hoard V234 * **Plate 34**
170 1.16 g │ REMMERDEN (Gld) hoard V223 * **Plate 34**
171 1.15 g └ ELST (Gld) NUMIS 1011035
172 1.03 g ┌ DOMBURG (Z) 121 = De Belfort 5793
173 1.13 g │ MAURIK (U) NUMIS 1019372
174 n.r. │ England? ex Lockett collection
175 0.85 g └ DOMBURG (Z) 119 = Cabinet des médailles Brussels BBR 2
176 1.28 g ┌ England? T&S 158. 95% 'silver' * **p 35**
177 1.21 g │ WIJNALDUM (Fr) NUMIS 1034035
178 0.83 g └ PEINS (Fr) NUMIS 1023787 (obverse only)
179 1.15 g ┌ REMMERDEN (Gld) hoard V167 * **Plate 34**
180 1.09 g │ DOMBURG (Z) 83
181 0.94 g │ DOMBURG (Z) 84
182 0.75 g │ DOMBURG (Z) 132
183 1.13 g └ Netherlands? Geldmuseum 1974-441 = Dirks (1870) k
184 1.29 g ┌ ASTON ROWANT (O) hoard. Auction Glendining 1988-23c
185 1.17 g │ VEN-ZELDERHEIDE (L) NUMIS 1032217 * **p 35**
186 1.23 g │ REMMERDEN (Gld) hoard V201 * **Plate 34**
187 1.25 g └ BANHAM (Nf) EMC 1994.0128
188 1.17 g ROYSTON (Hrt) EMC 1990.0321
189 1.08 g ┌ REMMERDEN (Gld) hoard V232 * **Plate 34**
190 1.20 g │ COTHEN (U) NUMIS 1006721
191 1.29 g └ ASTON ROWANT (O) hoard. British Museum 1971-12-16-94
192 1.13 g ┌ REMMERDEN (Gld) hoard V241 * **Plate 34**
193 1.02 g │ LEIDEN (ZH) NUMIS 1017193 * **p 5**
194 1.19 g │ England In private collection
195 1.19 g │ ASTON ROWANT (O) hoard. Auction Glendining 1988-24b
196 1.07 g │ REMMERDEN (Gld) hoard V081 * **Plate 34**
197 1.11 g │ REMMERDEN (Gld) hoard V245 * **Plate 34**
198 1.14 g │ EWIJK NUMIS 1011828
199 1.32 g └ ASTON ROWANT (O) hoard. Auction Glendining 1988-23a

Sub-variety 1b

200	n.r.	HOUTEN (U) NUMIS 90008
201	1.27 g	BAIS (France) hoard. Laufaurie (1969) 317a
202	1.27 g	BAIS (France) hoard. Laufaurie (1969) 317b
203	n.r.	CODDENHAM (Sf) DMM XL
204	1.23 g	REMMERDEN (Gld) hoard V276 * **Plate 34**
205	1.13 g	KATWIJK (ZH) NUMIS 1035556
206	1.06 g	DOMBURG (Z) 116
207	1.04 g	DOMBURG (Z) 117
208	1.23 g	REMMERDEN (Gld) hoard V287 * **Plate 34**
209	1.19 g	WIJK-BIJ-DUURSTEDE (U) NUMIS 1033430 * **p 35**
210	1.25 g	BAIS (France) hoard. Laufaurie (1969) 316a
211	1.23 g	REMMERDEN (Gld) hoard V275 * **Plate 34**
212	1.11 g	Friesland. In private collection
213	1.21 g	REMMERDEN (Gld) hoard V130 * **Plate 34**
214	1.11 g	WIJNALDUM (Fr) NUMIS 1033930
215	1.14 g	REMMERDEN (Gld) hoard V061 * **Plate 34**
216	1.12 g	REMMERDEN (Gld) hoard V053 * **Plate 34**
217	1.14 g	REMMERDEN (Gld) hoard V214 * **Plate 34**
218	1.26 g	DOMBURG (Z) 122 = Dirks (1870) G-28
219	1.19 g	REMMERDEN (Gld) hoard V132 * **Plate 34**
220	n.r.	England? Ex Lockett collection
221	1.13 g	DOMBURG (Z) 210
222	1.00 g	SLAPPETERP (Fr) NUMIS 1038362
223	1.18 g	SHERIFF HUTTON (NRY) EMC 2002.0007
224	1.34 g	REMMERDEN (Gld) hoard V127 * **Plate 35**
225	1.29 g	REMMERDEN (Gld) hoard V184 * **Plate 35**
226	1.03 g	BOER (Fr) NUMIS 1004890 In private collection
227	n.r.	Netherlands? KPK
228	1.26 g	REMMERDEN (Gld) hoard V137 * **Plate 35**
229	1.19 g	REMMERDEN (Gld) hoard V199 * **Plate 35**
230	1.09 g	OOYERHOEK (Gld) NUMIS 1023270
231	1.11 g	Friesland. In private collection
232	1.11 g	OOSTERBIERUM (Fr) NUMIS 1022069
233	1.15 g	REMMERDEN (Gld) hoard V194 * **Plate 35**
234	1.35 g	REMMERDEN (Gld) hoard V197 * **Plate 35**
235	1.24 g	REMMERDEN (Gld) hoard V174 * **Plate 35**
236	1.04 g	DOMMELEN (NB) NUMIS 1008722
237	n.r.	De MEERN (U) single find. In private collection
238	1.18 g	England. In private collection
239	1.01 g	DOMBURG (Z) 120
240	1.23 g	LINTON (C) EMC 1999.0024
241	1.15 g	ESCHAREN (NB) hoard 4 NUMIS 1011686
242	1.28 g	REMMERDEN (Gld) hoard V035 * **Plate 35**
243	1.40 g	ASTON ROWANT (O) hoard. British Museum 1971-12-16-92
244	1.22 g	BANHAM (Nf) EMC 1994.0129

245 1.11 g ┌ England? T&S 161. 95% 'silver'
246 1.16 g │ REMMERDEN (Gld) hoard V145 * **Plate 35**
247 1.21 g │ REMMERDEN (Gld) hoard V075 * **Plate 35**
248 1.2 g │ CAISTOR-BY-NORWICH (Nf) EMC 1986.5032 * **p 35**
249 1.21 g │ Unknown. SCBI-39 (Berlin) 3
250 0.96 g └ DONGJUM (Fr) NUMIS 1008815
251 1.17 g ┌ DOMBURG (Z) 156
252 1.17 g │ BIDFORD-ON-AVON (Wa) DMM XXVII
253 0.81 g │ BAKKUM (NH) NUMIS 1003793
254 1.22 g └ DOMBURG (Z) 118 = Van der Chijs V-42 = De Belfort 5795
255 n.r. ┌ ASTON ROWANT (O) hoard. Auction Glendining 1975-231
256 n.r. └ Unknown. Auction De Geus 16 (2003) no. 449
257 1.20 g MIDLUM (Fr) NUMIS 1020536
258 1.01 g OOSTERBIERUM (Fr) NUMIS 1022066 = Auction L. Schulman (1995) 237
259 n.r. Unknown. Auction L. Schulman (2003) 673

Sub-variety 2a

260 1.25 g RECULVER (K) EMC 1986.8640 = MEC 640 Fitzwilliam Museum 231
261 1.20 g ┌ REMMERDEN (Gld) hoard V087 * **Plate 36**
262 1.21 g └ REMMERDEN (Gld) hoard V206 * **Plate 36**
263 n.r. Netherlands? Holleman list 84 (1991) 432
264 1.23 g ┌ England? T&S 163 = ex Lockett collection 94% 'silver' * **p 36**
265 1.16 g └ DOMBURG (Z) 168
266 0.61 g DOMBURG (Z) 134
267 1.26 g ┌ REMMERDEN (Gld) hoard V082 * **Plate 37**
268 1.25 g └ England? P. Finn list 10-22 (1997)
269 0.80 g OOSTERBIERUM (Fr) NUMIS 1038361
270 n.r. ┌ SAINT PIERRE-LES-ETIEUX (France) hoard. Lafaurie (1969) pl XVI-103
271 1.35 g │ DOMBURG (Z) 85
272 1.16 g └ BAWSEY (Nf) EMC 1993.9153
273 1.16 g ┌ DOMBURG (Z) 115 = Dirks (1870) G-29; The actual diameter is 12 mm
274 1.25 g └ KATWIJK (ZH) NUMIS 1016262
275 1.24 g England? P. Finn list 16-62 (1999) * **p 36**
276 1.20 g ┌ DOMBURG (Z) 143
277 0.90 g └ REMMERDEN (Gld) hoard V164 * **Plate 37**

Sub-variety 2b

278 0.99 g ┌ LIENDEN (Gld) NUMIS 1017363
279 0.87 g │ DOMBURG (Z) 113
280 1.12 g │ England? T&S 187. 95% 'silver' Ex Lockett collection * **p 14**
281 1.18 g │ WIJK-BIJ-DUURSTEDE (U) NUMIS 1033585 * **p 36**
282 0.89 g │ DOMBURG (Z) 159
283 0.76 g └ DOMBURG (Z) 177

284	1.17 g	AKENHAM (Sf) EMC 1991.0099 = P. Finn list 16-63 (1999)
285	1.17 g	BOER (Fr) NUMIS 1004889
286	1.25 g	NOHANENT (France) hoard. Lafaurie (1969) pl XXI-25
287	1.12 g	Unknown. SCBI 36 (Berlin) 4
288	1.22 g	TIBENHAM (Nf) EMC 2003.0077
289	1.26 g	CAISTER-ON-SEA (Nf) EMC 1980.9004
290	1.30 g	VALKENBURG (ZH) NUMIS 1029787
291	1.32 g	ASTON ROWANT (O) hoard. British Museum 1971-12-16-153
292	1.21 g	REMMERDEN (Gld) hoard V142 * **Plate 37**
293	1.29 g	REMMERDEN (Gld) hoard V129 * **Plate 37**
294	1.20 g	ESCHAREN (NB) hoard 2 NUMIS 1011684
295	1.25 g	BAIS (France) hoard. Laufaurie (1969) 317
296	1.17 g	KATWIJK (ZH) NUMIS 1016263 * **p ##**
297	n.r.	Unknown. Auction Coin Investment (1997) 343
298	1.13 g	HALDER (NB) NUMIS 1013173
299	1.24 g	REMMERDEN (Gld) hoard V200 * **Plate 37**
300	1.14 g	BERGEN (NH) NUMIS 1004529
301	0.92 g	DOMBURG (Z) 114
302	1.19 g	DOMBURG (Z) 163
303	1.21 g	REMMERDEN (Gld) hoard V134 * **Plate 37**
304	1.15 g	REMMERDEN (Gld) hoard V209 * **Plate 37**
305	1.17 g	REMMERDEN (Gld) hoard V013 * **Plate 37**
306	n.r.	OOSTERBIERUM (Fr) NUMIS 1054206
307	0.59 g	SCHALSUM (Fr) NUMIS 103558
308	0.77 g	DOMBURG (Z) 199
309	1.1 g	Netherlands. Geldmuseum 17275 = Van der Chijs XX-14
310	0.88 g	England? T&S 177 = ex Lockett collection. 93% 'silver'

Sub-variety 2c *die-linked to BMC Type 10*

311	1.28 g	DE MEERN (U) single find NUMIS 1006920
312	1.28 g	REMMERDEN (Gld) hoard MU00123 * **Plate 37**
313	1.23 g	REMMERDEN (Gld) hoard V182 * **Plate 37**
314	1.13 g	IJZENDOORN (Gld) NUMIS 1015611
315	1.20 g	REMMERDEN (Gld) hoard V187 * **Plate 37**
316	n.r.	BEDFORD (Bd) EMC 1990.5012
317	1.24 g	BAWSEY (Nf) EMC 1993.9153 = T&S 159 * **p 36**

BMC Type 10

318	1.11 g	KERK-AVEZAATH (Gld) NUMIS 1016352
319	1.11 g	ESCHAREN (NB) hoard 8 NUMIS 1011690
320	1.24 g	ESCHAREN (NB) hoard 7 NUMIS 1011689 **p 7**
321	1.29 g	Friesland. Ex collection Stephanik. Auction Muller (1904) pl II-1

322 1.35 g ┌ Unknown. De Belfort 5796, ex collection Duhamel * **Plate 14**
323 1.38 g │ VALKENBURG (ZH) NUMIS 1029789
324 1.14 g │ VEN-ZELDERHEIDE (L) NUMIS 1032218
325 0.98 g └ ESCHAREN (NB) hoard 9 NUMIS 1011691
326 1.2 g ┌ MORLEY ST BOTULPH (Nf) EMC 2000.0033
327 1.25 g └ ESCHAREN (NB) hoard 6 NUMIS 1011688
328 0.96 g ┌ WIJNALDUM (Fr) NUMIS 1034038 In private collection
329 1.13 g │ LONG WITTENHAM (Brk) EMC 1984.0102
330 1.0 g │ Essex. In private collection
331 1.10 g │ VEN-ZELDERHEIDE (L) NUMIS 1032219
332 1.04 g └ England? British Museum 86 = Lindsey (1842) Pl 1-6
333 1.21 g DOMBURG (Z) 295 = De Belfort 5796

* Replicas, possibly cast from this coin, are known, see p 18

Sub-variety 2d

334 n.r. ┌ DOMBURG (Z) 110 = De Man (1926) I-12 (obverse only)
335 1.15 g │ Friesland. Auction Westerhof (1992); in private collection * **p 37**
336 1.13 g │ ASTON ROWANT (O) hoard. British Museum 1971-12-16-143
337 1.14 g │ REMMERDEN (Gld) hoard V112 * **Plate 37**
338 1.25 g │ REMMERDEN (Gld) hoard V071 * **Plate 38**
339 1.21 g └ BIDFORD-ON-AVON (Wa) DMM XXIV * **p 14**

Sub-variety 2e

340 n.r. DRONRIJP (Fr) NUMIS 1010138
341 1.22 g ┌ WIJK-BIJ-DUURSTEDE (U) NUMIS 1033584
342 1.2 g │ KATWIJK (ZH) NUMIS 1042363 * **p 37**
343 0.95 g │ HEILOO (NH) NUMIS 1014237
344 n.r. │ Unknown. Auction L. Schulman (2002) 1062
345 n.r. │ ASTON ROWANT (O) hoard. Auction Glendining (1973) 326
346 1.28 g │ REMMERDEN (Gld) hoard V115 * **Plate 38**
347 1.20 g │ DOMBURG (Z) 111
348 1.18 g │ WETZENS (Fr) NUMIS 1033278
349 n.r. │ SLAPPETERP (Fr) NUMIS 1052031
350 n.r. │ De MEERN (U) single find NUMIS –
351 0.93 g │ KATWIJK NUMIS – in private collection
352 1.3 g └ LOLWORTH (C) EMC 1999.0146
353 1.24 g ┌ REMMERDEN (Gld) hoard V216 * **Plate 38**
354 1.19 g │ REMMERDEN (Gld) hoard V235 * **Plate 38**
355 n.r. └ CODDENHAM (Sf) EMC 2000.311 = DMM XXXVII
356 1.10 g ┌ ESCHAREN (NB) hoard 1 NUMIS 1011683 * **p 37**
357 1.15 g └ REMMERDEN (Gld) hoard V903 * **Plate 38**
358 n.r. Friesland. De Man (1895) ex collection Stephanik
359 1.07 g ┌ VECHTEN (U) NUMIS 1030047
360 1.2 g │ Friesland. Van der Chijs V-38 = De Man (1895) ex collection Stephanik
361 1.05 g │ DOMBURG (Z) 123 = Van der Chijs V-41 = De Belfort 5790
362 1.28 g └ Unknown. Cabinet des Médailles Brussels BBR 3

363 1.23 g ┌ DOMBURG (Z) 80
364 1.15 g │ DOMBURG (Z) 81 = De Man (1895) I-8
365 n.r. │ Friesland. In private collection
366 n.r. └ Unknown. Auction Coin Investment (1982) 167
367 1.25 g REMMERDEN (Gld) hoard V208 * **Plate 38**

Sub-variety 2f

368 1.22 g ┌ BRIGHTON (Sx) EMC 1998.0129; P. Finn list 4-17 = list 17-62 (1999) * **p 37**
369 1.33 g │ ASTON ROWANT (O) hoard. British Museum 1971-12-16-150
370 1.10 g └ ABBEWIER (Fr) NUMIS 10011105
371 0.91 g DOMBURG (Z) 146
372 1.23 g ┌ Unknown. In private collection
373 0.92 g └ DOMBURG (Z) 130
374 n.r. ┌ England? Price list Gillis (September 2004)
375 1.16 g └ VALBURG (Gld) NUMIS 1029624
376 1.27 g ┌ Friesland? Auction Westerhof (1992) 372
377 0.89 g │ DOMBURG (Z) 102
378 0.49 g │ DOMBURG (Z) 101
379 1.12 g │ DOMBURG (Z) 128
380 1.12 g │ HEERENVEEN (Fr) NUMIS 1013915 * **p 37**
381 1.04 g │ Friesland. In private collection
382 1.13 g │ REMMERDEN (Gld) hoard V230 * **Plate 38**
383 1.14 g │ REMMERDEN (Gld) hoard V074 * **Plate 38**
384 1.13 g └ REMMERDEN (Gld) hoard V212 * **Plate 38**
385 1.11 g WEST RUDHAM (Nf) EMC 2002.0293
386 n.r. ┌ BIDDENHAM (Bd) EMC 1990.5014
387 1.18 g └ BIDFORD-ON-AVON (Wa) EMC 1990.0172
388 1.29 g ASTON ROWANT (O) hoard. List Spink (1983) 3894 = Auction Coin Investment 43/44-140 (1993)
389 n.r. England? List Seaby (1981) pl 39 E 107
390 n.r. ┌ England? List Seaby (1982) pl 66 E 451
391 0.82 g └ BAIS (France) hoard. Laufaurie (1969) 315a
392 1.30 g ASTON ROWANT (O) hoard. British Museum 1971-12-16-144
393 1.16 g ┌ WIJNALDUM NUMIS 1034009
394 1.05 g │ WIJK-BIJ-DUURSTEDE (U) NUMIS 1033427
395 1.20 g │ Unknown. In private collection
396 n.r. └ Friesland. In private collection
397 0.78 g LONDON DMM XLVI
398 1.22 g ┌ REMMERDEN (Gld) hoard V155 * **Plate 38**
399 1.19 g │ DOMBURG (Z) 148 * **p 14**
400 1.05 g └ RIED (Fr) NUMIS 1024684

Sub-variety 3a

401 1.12 g DOMBURG (Z) 131
402 n.r. WATTON-AT-STONE (Hrt) DMM

403 1.21 g TZUMMARUM (Fr) NUMIS 1029464
404 1.12 g WEST RUDHAM (Nf) EMC 1998.2061
405 1.14 g ASTON ROWANT (O) hoard. Auction Glendining (1988) 27d
406 n.r. Unknown. Auction Coin Investment (1993) 140
407 n.r. "Hampshire" hoard 4
408 1.25 g ┌ REMMERDEN (Gld) hoard V131 * **Plate 38**
409 1.21 g │ REMMERDEN (Gld) hoard V211 * **Plate 38**
410 1.08 g │ REMMERDEN (Gld) hoard V113 * **Plate 39**
411 1.16 g └ KATWIJK (ZH) NUMIS 1052918
412 n.r. ┌ ASTON ROWANT (O) hoard. Auction Sotheby (1985) 499
413 0.67 g └ England? T&S 178. 93% 'silver'
414 0.17 g DOMBURG (Z) 152
415 1.09 g MORLEY ST BOTULPH (Nf) EMC 1999.0197
416 1.18 g England? List P. Finn 15-51 (1999) * **p 38**
417 1.13 g SAINT PIERRE-LES-ETIEUX (France) hoard. Lafaurie (1969) pl XVI-102
418 1.04 g DOMBURG (Z) 127
419 0.72 g ┌ DOMBURG (Z) 155
420 1.22 g │ VALKENBURG (ZH) NUMIS 1029788
421 1.3 g └ HOUTEN (U) NUMIS 1015306
422 1.23 g BAIS (France) hoard. Laufaurie (1969) 312
423 0.91 g DOMBURG (Z) 207 * **p 38**
424 0.75 g DOMBURG (Z) 208 = Dirks (1870) G-30
425 n.r. ┌ BIDDENHAM (Bd) EMC 1990.5011
426 1.2 g └ Oxfordshire. EMC 2006.0060
427 1.22 g ┌ REMMERDEN (Gld) hoard V141 * **Plate 39**
428 1.16 g │ REMMERDEN (Gld) hoard V038 * **Plate 39**
429 1.23 g └ REMMERDEN (Gld) hoard V202 * **Plate 39**
430 1.24 g REMMERDEN (Gld) hoard V218 * **Plate 39**
431 1.16 g ┌ REMMERDEN (Gld) hoard V192 * **Plate 39**
432 1.26 g └ SLAPPETERP (Fr) NUMIS 1027715
433 1.18 g ┌ REMMERDEN (Gld) hoard V100 * **Plate 39**
434 1.22 g └ REMMERDEN (Gld) hoard V205 * **Plate 39**
435 1.24 g ┌ NARFORD (Nf) EMC 1997.0050
436 1.23 g └ REMMERDEN (Gld) hoard V084 * **Plate 39**
437 1.17 g REMMERDEN (Gld) hoard V217 * **Plate 39**
438 0.99 g WALSOKEN (Nf) EMC 1994.0134
439 1.16 g REMMERDEN (Gld) hoard V072 * **Plate 39**
440 1.04 g OOSTERBIERUM (Fr) NUMIS 1022068
441 1.26 g REMMERDEN (Gld) hoard V118 * **Plate 39**
442 0.99 g REMMERDEN (Gld) hoard V032 * **Plate 40**
443 0.67 g DOMBURG (Z) 105
444 1.19 g SLAPPETERP (Fr) NUMIS 90038
445 0.83 g England? MEC 643. 92% 'silver'
446 1.20 g England? Hunterian Museum Glasgow 55
447 1.1 g Netherlands. Van der Chijs XX-13
448 1.02 g ┌ REMMERDEN (Gld) hoard V271 * **Plate 40**
449 1.11 g │ REMMERDEN (Gld) hoard V273 * **Plate 40**
450 1.22 g │ REMMERDEN (Gld) hoard V042 * **Plate 40**

451	1.29 g	REMMERDEN (Gld) hoard V138 * **Plate 40**
452	1.16 g	REMMERDEN (Gld) hoard V018 * **Plate 40**
453	1.10 g	DOMBURG (Z) 129
454	1.25 g	KATWIJK (ZH) NUMIS 1016264
455	1.20 g	REMMERDEN (Gld) hoard V226 * **Plate 40**
456	1.25 g	REMMERDEN (Gld) hoard V157 * **Plate 40**
457	1.18 g	REMMERDEN (Gld) hoard V215 * **Plate 40**
458	0.69 g	DOMBURG (Z) 215 = De Man (1895) I-10
459	n.r.	NEDERWETTEN (NB) NUMIS 1054201
460	1.21 g	ROCKLANDS (Nf) EMC 2000.0311
461	1.02 g	REMMERDEN (Gld) hoard V028 * **Plate 40**
462	1.09 g	REMMERDEN (Gld) hoard V227 * **Plate 40**
463	1.23 g	REMMERDEN (Gld) hoard V085 * **Plate 40**
464	1.23 g	REMMERDEN (Gld) hoard V003 * **Plate 41**
465	1.13 g	REMMERDEN (Gld) hoard V012 * **Plate 41**
466	1.19 g	ASTON ROWANT (O) hoard. British Museum 1971-12-16-115
467	1.17 g	BAIS (France) hoard. Laufaurie (1969) 314a
468	1.09 g	REMMERDEN (Gld) hoard V255 * **Plate 41**
469	1.04 g	REMMERDEN (Gld) hoard V247 * **Plate 41**
470	1.14 g	KATWIJK (ZH) NUMIS 1052917
471	1.14 g	ASTON ROWANT (O) hoard. British Museum 1971-12-16-145
472	n.r.	BRAILES (Wa) DMM
473	1.26 g	ST NICOLAS-AT-WADE (K) T&S 160. 95% 'silver'
474	1.03 g	DOMBURG (Z) 104
475	0.97 g	DOMBURG (Z) 153
476	n.r.	ASTON ROWANT (O) hoard. Auction Sotheby (Feb. 1986) 16
477	1.28 g	BAIS (France) hoard. Laufaurie (1969) 317c
478	1.11 g	SCHALSUM (Fr) NUMIS 1027407
479	n.r.	England? Ex Lockett collection
480	1.12 g	REMMERDEN (Gld) hoard V065 * **Plate 41**
481	0.99 g	KATS (Z) NUMIS 1016069
482	1.34 g	Unknown. In private collection
483	1.13 g	REMMERDEN (Gld) hoard V056 * **Plate 41**
484	1.18 g	REMMERDEN (Gld) hoard V229 * **Plate 41**
485	1.2 g	REMMERDEN (Gld) hoard V901 * **Plate 41**
486	0.60 g	WESTENSCHOUWEN (Z) (Domburg 939)
487	1.24 g	BAIS (France) hoard. Laufaurie (1969) 318
488	0.90 g	Unknown. Cabinet des médailles Brussels BBR 4
489	1.11 g	England? List P. Finn 12-42 (1998)
490	1.24 g	ASTON ROWANT (O) hoard. Auction Glendining (1988) 27c
491	1.01 g	REMMERDEN (Gld) hoard V116 * **Plate 41**
492	1.1 g	BRIXTON DEVERILL (W) EMC 2001.0049
493	1.15 g	England? List P. Finn 10-24 (1997)
494	0.91 g	REMMERDEN (Gld) hoard V058 * **Plate 41**
495	n.r.	Friesland. In private collection
496	n.r.	Netherlands? Holleman list 79-405 (1989) * **p 34**
497	1.10 g	ESCHAREN (NB) hoard 5 NUMIS 1011687
498	1.41 g	ASTON ROWANT (O) hoard. British Museum 1971-12-16-95

499	n.r.	NOHANENT (France) hoard. Lafaurie (1969) pl XXI-26
500	1.29 g	ASTON ROWANT (O) hoard. Auction Glendining (1988) 24c
501	0.96 g	DOMBURG (Z) 140
502	1.05 g	DONGJUM (Fr) NUMIS 1008813
503	0.58 g	DOMBURG (Z) 133
504	0.61 g	┌ DOMBURG (Z) 166 = Dirks (1870) G-27
505	0.50 g	└ DOMBURG (Z) 167
506	0.96 g	DOMBURG (Z) 136
507	0.90 g	DOMBURG (Z) 151
508	n.r.	ASTON ROWANT (O) hoard. Auction Sotheby (1986) 185
509	1.07 g	PLASSAC (France) hoard. Lafaurie (1969) pl XX-162
510	1.04 g	Friesland. In private collection
511	1.20 g	ASTON ROWANT (O) hoard. British Museum 1971-12-16-154
512	n.r.	Unknown. Holleman list 139-549 (2003)
513	1.2 g	THURNHAM (K) EMC 1997.0052
514	0.49 g	South Lincolnshire p.s. DMM CXXI
515	0.91 g	ASTON ROWANT (O) hoard. Auction Glendining (1988) 29a
516	1.05 g	Unknown. MEC 641 92% 'silver'
517	0.63 g	DOMBURG (Z) 252 = van der Chijs V-35 = Dirks (1870) F-5
518	1.25 g	Cambridgeshire. EMC 1996.0075
519	1.08 g	REMMERDEN (Gld) single find NUMIS 1024669
520	1.05 g	ASTON ROWANT (O) hoard. Auction Glendining (1975) 347
521	1.22 g	WIJNALDUM (Fr) NUMIS 1034032
522	0.87 g	ASTON ROWANT (O) hoard. Auction Glendining (1988) 26c
523	0.43 g	DOMBURG (Z) 108 = Dirks (1870) G-35
524	1.22 g	ASTON ROWANT (O) hoard. Auction Glendining (1988) 23b
525	1.21 g	ASTON ROWANT (O) hoard. T&S 166 92% 'silver'
526	1.22 g	┌ REMMERDEN (Gld) hoard V191 * **Plate 41**
527	1.09 g	│ REMMERDEN (Gld) hoard V165 * **Plate 41**
528	1.2 g	└ England? In private collection
529	0.83 g	┌ Unknown. Auction J. Elsen 86 (March 2001) 1338
530	0.8 g	│ WIJK-BIJ-DUURSTEDE (U) NUMIS 1059604
531	1.1 g	│ East Anglia. In private collection
532	n.r.	│ Friesland. In private collection
533	0.97 g	└ DOMBURG (Z) 141
534	n.r.	┌ Netherlands. Reported on internet
535	1.11 g	└ REMMERDEN (Gld) hoard V266 * **Plate 42**
536	0.8 g	East Anglia. In private collection
537	1.23 g	REMMERDEN (Gld) hoard V237 * **Plate 42**
538	1.11 g	┌ Friesland. In private collection = Auction L. Schulman (1993) 341
539	1.20 g	│ ESCHAREN (NB) hoard 3 NUMIS 1011685
540	1.16 g	│ REMMERDEN (Gld) hoard V190 * **Plate 42**
541	1.07 g	└ REMMERDEN (Gld) hoard V246 * **Plate 42**
542	1.12 g	DOMBURG (Z) 90 =Van der Chijs V-43
543	n.r.	Friesland. In private collection
544	0.99 g	┌ DOMBURG (Z) 209 = Van der Chijs V-40
545	n.r.	└ DOMBURG (Z) 150
546	0.77 g	ASTON ROWANT (O) hoard. British Museum 1971-12-16-139

547 0.68 g DOMBURG (Z) 135
548 n.r. TORKSEY (L) EMC 2004.0138
549 n.r. ┌ ASTON ROWANT (O) hoard. Auction Glendining (1975) 220
550 n.r. │ Friesland. In private collection
551 0.73 g │ ASTON ROWANT (O) hoard. British Museum 1971-12-16-141
552 0.66 g └ ASTON ROWANT (O) hoard. British Museum 1971-12-16-157
553 n.r. "Hampshire" hoard 10
554 n.r. ASTON ROWANT (O) hoard. Auction Glendining (1975) 225
555 0.9 g LIPPENHUIZEN Fr) NUMIS 1042366
556 0.40 g DOMBURG (Z) 125
557 1.16 g BIDFORD-ON-AVON (Wa) DMM 2004
558 1.33 g KATWIJK (ZH) NUMIS 1058559
559 1.15 g Netherlands. Van der Chijs V-39
560 0.67 g DOMBURG (Z) 220
561 1.2 g MIDLUM (Fr) NUMIS 1054198
562 0.29 g DOMBURG (Z) 89
563 0.70 g DOMBURG (Z) 142
564 1.18 g ┌ REMMERDEN (Gld) hoard V136 * **Plate 42**
565 1.18 g │ England? List P. Finn list 17-63 (1999)
566 1.23 g └ ASTON ROWANT (O) hoard. British Museum 1971-12-16-106
567 n.r. Unknown. Auction Coin Investment (1992) 310
568 1.09 g ┌ BREDGAR (K) EMC 1989.0084
569 1.38 g │ ASTON ROWANT (O) hoard. Auction Glendining (1988) 26a
570 n.r. └ Unknown. List Holleman list 74-404 (1998)
571 1.22 g BAIS (France) hoard. Lafaurie (1969) 311
572 1.25 g ASTON ROWANT (O) hoard. British Museum 1971-12-16-100
573 1.06 g ┌ DOMBURG (Z) 154 = Dirks (1870) E-m = Geldmuseum 17073
574 1.27 g │ REMMERDEN (Gld) hoard V166 * **Plate 42**
575 n.r. │ REMMERDEN (Gld) hoard V265 * **Plate 42**
576 1.06 g └ REMMERDEN (Gld) hoard V014 * **Plate 42**
577 1.24 g DOMBURG (Z) 169 = Dirks (1870) E-l = Geldmuseum 17270
578 0.96 g REMMERDEN (Gld) hoard V020 * **Plate 42**
579 1.19 g ┌ MIDLUM (Fr) NUMIS 1020535
580 1.13 g │ ROYSTON (Hrt) EMC 1989.5168
581 1.23 g └ KATWIJK (ZH) NUMIS 1016285
582 0.80 g DOMBURG (Z) 216
583 1.08 g Unknown. Geldmuseum 17235
584 1.17 g REMMERDEN (Gld) hoard V022 * **Plate 42**
585 1.15 g ASTON ROWANT (O) hoard. British Museum 1971-12-16-96
586 0.43 g DOMBURG (Z) 109
587 1.23 g REMMERDEN (Gld) hoard V154 * **Plate 42**
588 1.27 g KATWIJK (ZH) NUMIS 1052916
589 n.r. ASTON ROWANT (O) hoard. Auction Glendining (1973) 327
590 0.93 g ASTON ROWANT (O) hoard. British Museum 1971-12-16-128
591 0.91 g ASTON ROWANT (O) hoard. Auction Glendining (1988) 23d
592 1.12 g REMMERDEN (Gld) hoard V009 * **Plate 42**
593 1.16 g REMMERDEN (Gld) hoard V173 * **Plate 43**
594 0.89 g TZUMMARUM (Fr) NUMIS 1059598

595 n.r. ASTON ROWANT (O) hoard. Auction Glendining (1975) 226
596 1.21 g DOMBURG (Z) 162
597 n.r. ┌ Unknown. Auction Coin Investment 40-312 (1992)
598 0.98 g └ England? P. Finn list 14-59 (1998)
599 1.21 g ASTON ROWANT (O) hoard. British Museum 1971-12-16-151
600 0.57 g SCHALSUM (Fr) NUMIS 1027405
601 1.31 g BAIS (France) hoard. Lafaurie (1969) 313
602 1.22 g ASTON ROWANT (O) hoard. British Museum 1971-12-16-110
603 1.18 g ASTON ROWANT (O) hoard. British Museum 1971-12-16-183
604 n.r. Unknown. Auction Coin Investment (1994) 187
605 1.05 g MIDLUM (Fr) NUMIS 1054197
606 1.18 g REMMERDEN (Gld) hoard V239 * **Plate 43**
607 1.18 g ┌ ASTON ROWANT (O) hoard. British Museum 1971-12-16-155
608 1.12 g └ REMMERDEN (Gld) hoard V148 * **Plate 43**
609 1.27 g ASTON ROWANT (O) hoard. Auction Glendining (1988) 29b
610 0.95 g REMMERDEN (Gld) hoard V117 * **Plate 43**
611 1.11 g KINGS LYNN (Nf) T&S p 185
612 0.90 g WIJK-BIJ-DUURSTEDE (U) NUMIS 1033431
613 1.03 g FINKUM (Fr) NUMIS 1011895
614 1.27 g ASTON ROWANT (O) hoard. Auction Glendining (1988) 30c
615 0.87 g ┌ ASTON ROWANT (O) hoard. British Museum 1971-12-16-131
616 0.99 g └ ASTON ROWANT (O) hoard. T&S 171. 96% 'silver'
617 1.18 g ASTON ROWANT (O) hoard. Auction Glendining (1988) 27b
618 0.94 g ASTON ROWANT (O) hoard. Auction Glendining (1988) 30d
619 0.94 g DOMBURG (Z) 126

Sub-variety 3b

620 1.04 g England? In private collection = Auction Coin Investment 40-238 (1992) * **p 38**
621 1.05 g BAWSEY (Nf) T&S 181 * **p 12**
622 1.07 g ┌ CAISTOR-BY-NORWICH (Nf) EMC 1986.5034
623 n.r. │ DOMBURG (Z) 238 = Dirks (1870) G-32
624 0.83 g └ DOMBURG (Z) 237
625 1.02 g DUNSTABLE (Bd) EMC 1977.0025
626 1.01 g FIRLE (Sx) EMC 2006.0098
627 0.84 g DOMBURG (Z) 234
628 0.44 g ┌ DOMBURG (Z) 230
629 1.30 g └ REMMERDEN (Gld) hoard V064 * **Plate 43**
630 1.23 g ┌ KATWIJK (ZH) NUMIS 1016267
631 1.29 g └ REMMERDEN (Gld) hoard V133 * **Plate 43**
632 0.95 g REMMERDEN (Gld) hoard V225 * **Plate 43**
633 n.r. ASTON ROWANT (O) hoard. Auction Glendining (1975) 233
634 1.08 g Oxfordshire EMC 2005.0092 * **p 38**
635 0.94 g DOMBURG (Z) 232
636 0.57 g ┌ ASTON ROWANT (O) hoard. British Museum 1971-12-16-170
637 0.94 g │ ASTON ROWANT (O) hoard. Auction Glendining (1975) 234 = in private
└ collection
638 1.06 g REMMERDEN (Gld) hoard V021 * **Plate 43**
639 1.12 g ASTON ROWANT (O) hoard. British Museum 1971-12-16-148

Sub-variety 3c

640 1.05 g ┌ REMMERDEN (Gld) hoard V268 * **Plate 43**
641 n.r. │ ASTON ROWANT (O) hoard. Auction Sotheby (1985) 501
642 n.r. │ Netherlands? Auction L. Schulman 14-873 (1995) * **p 38**
643 n.r. │ BIDDENHAM (Bd) EMC 1990.5015
644 1.16 g │ SHOTESHAM (Nf) EMC 1993.0150
645 1.19 g │ KINGSTON BAGPUIZE (O) EMC 1992.02168
646 1.20 g └ South Lincolnshire p.s. EMC 2000.0518
647 0.46 g ┌ DOMBURG (Z) 242
648 n.r. │ Unknown. Auction L. Schulman 17-574 (1996)
649 1.23 g │ ASTON ROWANT (O) hoard. British Museum 1971-12-16-163
650 1.28 g │ BAIS (France) hoard. Laufaurie (1969) 316
651 0.97 g └ REMMERDEN (Gld) hoard V055 * **Plate 43**
652 1.00 g ┌ HOUTEN (U) Communicated by J. Heinrichs * **p 38**
653 n.r. │ SKEGNESS (L) EMC 2001.0727
654 n.r. │ England? P. Finn list 4-19 (1995) * **p 10**
655 n.r. │ Unknown. Auction L. Schulman 25-1063 (2001)
656 n.r. │ England? Ex Lockett collection
657 1.34 g │ Unknown. In private collection
658 1.29 g │ Unknown. In private collection
659 1.27 g │ ASTON ROWANT (O) hoard. List Spink (1982) 3897
660 1.19 g └ KATWIJK (ZH) NUMIS 1052912
661 n.r. Unknown. Auction Coin Investment 49-316 (1994) * **p 87**
662 n.r. England? P. Finn list 4-19 (1995)

The following five coins of sub-variety 3c have a bust facing right

663 1.17 g ┌ REMMERDEN (Gld) hoard V114 * **Plate 43**
664 1.25 g │ BAIS (France) hoard. Lafaurie (1969) 314 * **p 34**
665 1.17 g └ Essex. EMC 1993.184
666 n.r. ISLE OF WIGHT (Ha) DMM XXVIII
667 n.r. EAST TILBURY (Ess) DMM

Sub-variety 3d

668 1.11 g ┌ CAMBRIDGE (C) EMC 1996.0075
669 1.12 g └ REMMERDEN (Gld) hoard V096 * **Plate 43**
670 1.21 g REMMERDEN (Gld) hoard V183 * **Plate 44**
671 0.84 g ┌ REMMERDEN (Gld) hoard V267 * **Plate 44**
672 1.02 g └ REMMERDEN (Gld) hoard V279 * **Plate 44**
673 1.09 g Unknown. Cabinet des médailles Brussels BBR 6
674 1.80 g ┌ DOMBURG (Z) 228 = Dirks (1870) G-37
675 1.23 g └ REMMERDEN (Gld) hoard V080 * **Plate 44**
676 1.22 g BENTLEY (Sf) EMC 1993.0147
677 1.23 g ┌ REMMERDEN (Gld) hoard V048 * **Plate 44**
678 1.23 g └ Unknown. In private collection
679 n.r. ASTON ROWANT (O) hoard. Auction Glendining (1975) 223

680 1.15 g ┌ REMMERDEN (Gld) hoard V193 * **Plate 44**
681 1.18 g │ REMMERDEN (Gld) hoard V198 * **Plate 44**
682 1.21 g │ REMMERDEN (Gld) hoard V144 * **Plate 44**
683 1.14 g │ REMMERDEN (Gld) hoard V079 * **Plate 44**
684 1.06 g └ GREAT DUNMOW (Ess) EMC 1990.0173 In private collection
685 0.49 g DOMBURG (Z) 103
686 n.r. BURES-ST-MARY (Ess) EMC 2003.0179
687 1.11 g Unknown. Geldmuseum 17086
688 n.r. "Hampshire" hoard DMM 11
689 n.r. ASTON ROWANT (O) hoard. Auction Glendining (1973) 328
690 1.09 g DOMBURG (Z) 198
691 n.r. De MEERN (U) single find, in private possession
692 n.r. ASTON ROWANT (O) hoard. Auction Sotheby (1986) 185bis
693 n.r. ┌ "Hampshire" hoard. DMM 3
694 1.24 g └ ASTON ROWANT (O) hoard. British Museum 1971-12-16-108
695 n.r. BERLIKUM (Fr) NUMIS 1004603
696 1.2 g UPTON (O) EMC 1998.0057
697 1.21 g Unknown. SCBI 16-70
698 1.25 g KATWIJK (ZH) NUMIS 1016284
699 1.25 g Unknown. In private collection
700 1.27 g Unknown. MEC 639. 92% 'silver'
701 0.60 g DOMBURG (Z) 227
702 0.76 g ┌ Friesland. Holleman list 114-525 (1998) = in private collection
703 1.21 g └ Unknown. Auction Coin Investment 1997-350
704 0.77 g ASTON ROWANT (O) hoard. British Museum 1971-12-16-140
705 1.24 g ASTON ROWANT (O) hoard. British Museum 1971-12-16-160
706 0.8 g OOSTERBIERUM (Fr) NUMIS 1054207
707 n.r. ┌ Unknown. Auction De Geus 16 (2003) 448
708 n.r. └ De MEERN (U) single find, in private possession
709 1.24 g ASTON ROWANT (O) hoard. British Museum 1971-12-16-104
710 1.00 g DOMBURG (Z) 171
711 0.46 g Unknown. MEC 644
712 1.16 g ┌ REMMERDEN (Gld) hoard V097 * **Plate 44**
713 1.12 g └ REMMERDEN (Gld) hoard V034 * **Plate 44**
714 0.67 g ASTON ROWANT (O) hoard. Auction Glendining 1988-26b
715 0.40 g DOMBURG (Z) 259
716 0.61 g DOMBURG (Z) 245
717 1.28 g ASTON ROWANT (O) hoard. British Museum 1971-12-16-99
718 1.21 g ASTON ROWANT (O) hoard. Auction Glendining (1988) 31a
719 1.16 g PEINS (Fr) NUMIS 1023788
720 n.r. ASTON ROWANT (O) hoard. Auction Glendining (1975) 226
721 0.71 g DOMBURG (Z) 250
722 0.89 g ┌ SOUTHAMPTON Metcalf & Andrews (1988) 3. 91% 'silver'
723 n.r. └ Unknown. Holleman list 100-899 (1994) * **p 38**
724 1.00 g REMMERDEN (Gld) hoard V010 * **Plate 44**
725 1.18 g DOMBURG (Z) 203
726 1.19 g ┌ DOMBURG (Z) 200 = De Man (1895) I-12
727 1.29 g └ ASTON ROWANT (O) hoard. British Museum 1971-12-16-171

728	n.r.	Unknown. Auction Coin Investment 40-242 (1992)
729	0.79 g	DOMBURG (Z) 186 = Dirks (1870) G-33
730	1.10 g	┌ WIJNALDUM (Fr) NUMIS 1034033 = Holleman list 102- 449 (1995)
731	1.09 g	│ CONGHAM (Nf) EMC 1994.0126
732	1.14 g	│ REMMERDEN (Gld) hoard V083 * **Plate 45**
733	1.16 g	│ REMMERDEN (Gld) hoard V135 * **Plate 45**
734	1.18 g	└ DOMBURG (Z) 204
735	1.18 g	DOMBURG (Z) 222 = Geldmuseum HKP 55
736	1.13 g	DOMBURG (Z) 106
737	1.02 g	REMMERDEN (Gld) hoard V186 * **Plate 45**
738	1.22 g	┌ England? In private collection * **p 38**
739	1.12 g	│ REMMERDEN (Gld) hoard V128 * **Plate 45**
740	1.02 g	└ REMMERDEN (Gld) hoard V092 * **Plate 45**
741	1.20 g	ASTON ROWANT (O) hoard. British Museum 1971-12-16-109
742	1.22 g	┌ ASTON ROWANT (O) hoard. British Museum 1971-12-16-98
743	1.21 g	└ KINGS LYNN (Nf) T&S p 185
744	n.r.	South Lincolnshire p.s. The Searcher (Sept. 2001)
745	1.20 g	ASTON ROWANT (O) hoard. British Museum 1971-12-16-109
746	n.r.	ASTON ROWANT (O) hoard. Auction Glendining (1975) 228
747	1.17 g	DRONRIJP (Fr) NUMIS 1051743 = Auction Coin Investment 52-348 (1997)
748	1.15 g	REMMERDEN (Gld) hoard V902 * **Plate 45**
749	1.06 g	┌ WIJK-BIJ-DUURSTEDE (U) NUMIS 1033426
750	1.16 g	└ REMMERDEN (Gld) hoard V178 * **Plate 45**
751	n.r.	Département Aube (France) Lafaurie & Pilet-Lemière (2003) 10.000.8
752	1.08 g	REMMERDEN (Gld) hoard V269 * **Plate 45**
753	0.93 g	DOMBURG (Z) 225
754	1.04 g	ASTON ROWANT (O) hoard. Auction Glendining (1988) 31b
755	n.r.	BIDDENHAM (Bd) EMC 1990.5016
756	0.97 g	ASTON ROWANT (O) hoard. British Museum 1971-12-16-126
757	0.40 g	DOMBURG (Z) 254
758	0.96 g	ASTON ROWANT (O) hoard. British Museum 1971-12-16-167
759	0.67 g	DOMBURG (Z) 87
760	0.46 g	Unknown. Hunterian Museum Glasgow 57
761	1.20 g	England? P. Finn list 14-60 (1998)
762	1.08 g	REMMERDEN (Gld) hoard V070 * **Plate 45**
763	1.21 g	ASTON ROWANT (O) hoard. British Museum 1971-12-16-158
764	0.49 g	DOMBURG (Z) 229
765	1.07 g	DOMBURG (Z) 261
766	1.57 g	BLEDLOW (Bk) DMM V
767	1.25 g	ASTON ROWANT (O) hoard. Auction Glendining (1988) 24a
768	1.20 g	BAIS (France) hoard. Laufaurie (1969) 311a
769	1.14 g	REMMERDEN (Gld) hoard V272 * **Plate 45**
770	1.17 g	BAIS (France) hoard. Laufaurie (1969) 314b
771	0.51 g	DOMBURG (Z) 221
772	n.r.	South Lincolnshire p.s. The Searcher (Sept. 2001) 21
773	1.07 g	ASTON ROWANT (O) hoard. British Museum 1971-12-16-121
774	0.44 g	DOMBURG (Z) 217
775	1.22 g	BAIS (France) hoard. Laufaurie (1969) 314c

776 1.20 g ASTON ROWANT (O) hoard. British Museum 1971-12-16-107
777 n.r. ┌ De MEERN (U) single find, in private possession
778 1.15 g └ ISLE OF WIGHT (Ha) EMC 2003.0235

Sub-variety 3e

779 1.14 g ┌ BIDFORD-ON-AVON (Wa) EMC 1990.0172
780 1.09 g │ WIJNALDUM (Fr) NUMIS 1034037
781 1.14 g └ WIJNALDUM (Fr) NUMIS 1034010 = Holleman list 96-403 (1993)
782 0.77 g WIJK-BIJ-DUURSTEDE (U) NUMIS 1033653
783 0.42 g WIJK-BIJ-DUURSTEDE (U) NUMIS 1033654
784 0.99 g HOUTEN (U) NUMIS 1015374
785 1.16 g ┌ REMMERDEN (Gld) hoard V054 * **Plate 45**
786 n.r. │ England? Ex Lockett collection * **p 39**
787 n.r. └ Netherlands. Sipiro list (1989) 69
788 1.17 g ASTON ROWANT (O) hoard. Auction Glendining (1988) 33
789 1.02 g Unknown. Auction Coin Investment (1993) 139
790 0.43 g DOMBURG (Z) 247 = Dirks (1870) G-26
791 0.63 g DOMBURG (Z) 235
792 0.72 g DOMBURG (Z) 240
793 0.92 g East Anglia? T&S 176. 95% 'silver'
794 1.01 g REMMERDEN (Gld) hoard V262 * **Plate 45**
795 n.r. ASTON ROWANT (O) hoard. Auction Sotheby (1986) 182
796 1.17 g REMMERDEN (Gld) hoard V168 * **Plate 46**
797 1.16 g REMMERDEN (Gld) hoard V203 * **Plate 46**
798 1.23 g ASTON ROWANT (O) hoard. British Museum 1971-12-16-162
799 1.18 g KATWIJK NUMIS 1054603
800 n.r. DOMBURG (Z) 241 = Van der Chijs V-37 = De Belfort 5791
801 1.08 g LASHLEY WOOD (Ess) EMC 2006.0072
802 0.42 g DOMBURG (Z) 246
803 1.13 g GRIMSBY (L) EMC 1994.0149
804 1.2 g HOGEBEINTUM (Fr) NUMIS 90007
805 0.95 g REMMERDEN (Gld) hoard V073 * **Plate 46**
806 0.80 g. South Lincolnshire p.s. The Searcher (Sept. 2001) 24
807 0.82 g Unknown. In private collection
808 1.20 g KATWIJK (ZH) NUMIS 1016268
809 1.31 g ASTON ROWANT (O) hoard. British Museum 1971-12-16-161
810 1.13 g ┌ COVEHITHE (Sf) EMC 1997.0051
811 0.83 g └ DOMBURG (Z) 233
812 1.07 g ┌ DOMBURG (Z) 244
813 0.81 g └ DOMBURG (Z) 243 = Dirks (1870) G-39
814 0.73 g England? P. Finn list 12-43 1998 = Memorial list 26 (2001) * **p 39**

Sub-variety 3f

815 1.12 g SCHALSUM (Fr) NUMIS 1027406
816 1.20 g England? P. Finn list 12-41 (1998)
817 0.94 g WAPPENBURY (Wa) EMC 1994.0134 = T&S p 190

818 1.11 g DE MEERN (U) single find. NUMIS 1006926
819 0.91 g England? P. Finn list 14-61 (1998)
820 n.r. REMAGEN (Germany) Werner (1935) 161
821 1.26 g ASTON ROWANT (O) hoard. British Museum 1971-12-16-159
822 1.32 g ASTON ROWANT (O) hoard. British Museum 1971-12-16-156
823 0.86 g ASTON ROWANT (O) hoard. British Museum 1971-12-16-168
824 0.75 g DONGJUM (Fr) NUMIS 1003816 * **p 39**
825 1.12 g WIJNALDUM (Fr) NUMIS 1033929
826 n.r. Netherlands. NUMIS 1051636
827 1.13 g Unknown. T&S 164. 94% 'silver'
828 0.88 g ROYSTON (Hrt) EMC 1986.0006
829 0.84 g ASTON ROWANT (O) hoard. In private collection
830 n.r. Unknown. Holleman list 130-533 (2001)
831 1.11 g HINTON WALDRIST (O) DMM
832 1.01 g REMMERDEN (Gld) hoard V047 * **Plate 46**
833 1.20 g NICE-CIMIEZ (France) hoard. Le Gentilhomme (1938) pl III-24
834 0.71 g REMMERDEN (Gld) hoard V258
835 1.15 g ┌ REMMERDEN (Gld) hoard V041 * **Plate 46**
836 0.99 g └ REMMERDEN (Gld) hoard V111 * **Plate 46**
837 0.54 g REMMERDEN (Gld) hoard V016 * **Plate 46**
838 1.05 g REMMERDEN (Gld) hoard V238 * **Plate 46**
839 0.73 g ┌ DOMBURG (Z) 256 = Dirks (1870) G-41
840 n.r. │ BIDDENHAM (Bd) EMC 1990.5017
841 1.08 g │ DEBDEN (Ess) EMC 2004.0206
842 0.88 g │ DOMBURG (Z) 257 = Dirks (1870) G-42
843 1.18 g │ South Lincolnshire p.s. DMM CXXIII
844 1.2 g │ South Lincolnshire p.s. In private collection
845 1.15 g └ ASTON ROWANT (O) hoard. British Museum 1971-12-16-146
846 0.91 g DOMBURG (Z) 253
847 1.15 g ┌ ASTON ROWANT (O) hoard. Auction Glendining (1988) 30b
848 1.04 g └ South Lincolnshire p.s. EMC 2000.0528
849 0.34 g DOMBURG (Z) 265
850 0.54 g BAWSEY (Nf) T&S 179 = EMC 1993.9179 * **p 11**
851 0.64 g England? Hill (1953) pl IV-1
852 0.54 g ┌ Unknown. MEC 645
853 1.0 g └ SOUTHEND-ON-SEA (Ess) EMC 2005.0275 = Vosper list (2005)
854 0.94 g DOMBURG (Z) 224 = De Man (1895) I-11
855 1.15 g DOMBURG (Z) 258 = Dirks (1870) G-31
856 1.23 g ┌ ASTON ROWANT (O) hoard. T&S 169. 96% 'silver' * **p 11**
857 0.75 g └ DOMBURG (Z) 255 = Dirks (1870) G-36
858 0.72 g FAKENHAM (Nf) EMC 1996.0076 * **p 39**
859 0.82 g BAIS (France) hoard. Laufaurie (1969) 315b
860 n.r. Unknown. Auction L. Schulman (1995) 875
861 1.15 g ASTON ROWANT (O) hoard. British Museum 1971-12-16-146
862 1.18 g KATWIJK NUMIS 1016261
863 1.10 g ┌ REMMERDEN (Gld) hoard V900 * **Plate 46**
864 1.03 g │ REMMERDEN (Gld) hoard V040 * **Plate 46**
865 1.21 g │ REMMERDEN (Gld) hoard V101 * **Plate 46**
866 1.19 g └ REMMERDEN (Gld) hoard V240 * **Plate 46**

867 0.89 g ROYSTON (Hrt) EMC 1986.0007
868 1.13 g England? Hunterian Museum Glasgow 56
869 n.r. Unknown. Auction Coin Investment 50-3083 (1995)

Sub-variety 3g

870 1.25 g ┌ ASTON ROWANT (O) hoard. British Museum 1971-12-16-102
871 1.13 g │ DOMBURG (Z) 86 * **Plate 47**
872 1.1 g │ KELLING (Nf) EMC 1996.0082
873 n.r. └ England? List Gillis (Sept. 2004) * **p 39**
874 1.13 g ZOELEN (Gld) NUMIS 1034556
875 1.21 g ┌ STANFIELD-BEETLEY (Nf) EMC 1993.0133
876 0.90 g │ DOMBURG (Z) 82 = Dirks (1870) E-I * **Plate 47**
877 n.r. │ MAIDSTONE (K) EMC 2004.0062 * **Plate 47**
878 n.r. │ Netherlands? Dirks (1870) E-i
879 1.13 g └ LASHLEY WOOD (Ess) EMC 2005.0098
880 0.91 g ┌ DOMBURG (Z) 145
881 1.08 g └ DOMBURG (Z) 160
882 n.r. ┌ BIDDENHAM (Bd) EMC 1990.5013
883 1.14 g │ WIJK-BIJ-DUURSTEDE (U) Cabinet des medailles Brussels BBR 7 * **Plate 47**
884 n.r. │ BIDDENHAM (Bd) EMC 1990.5010
885 0.94 g │ DOMBURG (Z) 124
886 1.02 g └ SLAPPETERP (Fr) NUMIS 1027716 * **p 39**

Sub-variety 3h

887 1.19 g ┌ ASTON ROWANT (O) hoard. British Museum 1971-12-16-114
888 1.23 g └ ASTON ROWANT (O) hoard. Auction Glendining (1975) 222 * **p 87**
889 1.18 g ASTON ROWANT (O) hoard. British Museum 1971-12-16-118
890 1.11 g DE MEERN (U) hoard * **Plate 47**
891 n.r. DE PANNE (Belgium) Loffens (1960)
892 1.12 g ALFORD (L) DMM
893 1.01 g GREAT OAKLEY (Ess) EMC 1994.0127
894 n.r. Unknown. Auction Coin Investment (1994) 193
895 1.31 g ┌ ASTON ROWANT (O) hoard. Auction Glendining (1988) 22
896 n.r. └ NÖRVENICH/WISSERSHEIM (Germany) Communicated by J. Heinrichs
897 1.04 g LONDON EMC 1994.0137
898 1.20 g ASTON ROWANT (O) hoard. T&S 168. 86% 'silver' * **p 11**
899 1.01 g DOMBURG (Z) 262
900 1.11 g England? In private collection
901 1.14 g England? T&S 162 * **Plate 47**
902 n.r. Unknown. Auction L. Schulman (1995) 874
903 1.1 g ┌ England? P. Finn list 13-50 (1998) * **p 40**
904 1.21 g │ England? P. Finn list 13-51 (1998) * **Plate 47**
905 1.03 g └ DANKIRKE (Denmark) Bendixen (1981) 44
906 1.15 g GUDME (Denmark) Pedersen (1997)
907 n.r. ASTON ROWANT (O) hoard. Auction Glendining 1975-224 * **Plate 47**

908 0.95 g DOMBURG (Z) 211
909 n.r. ASHBY DE LA LAUNDE (L) EMC 2005.0009
910 1.06 g NICE-CIMIEZ (France) hoard. Le Gentilhomme (1938) pl III-9
911 1.19 g ASTON ROWANT (O) hoard. British Museum 1971-12-16-115
912 n.r. Unknown. Auction Van der Dussen (1990) 78
913 1.18 g ┌ BARNHAM BROOM (Nf) EMC 1994.0130
914 n.r. └ FRIDAYTHORPE (ERY) EMC 2002.0285
915 1.19 g ┌ ROYSTON (Hrt) EMC 1989.5170
916 1.12 g └ ROYSTON (Hrt) EMC 1986.0005. A 2c/8 mule
917 1.18 g ┌ ASTON ROWANT (O) hoard. British Museum 1971-12-16-113
918 0.97 g └ South Lincolnshire p.s. DMM CIII * **p 40**
919 1.17 g England? In private collection
920 n.r. DOMBURG (Z) 149 = Dirks (1870) E-n = Geldmuseum 17262
921 1.1 g England? Vosper list (2006)
922 1.2 g NEWARK (Nt) EMC 2005.0240
923 0.58 g DOMBURG (Z) 249

Sub-variety 4a

924 0.88 g ┌ ASTON ROWANT (O) hoard. Auction Glendining (1988) 28c
925 1.12 g │ ASTON ROWANT (O) hoard. Auction Glendining (1988) 28a
926 0.97 g └ Unknown. Auction Coin Investment 40-239 = Holleman list 95-410 (1993)
927 1.24 g Unknown. In private collection
928 1.23 g ASTON ROWANT (O) hoard. In private collection
929 1.16 g NORWICH area T&S 170 = EMC 1987.0049. 96% 'silver'
930 1.12 g ┌ CLIFFE (K) EMC 1988.0108
931 1.1 g │ England? In private collection * **Plate 47**
932 1.22 g │ ASTON ROWANT (O) hoard. British Museum 1971-12-16-184
933 1.29 g │ ASTON ROWANT (O) hoard. British Museum 1971-12-16-172
934 1.21 g │ ASTON ROWANT (O) hoard. British Museum 1971-12-16-173
935 1.02 g └ Unknown. In private collection * **Plate 47**
936 n.r. ┌ ASTON ROWANT (O) hoard. Auction Glendining (1975) 230 * **p 40**
937 1.19 g └ ASTON ROWANT (O) hoard. British Museum 1971-12-16-152
938 n.r. England? Vosper list (2004) * **Plate 48**
939 1.12 g ┌ Friesland. Auction Westerhof (1992) 370 * **Plate 48**
940 1.19 g │ SHOTTISHAM (Sf) EMC 1993.0146
941 0.70 g │ DOMBURG (Z) 138
942 1.07 g └ DOMBURG (Z) 137
943 1.02 g Unknown. Auction Coin Investment (1994) 188
944 0.86 g ASTON ROWANT (O) hoard. British Museum 1971-12-16-132
945 0.98 g ASTON ROWANT (O) hoard. British Museum 1971-12-16-124
946 1.1 g PAPWORTH (C) EMC 1999.0033
947 1.12 g England. In private collection
948 0.85 g Probably ASTON ROWANT (O) hoard. In private collection * **p 40**
949 n.r. ASTON ROWANT (O) hoard. Auction Glendining (1973) 329
950 n.r. England? Ex Lockett collection
951 0.95 g ┌ DOMBURG (Z) 231 = De Man (1895) I-9
952 1.09 g └ Unknown. In private collection * **Plate 48**

953 0.87 g ASTON ROWANT (O) hoard. British Museum 1971-12-16-166
954 0.79 g Unknown. Cabinet des médailles Brussels BBR 5
955 1.12 g ASTON ROWANT (O) hoard. British Museum 1971-12-16-148
956 0.48 g DOMBURG (Z) 248
957 0.82 g ┌ ASTON ROWANT (O) hoard. British Museum 1971-12-16-169
958 0.72 g └ ASTON ROWANT (O) hoard. List Spink (1983) 3898
959 0.98 g DOMBURG (Z) 236
960 1.10 g ASTON ROWANT (O) hoard. British Museum 1971-12-16-164
961 1.10 g ASTON ROWANT (O) hoard. British Museum 1971-12-16-147
962 0.60 g Friesland? Auction Westerhof (1992) 373

Sub-variety 4b

963 1.11 g BEUNINGEN (Gld) NUMIS 1053261
964 1.3 g ┌ Oxfordshire. EMC 2006.0069
965 1.12 g └ Lincolnshire. EMC 2006.0062
966 0.75 g Oxfordshire. EMC 2005.0093 * **Plate 48**
967 0.85 g HIPPOLYTUSHOEF (NH) NUMIS 1014500
968 0.99 g WEST WRATTING (C) EMC 2006.0014
969 1.02 g BUREN (Gld) EMC 1006282
970 n.r. Unknown. Holleman list 140-613 (2003)
971 n.r. England? Vosper list (2005)
972 n.r. NIJMEGEN (Gld) NUMIS 1054202
973 1.02 g DOMBURG (Z) 172
974 1.18 g ASTON ROWANT (O) hoard. British Museum 1971-12-16-111
975 0.77 g Unknown. SCBI-36 (Berlin) 5
976 0.68 g ┌ XANTEN (Germany) Zedelius (1980) 139 5
977 0.58 g └ DOMBURG (Z) 99
978 0.30 g ┌ DOMBURG (Z) 213
979 0.65 g └ NIJMEGEN (Gld) NUMIS 1020957 * **p 34**
980 n.r. ┌ South Lincolnshire p.s. The Searcher (Sept. 2001) 23
981 1.10 g └ BIRCHINGTON (K) T&S 165. 95% 'silver'
982 1.05 g South Lincolnshire p.s. EMC 2000.0508 * **p 40**
983 0.93 g ┌ DANKIRKE (Denmark) Bendixen (1981) 45
984 1.05 g └ BONN (Germany) Zedelius (1980)
985 0.86 g ISLE OF WIGHT (Ha) EMC 1993.0148
986 0.97 g ┌ England? British Museum 9
987 0.94 g └ NORTH ELMHAM (K) EMC 2001.0882
988 1.16 g ┌ ASTON ROWANT (O) hoard. T&S 167. 86% 'silver' * **Plate 48**
989 0.91 g └ ASTON ROWANT (O) hoard. British Museum 1971-12-16-130
990 0.91 g WIJNALDUM (Fr) NUMIS 90043
991 0.88 g WIJK-BIJ-DUURSTEDE (U) NUMIS 1033585 * **Plate 48**
992 1.21 g ┌ BAIS (France) hoard. Laufaurie (1969) 315
993 1.23 g └ ASTON ROWANT (O) hoard. British Museum 1971-12-16-103
994 0.93 g DOMBURG (Z) 219
995 0.90 g DOMBURG (Z) 100
996 0.42 g ┌ DOMBURG (Z) 97
997 0.47 g └ DOMBURG (Z) 98 = Van der Chijs V-36 = De Belfort 5794

998	1.09 g	Unknown. In private collection
999	0.90 g	Unknown. In private collection
1000	1.19 g	ASTON ROWANT (O) hoard. British Museum 1971-12-16-112
1001	1.24 g	⌜ ASTON ROWANT (O) hoard. British Museum 1971-12-16-101
1002	1.12 g	⌞ COLKIRK (Nf) EMC 1994.0132
1003	1.18 g	ASTON ROWANT (O) hoard. Auction Glendining (1988) 25c
1004	1.10 g	ASTON ROWANT (O) hoard. British Museum 1971-12-16-119
1005	0.88 g	DOMBURG (Z) 170
1006	1.07 g	⌜ ASTON ROWANT (O) hoard. British Museum 1971-12-16-120
1007	1.18 g	⌞ ASTON ROWANT (O) hoard. British Museum 1971-12-16-116
1008	0.94 g	ASTON ROWANT (O) hoard. British Museum 1971-12-16-127
1009	0.78 g	ASTON ROWANT (O) hoard. Auction Glendining (1988) 27a
1010	0.95 g	VECHTEN (U) NUMIS 1032067
1011	0.87 g	DOMBURG (Z) 218
1012	0.92 g	WIJNALDUM (Fr) NUMIS 1033928 * **p 40**
1013	n.r.	England? Vosper list 2004 * **Plate 48**
1014	1.22 g	ASTON ROWANT (O) hoard. Auction Glendining (1988) 28b
1015	n.r.	NASSAU/LAHN (Germany) communicated by J. Heinrichs
1016	1.04 g	ASTON ROWANT (O) hoard. British Museum 1971-12-16-122
1017	n.r.	ASTON ROWANT (O) hoard. Auction Sotheby (1985) 500
1018	n.r.	England? Ex Lockett collection
1019	1.11 g	ASTON ROWANT (O) hoard. British Museum 1971-12-16-91
1020	0.49 g	DOMBURG (Z) 226
1021	n.r.	South Lincolnshire p.s. DMM
1022	1.18 g	ASTON ROWANT (O) hoard. British Museum 1971-12-16-117
1023	0.98 g	ASTON ROWANT (O) hoard. Auction Glendining (1975) 232 = P. Finn (2001) 25
1024	n.r.	BERLIKUM (Fr) NUMIS 1052030
1025	n.r.	ASTON ROWANT (O) hoard. Auction Glendining (1975) 218 = Holleman 143-466 (2004)
1026	1.04 g	HAVERSHAM (Bk) EMC 2002.0226
1027	0.80 g	ASTON ROWANT (O) hoard. Auction Glendining (1988) 30a
1028	0.68 g	XANTEN (Germany) Zedelius (1980) 6
1029	0.94 g	BERLIKUM (Fr) NUMIS 1004604
1030	1.15 g	⌜ DOMBURG (Z) 93 = Van der Chijs V-44 = De Belfort 5860
1031	0.65 g	⌞ DOMBURG (Z) 94 = Dirks (1870) G-25
1032	1.00 g	DOMBURG (Z) 95
1033	0.76 g	DOMBURG (Z) 96
1034	1.10 g	BIDFORD-ON-AVON (Wa) DMM XXVIII
1035	1.01 g	ASTON ROWANT (O) hoard. Auction Glendining (1988) 24d
1036	n.r.	ASTON ROWANT (O) hoard. Auction Glendining (1975) 229
1037	0.97 g	ASTON ROWANT (O) hoard. British Museum 1971-12-16-125
1038	1.07 g	Friesland. In private collection
1039	n.r.	ASTON ROWANT (O) hoard. Auction Glendining (1975) 227
1040	1.21 g	⌜ DOMBURG (Z) 91
1041	1.10 g	⌞ DOMBURG (Z) 92 = Dirks (1870) G-34
1042	n.r.	ASTON ROWANT (O) hoard. Auction Sotheby (1986) 183

Sub-variety 4c

1043 0.53 g ┌ DOMBURG (Z) 187
1044 0.84 g │ ASTON ROWANT (O) hoard. British Museum 1971-12-16-133
1045 0.79 g │ ASTON ROWANT (O) hoard. Auction Glendining (1988) 26d
1046 0.89 g └ ASTON ROWANT (O) hoard. Auction Glendining (1988) 25b * **p 41**
1047 0.97 g ┌ ASTON ROWANT (O) hoard. Auction Glendining (1988) 29c
1048 n.r. │ Unknown. Auction Coin Investment (1992) 311
1049 n.r. │ Unknown. Auction Coin Investment (1994) 189
1050 0.89 g │ ASTON ROWANT (O) hoard. T&S 172. 90% 'silver' * **Plate 48**
1051 0.95 g └ ASTON ROWANT (O) hoard. T&S 173. 69% 'silver' * **Plate 48**
1052 n.r. ASTON ROWANT (O) hoard. Auction Glendining (1975) 221
1053 0.84 g ┌ ASTON ROWANT (O) hoard. British Museum 1971-12-16-134
1054 0.83 g │ ASTON ROWANT (O) hoard. British Museum 1971-12-16-135
1055 0.78 g │ England? P. Finn list 7-26 = list 13-51 * **Plate 48**
1056 0.64 g └ South Lincolnshire p.s. EMC 2000.0529 * **p 41**
1057 0.54 g DOMBURG (Z) 165
1058 0.84 g ASTON ROWANT (O) hoard. British Museum 1971-12-16-136
1059 0.81 g ┌ ASTON ROWANT (O) hoard. A. Glendining (1988) 25d = Auction Coin Investment (1992) 313
1060 0.6 g └ England? Vosper (June 2006)
1061 0.88 g ┌ THETFORD (Nf) T&S 175. 94% 'silver'
1062 1.01 g └ ASTON ROWANT (O) hoard. British Museum 1971-12-16-123
1063 0.41 g ┌ DOMBURG (Z) 164
1064 n.r. └ ASTON ROWANT (O) hoard. Auction Glendining (1975) 219
1065 0.88 g England? P. Finn list 17-64 (1999) * **Plate 48**
1066 0.53 g Netherlands? Geldmuseum 1974-440
1067 0.84 g ASTON ROWANT (O) hoard. T&S 174. 81% 'silver' * **Plate 48**
1068 0.82 g ASTON ROWANT (O) hoard. British Museum 1971-12-16-137
1069 0.62 g ASTON ROWANT (O) hoard. British Museum 1971-12-16-142
1070 0.79 g ASTON ROWANT (O) hoard. British Museum 1971-12-16-138

BMC Type 2c mules

1071 0.75 g BAWSEY (Nf) T&S 188. D 2c / E VICO mule

Series D Coins with a Geographical Provenance, not included in the Die-Corpus

Die-comparison was impossible because of poor quality of the coins or lacking illustration

BMC Type 8

1072 ADDINGTON (K) EMC 2001.1217
1073 ARUM (Fr) NUMIS 1003605
1074 ASTON ROWANT (O) hoard. Auction Glendining (1975) 236
1075 BIRCHINGTON (K) EMC 1992.7471
1076 COLCHESTER (Ess) EMC 1997.0019
1077-8 DOMBURG (Z) 291 and 292
1079 FLIXBOROUGH (L) EMC 2000.0236
1080 HOEK VAN HOLLAND (ZH) NUMIS 1015162
1081 KNARESBOROUGH (WRY) See EMC 2000.0505
1082-9 Lincolnshire (South, p.s.) DMM XI, XV, XVI, XVII, XCI, XCII, XCLII, CLII
1090-1 LONDON DMM XLVIII and XLIX
1092 NORTH FERRIBY (ERY) EMC 1997.8150; Pirie (1982)
1093 RECULVER (Isle of Thanet) DMM LIII = BNJ (1988) p 127
1094 REMMERDEN Gld) single find. NUMIS 1024344
1095 ROCHESTER (Hrt) DMM
1096 THE RODINGS (Ess) DMM
1097 TILBURY (Ess) T&S p 194
1098 UPTON SNODSBURY (Wo) DMM
1099 WESTON-ON-TRENT (Db) EMC 1996.0060
1100 WHITBY (NRY) DMM
1101 WICKFORD (Ess) EMC 2004.0077
1102 WOODNESBOROUGH (K) CR (1999) 60

BMC Type 2c

1103 BARDNEY PARISH (L) EMC 2000.0218
1104-6 BARHAM (Sf) DMM XXXVIII, XXXIX, XL
1107 BAWSEY (Nf) EMC 1994.0131
1108 BEEGDEN (L) NUMIS 1004320
1109-10 BIDFORD-ON-AVON (Wa) EMC 1995.0301 and DMM XXXIII
1111 BIRCHINGTON (K) T&S 182 * **p 13**
1112 BRANDON (Sf) DMM
1113 CAISTOR-BY-NORWICH (Nf) DMM
1114-7 CAMBRIDGE (C) BAR 1984 (2x) and EMC 1977.0010 and 2006.0253
1118 CHARLTON MARSHALL (Do) EMC 2001.0816
1119 CHILHAM (K) EMC 2001.0949
1120 COLSTERWORTH (L) EMC 2001.1259
1121 DE HOUW (Gr) NUMIS 1015507

1122-3 DE MEERN (U) two single finds in private possession
1124 DE PANNE (Belgium) Loffens (1960) 10-12
1125-81 DOMBURG (Z) 87, 88, 97, 107, 112, 139, 144, 147, 157, 158, 161, 173-176, 178-185, 188-197, 201, 202, 205, 206, 212, 214, 233, 239, 249, 251, 260, 263, 264, 266-277
1182 DOMMELEN (NB) NUMIS 1008721
1183-6 DONGJUM (Fr) NUMIS 1051953, 1008812, 1008814 and 1008860
1187 DRIFFIELD (ERY) EMC 2004.0057
1188 DRONRIJP (Fr) NUMIS 90051
1189 EENRUM (Fr) NUMIS 1010336
1190 EMPE (Gld) NUMIS 1011572
1191 EZINGE (Gr) NUMIS 1011861
1192-4 FLIXBOROUGH (L) EMC 2000.0235, 2000.0248, and 2000.0229
1195 FRECKENHAM (Sf) EMC 2004.0012
1196-204 Friesland. 9 single detector finds
1205 't GOY (U) NUMIS 1012777
1206 GREAT WALSINGHAM (Nf) EMC 1994.0149
1207 HANBY (L) DMM
1208 HEBRON (Isreal) Communicated in 1994 to Dr. P. Ilisch
1209 HEEREWAARDEN (Gld) NUMIS 1014133
1210 HEESWIJK-DINTHER (Gld) NUMIS 1014169
1211-2 HOEK-VAN-HOLLAND NUMIS 1015160 and 101564
1213 HOUTEN (U) NUMIS 1015308
1214 IPSWICH (Sf) DMM
1215 KEMPSTON (Bd) BAR (1984)
1216 KINGSTON (Bd) BAR (1984)
1217 KINGSTON DOWN (K) EMC 1960.0006
1218 LAMBETH (Sr) EMC 1994.0137
1219-20 Lincolnshire (South, p.s.) EMC 1990.0307 and 2000.0347
1221 LINTON (C) EMC 1999.0025
1222-3 LITTLEPORT (C) EMC 2006.0254 and 2006.0255
1224 MAASTRICHT (L) NUMIS 1018601
1225 MAIDSTONE (K) EMC 2004.0062
1226 MAINZ (Germany) Stoess (1994) 6
1227 MENALDUM (Fr) NUMIS 1042370
1228 MIDLUM (Fr) NUMIS 1020534, 1020538 and 1020558
1229 MILDENHALL (Sf) EMC 1992.0219
1230 NARBOROUGH (Nf) EMC 1993.0151
1231 NEWBURY (Brk) DMM
1232 NIJNSEL (NB) NUMIS 1021084
1233 NORTH FERRIBY (ERY) EMC 1997.8148
1234-5 OOSTERBIERUM NUMIS 1022067 and 1035557
1236 ORSETT (Ess) DMM
1237 RAMSHOLT (Sf) DMM
1238 RECULVER (Isle of Thanet) EMC 1960.0007
1239-42 RIBE (Denmark) 4 specimens Feveile (in press)
1243 RIED (Fr) NUMIS 1024683
1244-5 ROYSTON (He) (productive site) EMC 1990.0307, 1994.5114 and 1994.5115

1246 SCHOUWEN (Z) Op den Velde & Klaassen (2004) 940
1247 SLAPPETERP NUMIS 1059594
1248 SOMERSET (So) EMC 2003.0107
1249 STURTON-BY-STOW (L) EMC 2000.0329
1250 SUAWOUDE (Fr) NUMIS 1028988
1251-3 THE RODINGS (Ess) DMM (3 specimens)
1254 TUTBURY (St) EMC 1997.0053
1255-6 ULCEBY (L) EMC 1997.0090 and 2000.0341
1257 URCHFONT (W) DMM
1258 WAAXENS (Fr) NUMIS 1032586
1259 WATTON (Nf) DMM
1260-2 WHITBY ABBEY (NRY) EMC 1997.0089 and 1997.0090
1262-3 WIJK-BIJ-DUURSTEDE (U) NUMIS 1033428 and 1033654
1264-7 WIJNALDUM (Fr) NUMIS 1034031, 1033931, 1034032, and 1051732
1268 WINGHAM (K) EMC 2006.0158
1269 WINTERBORNE MONKTON (Do) EMC 1988.0110
1270 WYE (K) EMC 2001.1117
1271 YAVERLAND (Isle of Wight) DMM
1272 YORK DMM XXIII

Appendix II.
Alphabetical list of provenances of Series D sceattas

Acknowledgements

Of the colleagues and friends who have helped us by their interest and with their generous practical support, our thanks go first to Arent Pol. He has himself made signal and forward-looking contributions to the monetary history of the early medieval Netherlands, through all his work in the Royal Coin Cabinet (now *Geldmuseum*), and not least by registering stray finds. We are especially grateful that he has allowed us to include the Series D coins of the Remmerden hoard in our die-corpus, and also to illustrate them with enlarged photographs. They give an excellent impression of the wide range of style found in Type 2c.
All the staff-members of the *Geldmuseum* and the former *Koninklijk Penningkabinet* gave very much appreciated assistance, notwithstanding their great burden caused by the moving of their offices. We have to mention in particular Jan Pelsdonk and Bouke Jan van der Veen, for their efforts to complete our Corpus of Series D sceattas. The NUMIS and EARLY MEDIEVAL COINS databases, and their easy access by internet have greatly facilitated our study. We sincerely admire all professionals who have worked so hard to create and update these indispensable files.
Klaas Faber has been generous in his help, drawing our attention to many new finds, and rescuing their provenances from oblivion. We remember with gratitude our late colleague Cees Klaassen, who worked so hard to secure the publicity of the Domburg finds.
Gareth Williams and Anna Gannon generously allowed us to study the many Series D coins from the Aston Rowant hoard, kept in the British Museum, and provided photographs of them with a detailed description. Johannes Heinrichs offered indispensable aid by providing access to the results of his current research on sceatta finds in Germany, and some spontaneous recent additions.
Several collectors have been so kind to give us access to their collection, with a wealth of new material and information. We are grateful to all those collectors who, for understandable reasons, want to stay anonymous. In particular detailed information and excellent illustrations of coins in their possession were provided by Prof. Wim de Wit, Tony Abramson and Dick Purmer. We also have to mention the kind cooperation of many reliable coin dealers. Furthermore, we very much appreciate the efforts of the serious metal detectorists who have recovered so many sceattas and reported them for registration.
Finally, we want to thank in advance all those who will give their reactions and comments on this study.

The authors

Professor D.M. METCALF, D.Phil, D.Litt, FSA, has been deeply interested in sceattas for more than forty years. His active interest began in 1965, when he published a critique of the late Stuart Rigold's epoch-making study, 'The two primary series of sceattas'. A still classic study is 'A stylistic analysis of the "porcupine" sceattas' from 1966. In 1984 he organized, with Dr. David Hill, an international symposium at Oxford, 'Sceatttas in England and on the Continent'. In 1992 he was elected an honorary member of the *Koninklijk Nederlands Genootschap voor Munt- en Penningkunde* for his work on screattas. His three-volume survey of the sceattas series was published by the Royal Numismatic Society in 1993-4. He is currently publishing a series of articles, in the *British Numismatic Journal* from 2000 onwards, and elsewhere, on the regional circulation patterns of sceattas.
Professor Metcalf was Keeper of the Heberden Coin Room and Professor of Numismatics, Oxford University, and is an Emeritus Fellow of Wolfson College, Oxford. He served as editor of the Numismatic Chronicle (1974-1984) and President of the Royal Numismatic Society (1994-1999). He has received the Medal of that society, the Huntingdon Medal of the American Numismatic Society, the Sanford Saltus gold medal of the British Numismatic Society, the *jeton de vermeil* of the French Numismatic Society, and other awards.

Dr. W. OP DEN VELDE MD DSc studied medicine at Leiden University and graduated in 1968. During his study he published his MD thesis on schizophrenia. He specialized in psychiatry from 1970-1974. He was head of the department of Psychiatry and trainer in psychiatry at St. Lucas Andreas Hospital in Amsterdam until 2001. He published around 60 articles on the psychological consequences of exposure to war stress, and in 1993 he received the R*amaer* gold medal of the *Nederlandse Vereniging voor Psychiatrie*. In 2001 he was appointed as *Officier in de Orde van Oranje Nassau*. His interest in sceattas dates from 1980, when he examined a find of sceattas at Maurik and Rijswijk, published in the *Jaarboek voor Munt- en Penningkunde* in 1982. His contacts with Prof. Metcalf started in 1980. Since then he has written several articles on early medieval European and also on Chinese coinage. Together with the late Cees Klaassen he has published a catalogue of the sceattas found at Domburg. He served from 1985 onwards as member of the editorial board of the *Jaarboek voor Munt- en Penningkunde*.

Summary

It has long been supposed that the plentiful sceattas of *BMC* Type 2c, the so-called 'Continental runics', were minted in the Netherlands. This study presents a detailed examination of the sceattas belonging to Series D, of which Type 2c makes up 85 percent, Type 8 14 percent, and Type 10 one percent. Because there are hardly any contemporary written sources on these coins they were treated as purely archaeological objects. It can be stated, however, that they fall within the reign of the Frisian King Radbod.

As a first step a Corpus of all sceattas of Series D, known to the authors in 2006, was compiled. Of these 1272 coins the provenances and the weights were recorded, and they were carefully checked for die-duplication. Photographs of the great majority of these specimens have been published, either here or already elsewhere. On the basis of an analysis of hoards Type 2c was divided into four chronological varieties. These varieties were further divided into 19 sub-varieties, guided by stylistic criteria. This data-base was used for metrological and distributional analyses.

Until late in the period of issue the coins of Series D are made of good-quality silver (c. 90 percent or better). They are all of one denomination, with an average weight of around 1.2 grammes. The last issues of Type 2c show a reduction in the weight standard. The period of issue and circulation of Series D falls within a relatively short period. The production started in c. 690-695, and ended sharply in c. 710. The scarcer Type 8 seems to fall early in this period. Large numbers of single finds have come to light in the Netherlands and in England, but they also circulated in the Merovingian realm, the Rhinelands and in Denmark. In England they make up roughly 23 percent of the currency in the period c. 695-710, against more than 90 percent in the Netherlands. This is a strong indication for production somewhere in the Low Countries. The presence of all the sub-varieties, and the recurrence of die-linked specimens in both countries implies a unified circulation.

The number of reverse dies used to strike the coins of Series D was estimated from the number of die-links to be around 2900. Given that reverse dies were technically capable of producing on average well over 10,000 coins, the total volume of Series D could have been well over 20 million specimens, an astounding quantity.

The location of the mint-place or places proved to be far from easy and remains uncertain as regards Type 2c. The proportion of the individual sub-varieties, as between Friesland and the Big rivers region, hint that Type 2c may have been

minted in both those regions. Distributional evidence indicates tentatively that much of Type 2c was produced in Friesland. But there is also evidence of large-scale imitation, and production in various places. Type 10 together with a die-linked sub-variety of Type 2c was most likely produced in the Big rivers area. Two or three sub-varieties of Type 2c are almost certainly English imitations, which together comprise circa 10 percent of the total output. The dispersion of the finds of Type 8 is quite different from that of Type 2c, Type 8 being relatively much more plentiful among the English stray finds. Although this at first sight points towards production in England, a further detailed regional analysis of its appearance in eleven English regions made this unlikely, and led to the hypothesis that Type 8 was produced in Friesland, mainly as an export coinage for the trade with England. Just as with Type 2c, also for Type 8 there are indications for small scale imitation in England. The distinctive variety Type 8Z is almost certainly English.

The stray finds of Series D sceattas are by no means restricted to large commercial centres and *wics*, and this, together with the estimated volume of Series D, is proof of an already thoroughly monetized and well-developed economy in the eighth century in the Netherlands. Sceattas appear to have been widely employed in daily local exchanges, as well as in international trade. The same is true for England.

Samenvatting

Reeds lang wordt verondersteld dat de vele sceattas van *BMC* Type 2c, het continentale runen type, in Nederland zijn aangemunt. Deze studie beschrijft een gedetailleerd onderzoek van de sceattas behorend tot Serie D, die voor 85 procent uit Type 2c bestaat, voor 14 procent uit Type 8, en Type 10 één procent. Omdat er nauwelijks geschreven bronnen over deze muntjes bestaan, zijn zij in deze studie als archeologische voorwerpen behandeld. Het is echter duidelijk dat zij in de regeringsperiode van de Friese Koning Radbod vallen.
Begonnen werd met het samenstellen van een Corpus van alle aan de auteurs in 2006 bekende exemplaren van sceattas van Serie D. Afbeeldingen van de meeste van deze munten zijn elders of in dit artikel gepubliceerd. Van deze 1272 munten werden de vindplaats en het gewicht geregistreerd, en zij werden zorgvuldig onderzocht op stempelkoppelingen. Op grond van de analyse van de samenstelling van muntvondsten werden deze sceattas in vier chronologische variëteiten ingedeeld. Aan de hand van stijlkenmerken werden de vier variëteiten in 19 sub-variëteiten onderverdeeld. Dit Corpus werd gebruikt voor nader metrologisch en distributioneel onderzoek.
Tot laat in de periode van vervaardiging zijn de sceattas van Serie D van hoogwaardig zilver (90 procent of hoger). Zij zijn alle van één denominatie, met een gemiddelde massa van circa 1,2 gram. De laatste emissies tonen een daling van het gewicht. De periode van aanmaak en circulatie van Serie D is relatief kort. De productie begon in ongeveer 690-695 en eindigde vrij plotseling omstreeks 710. Het schaarsere Type 8 werd in het begin van deze tijdspanne geslagen.
Zowel in Engeland als Nederland zijn relatief grote aantallen losse vondsten gedaan, maar deze sceattas circuleerden ook in het Merovingische rijk, het Rijnland en in Denemarken. In Engeland vormden zij bij benadering 23 procent van de munten die in de periode 695 – 710 in circulatie waren, in Nederland was dat meer dan 90 procent. Dit is een duidelijke aanwijzing voor productie ergens in de Lage Landen. De verhoudingen van de stempelidentieke exemplaren en de sub-variëteiten tonen aan dat zij in het gebruik intensief werden gemengd.
Het aantal keerzijdestempels dat gebruikt werd om deze muntjes te slaan werd berekend op ongeveer 2900. Uitgaande van het gegeven dat met één keerzijdestempel meer dan 10.000 munten konden worden geslagen, kon de totale productie meer dan 20 miljoen exemplaren hebben bedragen, een verbazingwekkend hoog aantal.

Het bepalen van de muntplaats of plaatsen bleek verre van eenvoudig te zijn. Het relatieve aandeel van de sub-variëteiten van Type 2c in Friesland en het gebied van de Grote Rivieren wijst op aanmaak in beide regio's. De verspreiding van de losse vondsten is het beste te verklaren door aan te nemen dat het grootste gedeelte in de huidige provincie Friesland werd aangemunt. Maar er zijn ook duidelijke aanwijzingen dat zij op grote schaal werden geïmiteerd. Type 10 samen met de stempelgekoppelde subvariëteit van Type 2c werd waarschijnlijk in een kleinere munt in het gebied van de Grote Rivieren vervaardigd. Twee of mogelijk drie sub-variëteiten van Type 2c zijn Engelse navolgingen. Zij maken ongeveer 10 procent van de totale aanmaak uit. De verspreiding van de vondsten van Type 8 verschilt sterk van die van Type 2c. Type 8 is sterk oververtegenwoordigd in Engeland. Hoewel dat op het eerste gezicht wijst op vervaardiging in Engeland, is dat op grond van een gedetailleerde regionale analyse van de Engelse vondsten onwaarschijnlijk. Dit leidt tot de veronderstelling dat Type 8 in Friesland werd geslagen, en vooral voor de betaling van importen uit Engeland werd gebezigd. Net als bij Type 2c zijn er aanwijzingen gevonden dat Type 8 op bescheiden schaal in Engeland werd geïmiteerd. De variëteit 8Z is vrijwel zeker Engels.

De losse vondsten van Serie D sceattas zijn niet beperkt tot de grote handelscentra uit de vroege middeleeuwen, en in combinatie met het berekende totale aantal dat is aangemunt wijst dit op een reeds in het begin van de 8e eeuw bestaande hoog ontwikkelde geldeconomie in Nederland. Sceattas werden gebruikt voor de dagelijkse aankopen, maar ook voor internationale handelstransacties. Hetzelfde geldt voor Engeland.

Plate 1. Die-linked coins of Series D, Type 8.

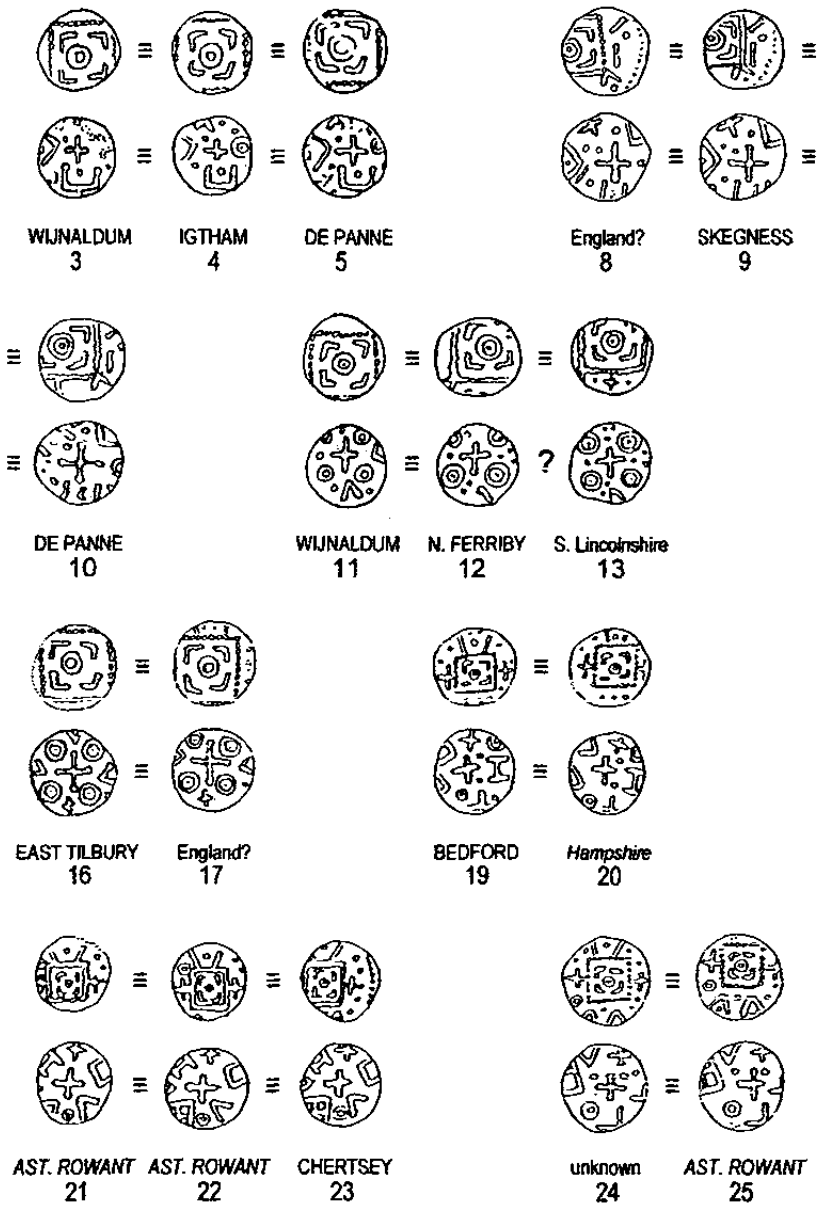
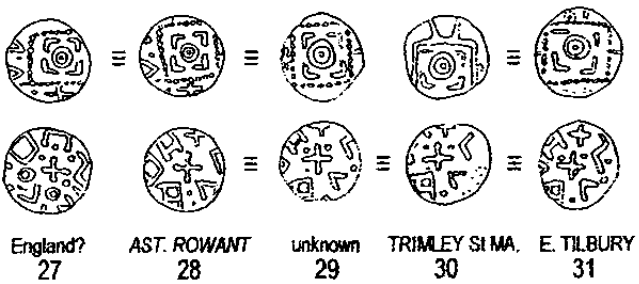
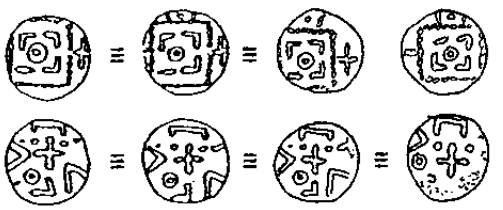


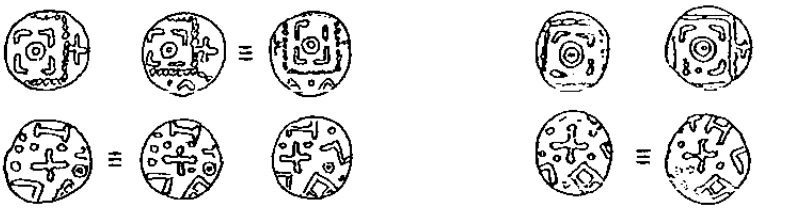
Plate 2. Die-linked coins of Series D, Type 8.



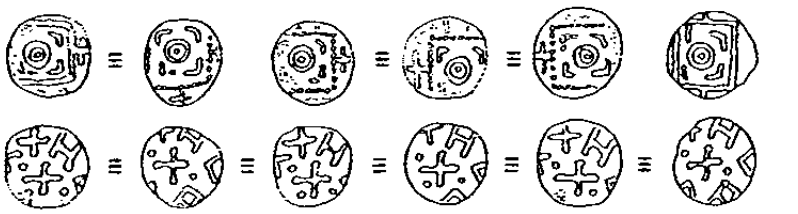
England? 27 | *AST. ROWANT* 28 | unknown 29 | TRIMLEY St MA. 30 | E. TILBURY 31



CAMPSEY ASH 34 | N. FERRIBY 35 | England? 36 | *St. PIERRE* 37



BIELBY 38 | S. Lincolnshire 39 | Oxfordshire 40 | *AST. ROWANT* 41 | KETTLESTONE 42



GIPPING VALLEY 43 | unknown 44 | unknown 45 | unknown 46 | CODDENHAM 47 | POCKLINGTON 48

Plate 3. Die-linked coins of Series D, Type 8.

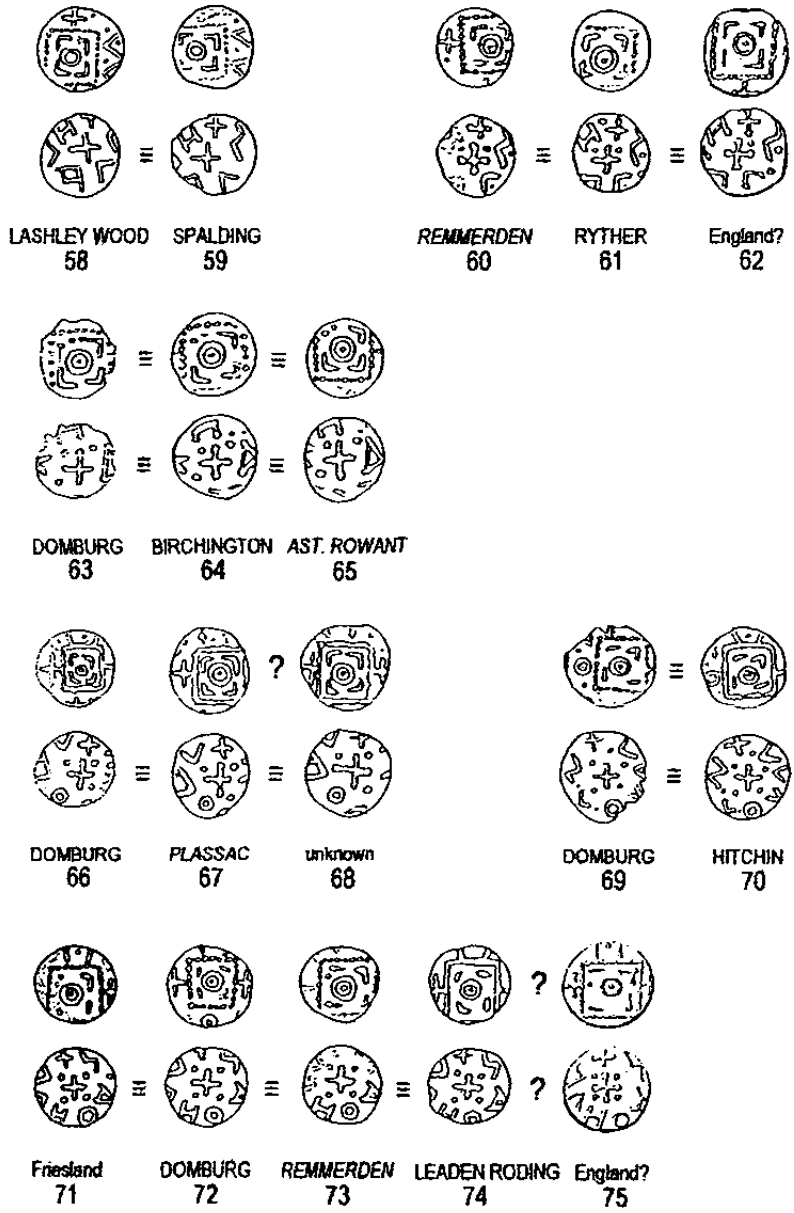


Plate 4. Die-linked coins of Series D, Type 8.

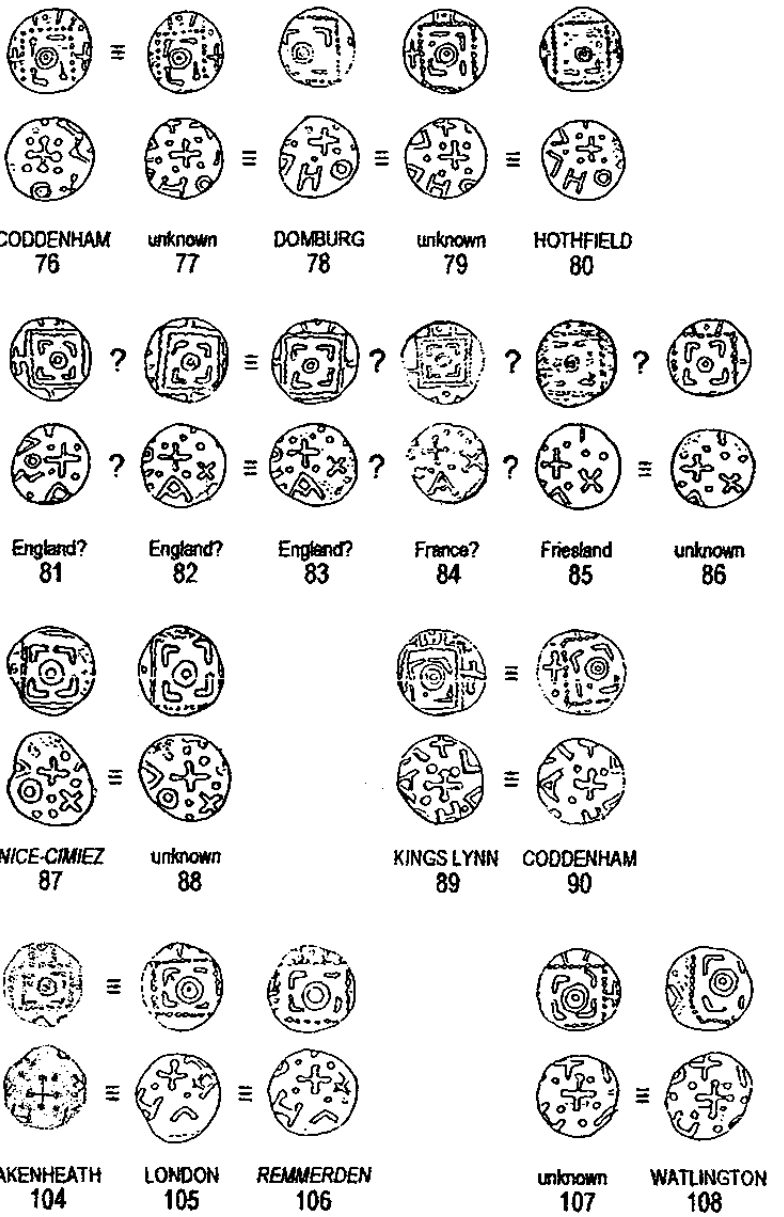


Plate 5. Die-linked coins of Series D, Type 8.

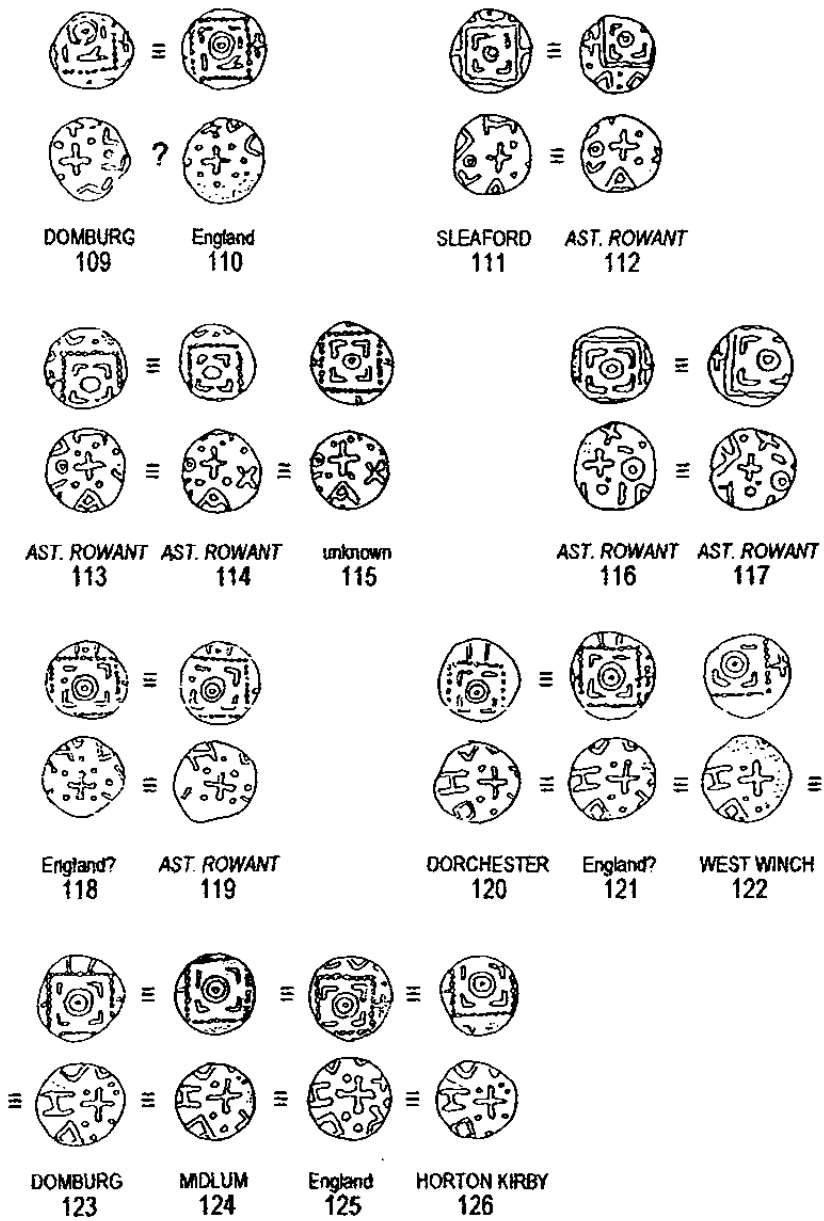
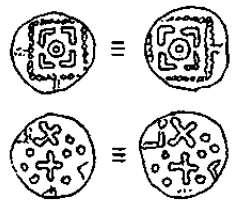
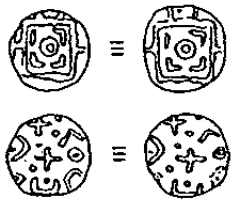


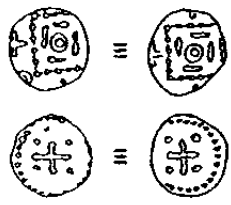
Plate 6. Die-linked coins of Series D, Type 8.



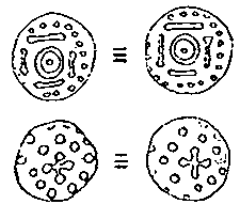
THWING 129 unknown 130



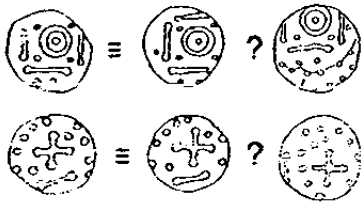
DOMBURG 131 M. IN THANET 132



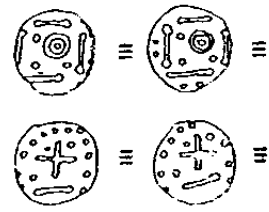
AST. ROWANT 139 COBHAM PARK 140



L. ABINGTON 142 WOODNESB. 143

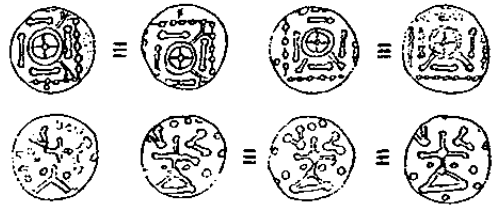


EAST KNOYLE 145 DOMBURG 146 unknown 147



EASTRY 148 BURGH CASTLE 149

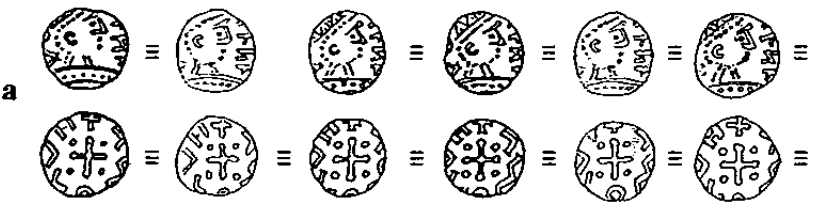
ROYSTON 150



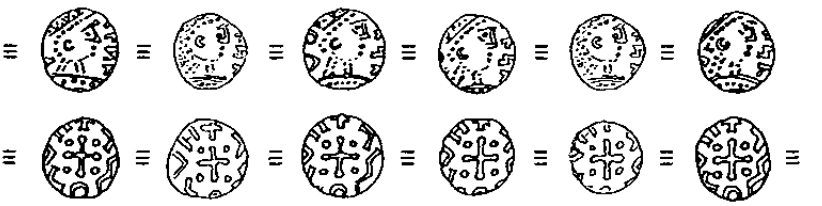
NICE-CIMIEZ 152 England 153 S. Lincolnshire 154 Essex 155

Plate 7. Die-linked coins of Series D, Type 2c

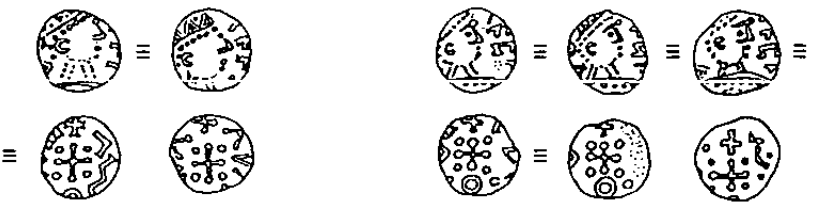
1a



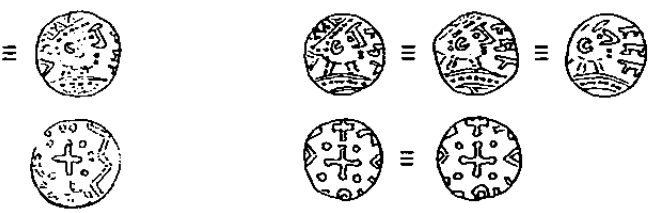
HORNCASTLE 158 | England? 159 | *AST. ROWANT* 160 | *REMMERDEN* 161 | DONGJUM 162 | MIDLUM 163



REMMERDEN 164 | Friesland 165 | *REMMERDEN* 166 | *REMMERDEN* 167 | England? 168 | *REMMERDEN* 169



REMMERDEN 170 | ELST 171 | DOMBURG 172 | MAURIK 173 | England? 174



DOMBURG 175 | England? 176 | WIJNALDUM 177 | PEINS 178

Plate 8. Die-linked coins of Series D, Type 2c

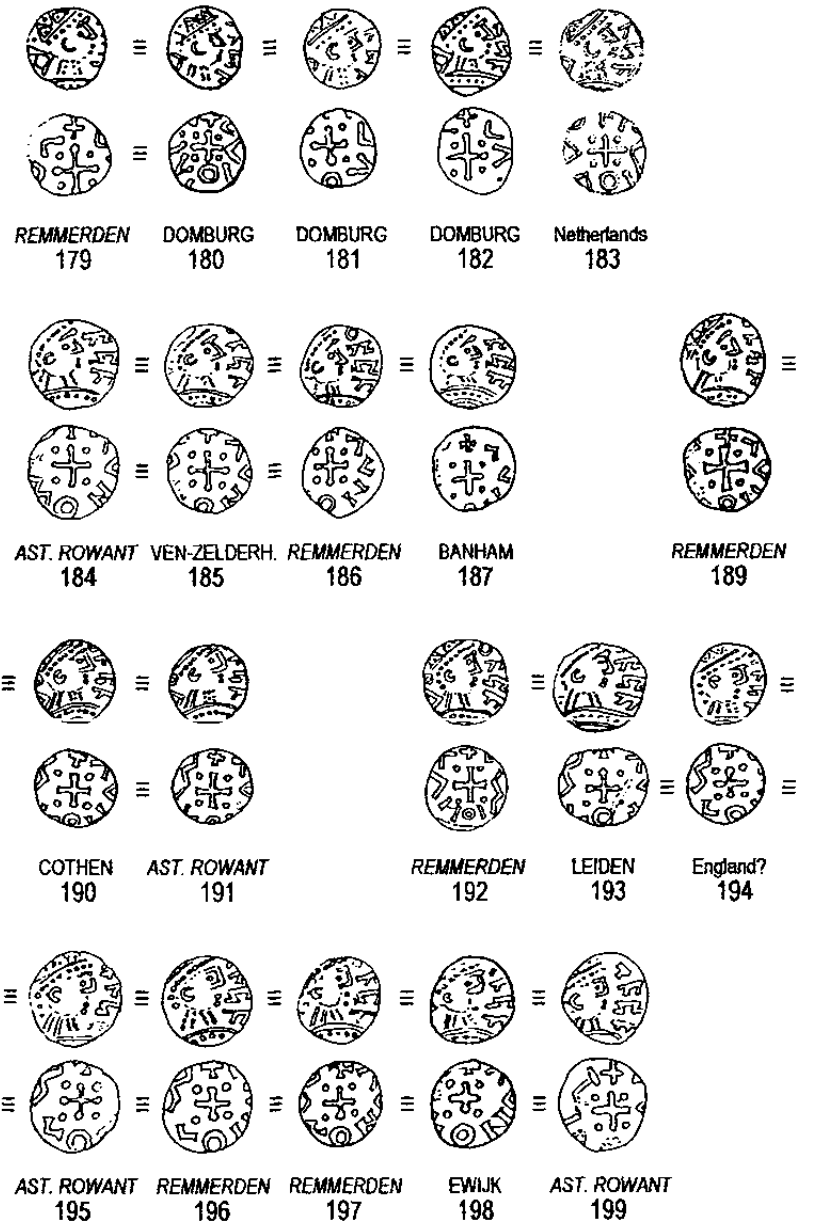
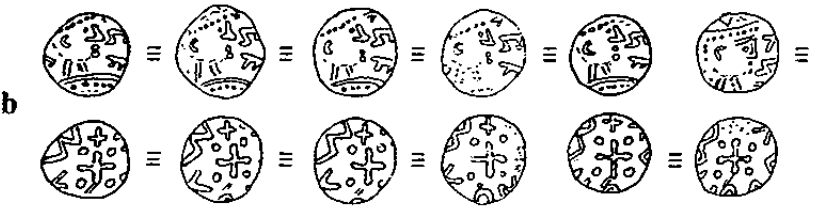


Plate 9. Die-linked coins of Series D, Type 2c

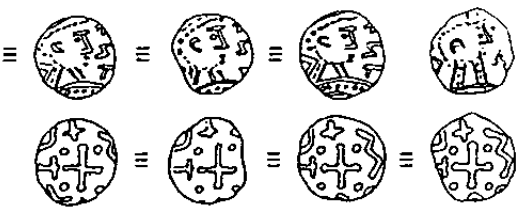
1b



HOUTEN 200 — *BAIS* 201 — *BAIS* 202 — CODDENHAM 203 — *REMMERDEN* 204 — KATWIJK 205

DOMBURG 206 — DOMBURG 207 — *REMMERDEN* 208 — WIJK-BIJ-DUU. 209 — *BAIS* 210 — *REMMERDEN* 211

Friesland 212 — *REMMERDEN* 213 — WIJNALDUM 214 — *REMMERDEN* 215 — *REMMERDEN* 216



REMMERDEN 217 — DOMBURG 218 — *REMMERDEN* 219 — England? 220

Plate 10. Die-linked coins of Series D, Type 2c

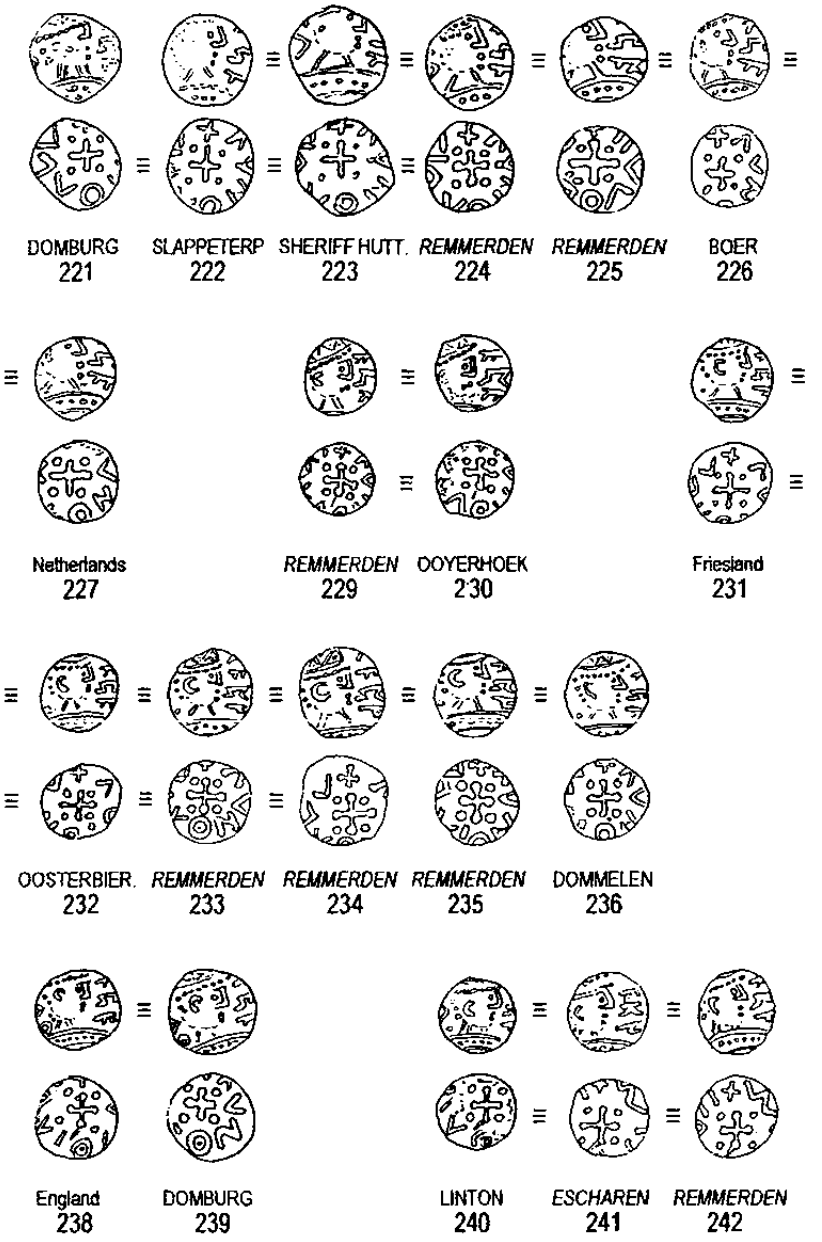


Plate 11. Die-linked coins of Series D, Type 2c

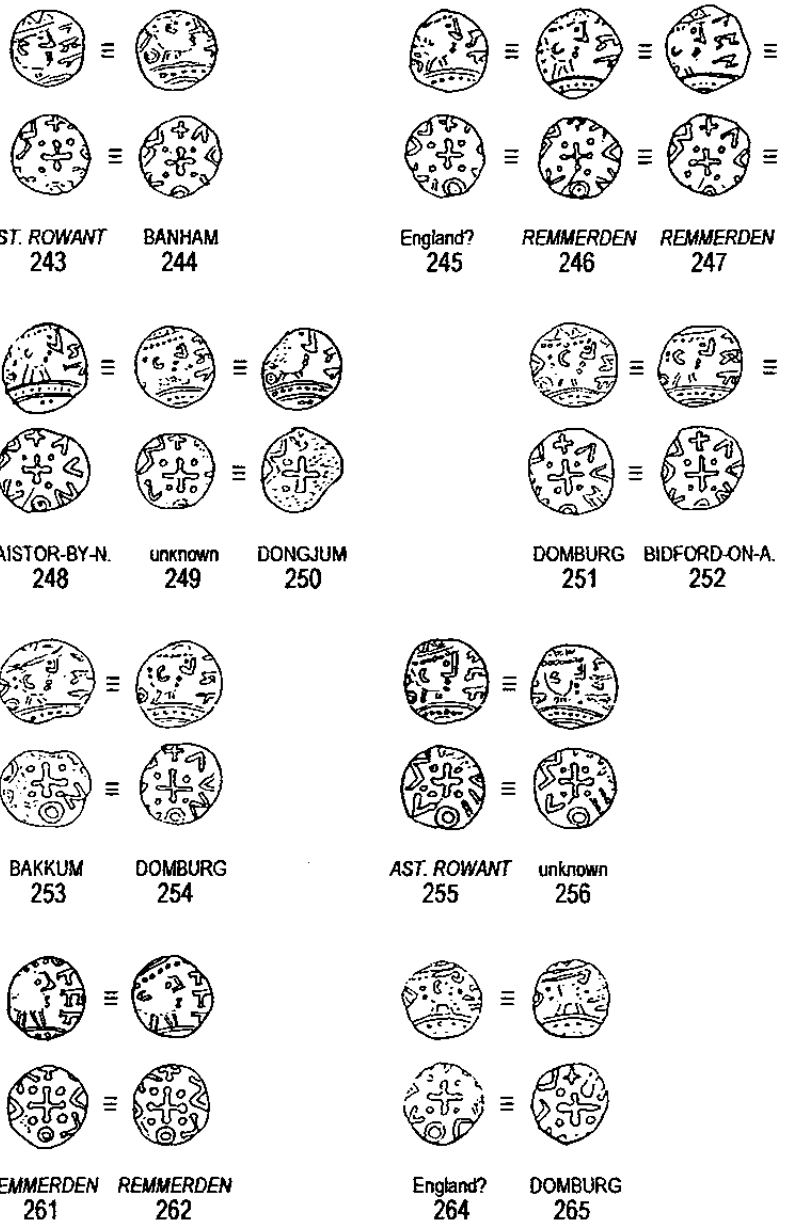
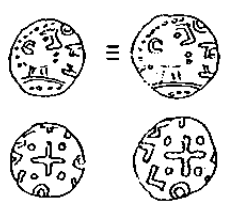
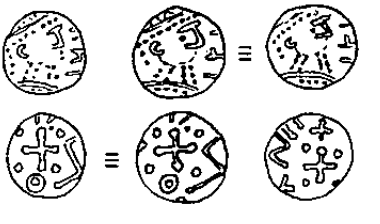


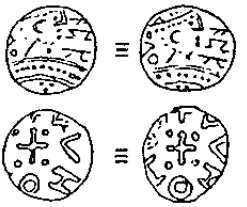
Plate 12. Die-linked coins of Series D, Type 2c



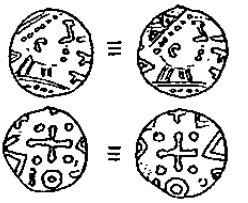
REMMERDEN 267 — England? 268



St. PIERRE 270 — DOMBURG 271 — BAWSEY 272

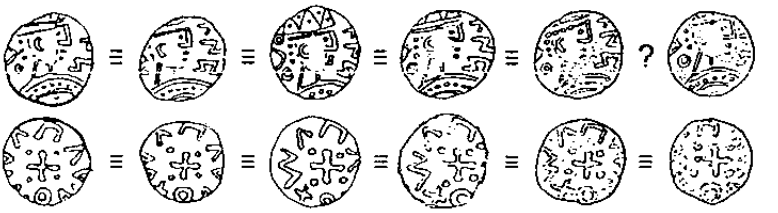


DOMBURG 273 — KATWIJK 274



DOMBURG 276 — *REMMERDEN* 277

2b



IJENDEN 278 — DOMBURG 279 — England? 280 — WIJK-BIJ-DUU. 281 — DOMBURG 282 — DOMBURG 283

AKENHAM 284 — BOER 285 — *NOHANENT* 286 — unknown 287

Plate 13. Die-linked coins of Series D, Type 2c

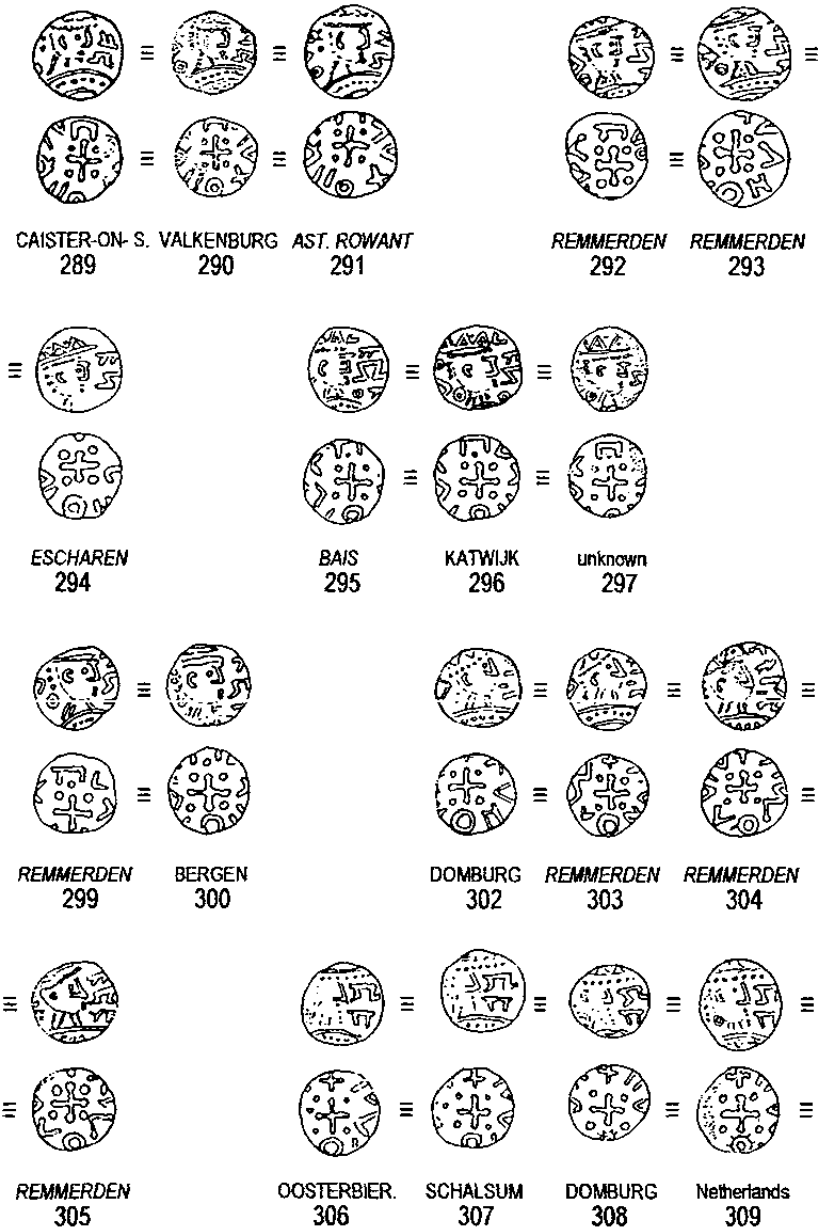
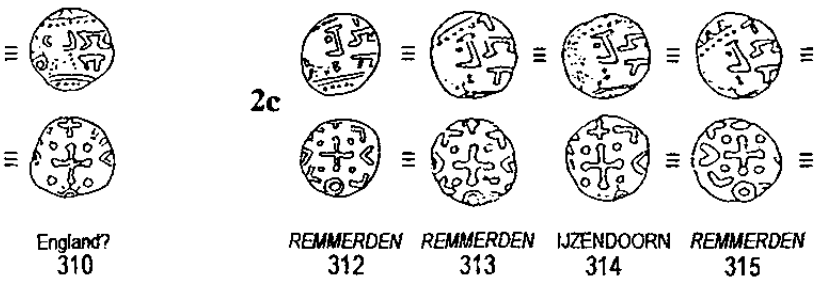
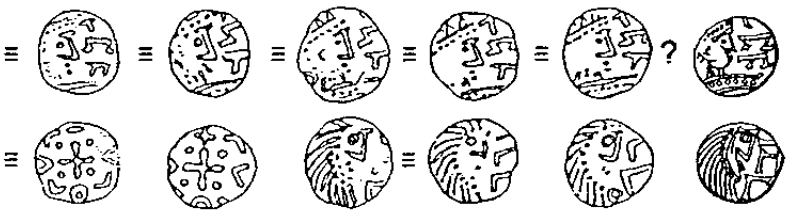


Plate 14. Die-linked coins of Series D, Type 2c and Type 10

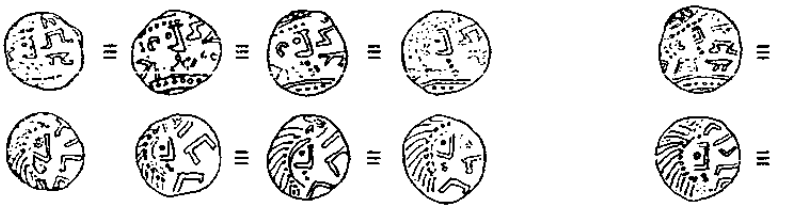


2c

England? 310 | *REMMERDEN* 312 | *REMMERDEN* 313 | IJZENDOORN 314 | *REMMERDEN* 315



BEDFORD 316 | BAWSEY 317 | KERK-AVEZA. 318 | *ESCHAREN* 319 | *ESCHAREN* 320 | Friesland 321



unknown 322 | VALKENBURG 323 | VEN-ZELDERH. 324 | *ESCHAREN* 325 | MORLEY PAR. 326

ESCHAREN 327 | WIJNALDUM 328 | LONG WITTEN. 329 | Essex 330 | VEN-ZELDERH. 331

Plate 15. Die-linked coins of Series D, Type 2c and Type 10

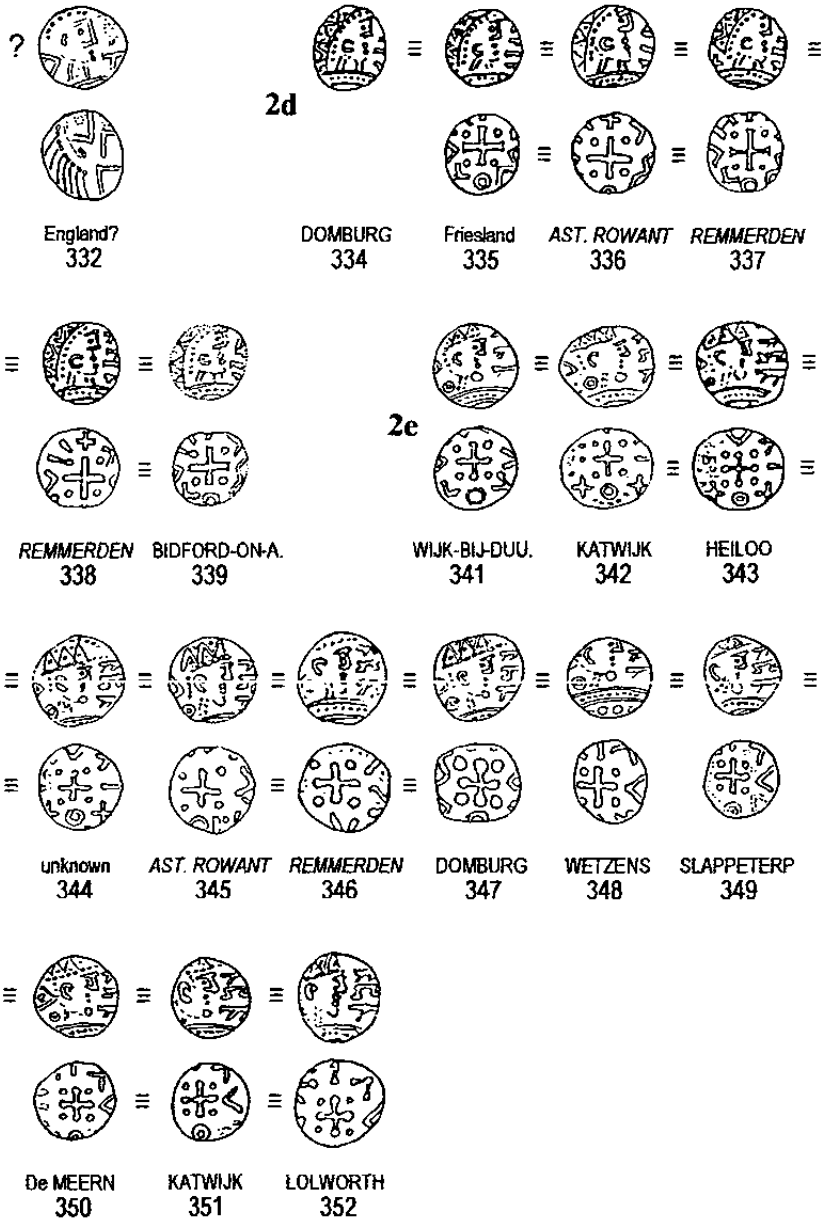
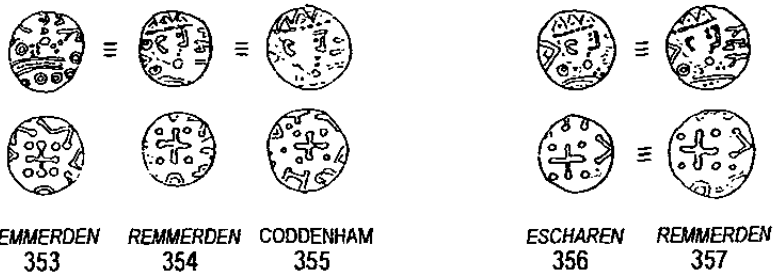
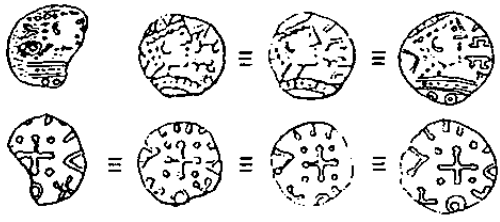


Plate 16. Die-linked coins of Series D, Type 2c

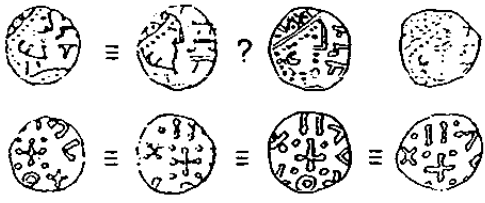


REMMERDEN 353 — *REMMERDEN* 354 — CODDENHAM 355

ESCHAREN 356 — *REMMERDEN* 357



VECHTEN 359 — Friesland 360 — DOMBURG 361 — unknown 362



DOMBURG 363 — DOMBURG 364 — Friesland 365 — unknown 366

2f

BRIGHTON 368 — *AST. ROWANT* 369 — ABBEWIER 370

unknown 372 — DOMBURG 373

Plate 17. Die-linked coins of Series D, Type 2c

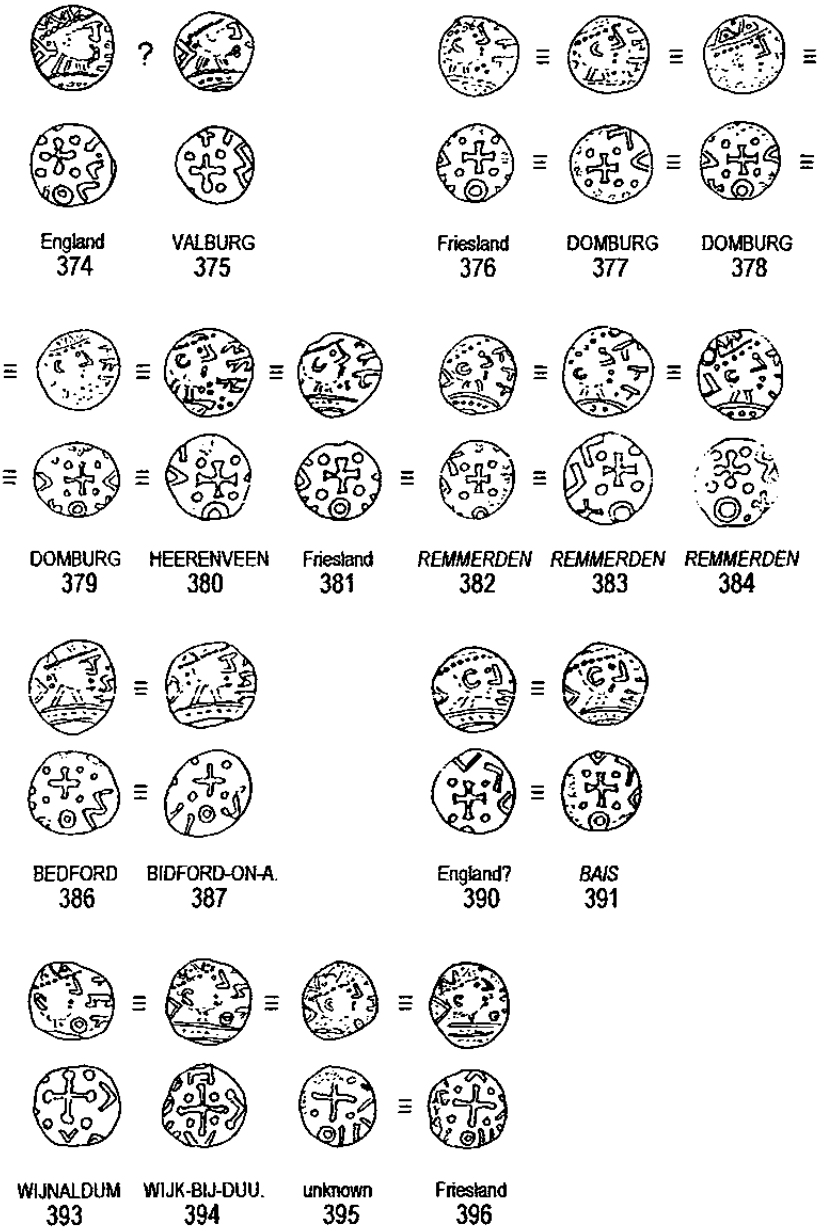
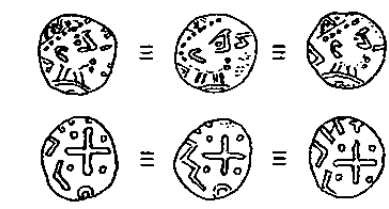
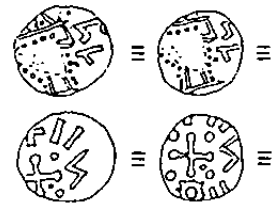


Plate 18. Die-linked coins of Series D, Type 2c

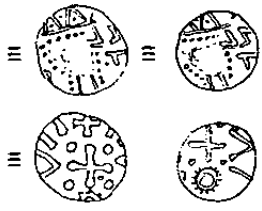


REMMERDEN 398 DOMBURG 399 RIED 400

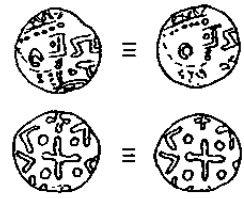
3a



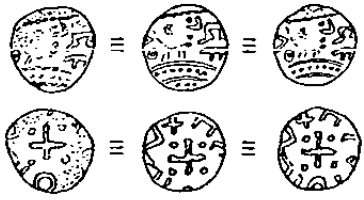
REMMERDEN 408 REMMERDEN 409



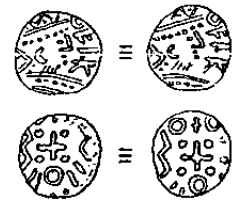
REMMERDEN 410 KATWIJK 411



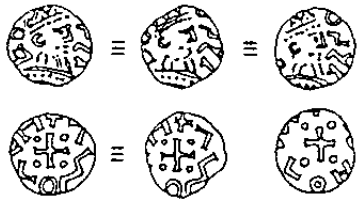
AST. ROWANT 412 England? 413



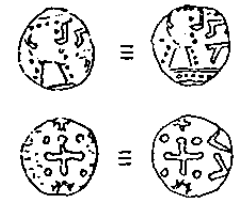
DOMBURG 419 VALKENBURG 420 HOUTEN 421



BEDFORD 425 Oxfordshire 426



REMMERDEN 427 REMMERDEN 428 REMMERDEN 429



REMMERDEN 431 SLAPPETERP 432

Plate 19. Die-linked coins of Series D, Type 2c

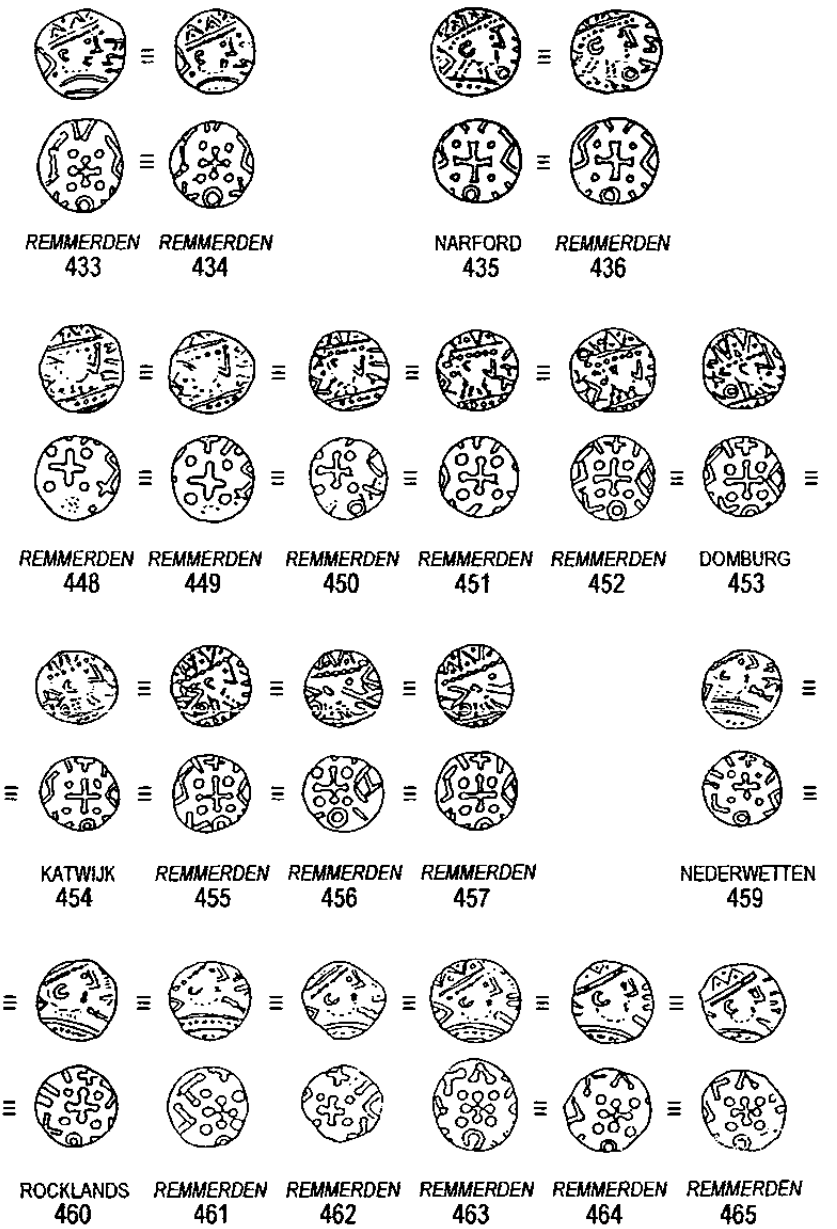
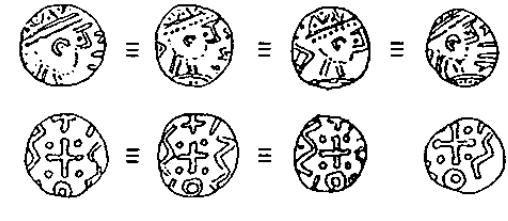
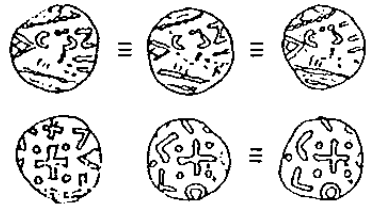


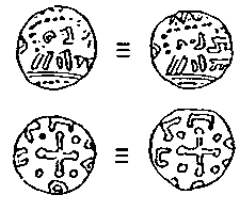
Plate 20. Die-linked coins of Series D, Type 2c



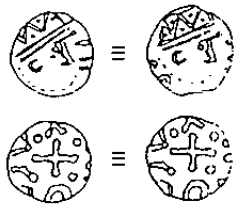
AST. ROWANT 466 — *BAIS* 467 — *REMMERDEN* 468 — *REMMERDEN* 469



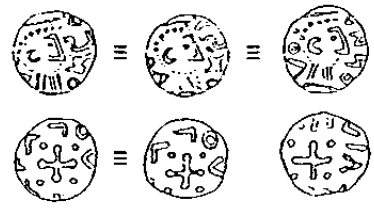
DOMBURG 474 — DOMBURG 475 — *AST. ROWANT* 476



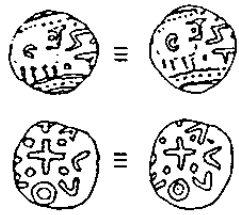
BAIS 477 — SCHALSUM 478



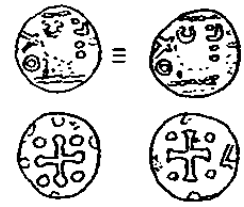
REMMERDEN 480 — KATS 481



REMMERDEN 483 — *REMMERDEN* 484 — *REMMERDEN* 485



ESCHAREN 497 — *AST. ROWANT* 498



DOMBURG 504 — DOMBURG 505

Plate 21. Die-linked coins of Series D, Type 2c

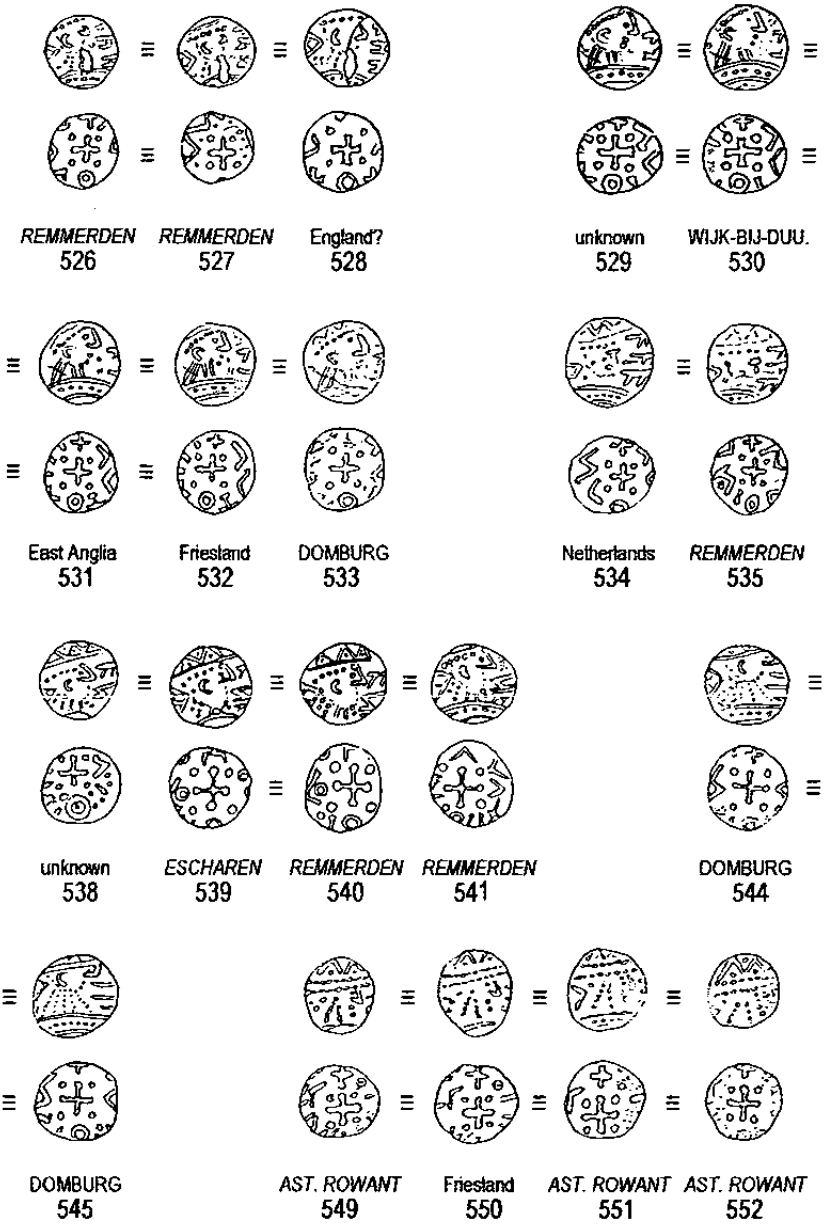
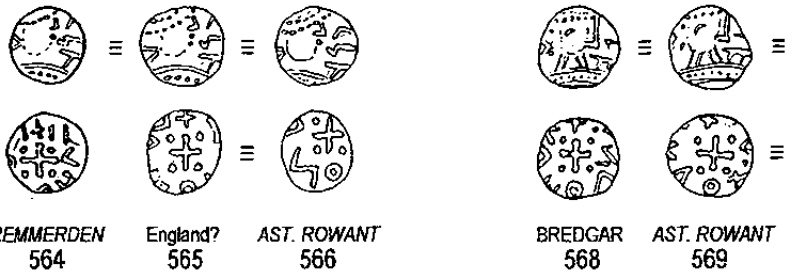
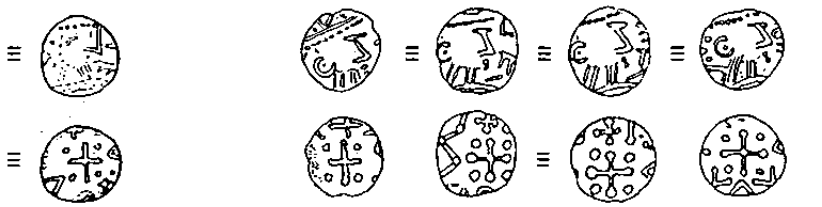


Plate 22. Die-linked coins of Series D, Type 2c

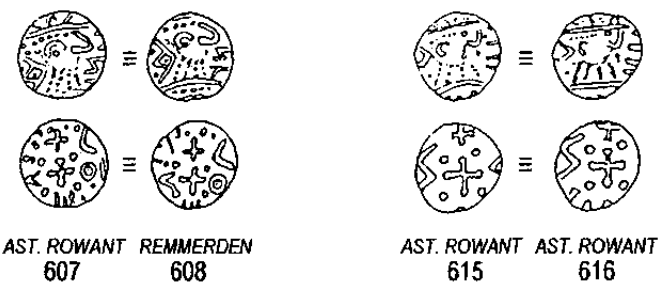


REMMERDEN 564 — England? 565 — *AST. ROWANT* 566 — BREDGAR 568 — *AST. ROWANT* 569



unknown 570 — DOMBURG 573 — *REMMERDEN* 574 — *REMMERDEN* 575 — *REMMERDEN* 576

MIDLUM 579 — ROYSTON 580 — KATWIJK 581 — unknown 597 — England? 598



AST. ROWANT 607 — *REMMERDEN* 608 — *AST. ROWANT* 615 — *AST. ROWANT* 616

Plate 23. Die-linked coins of Series D, Type 2c

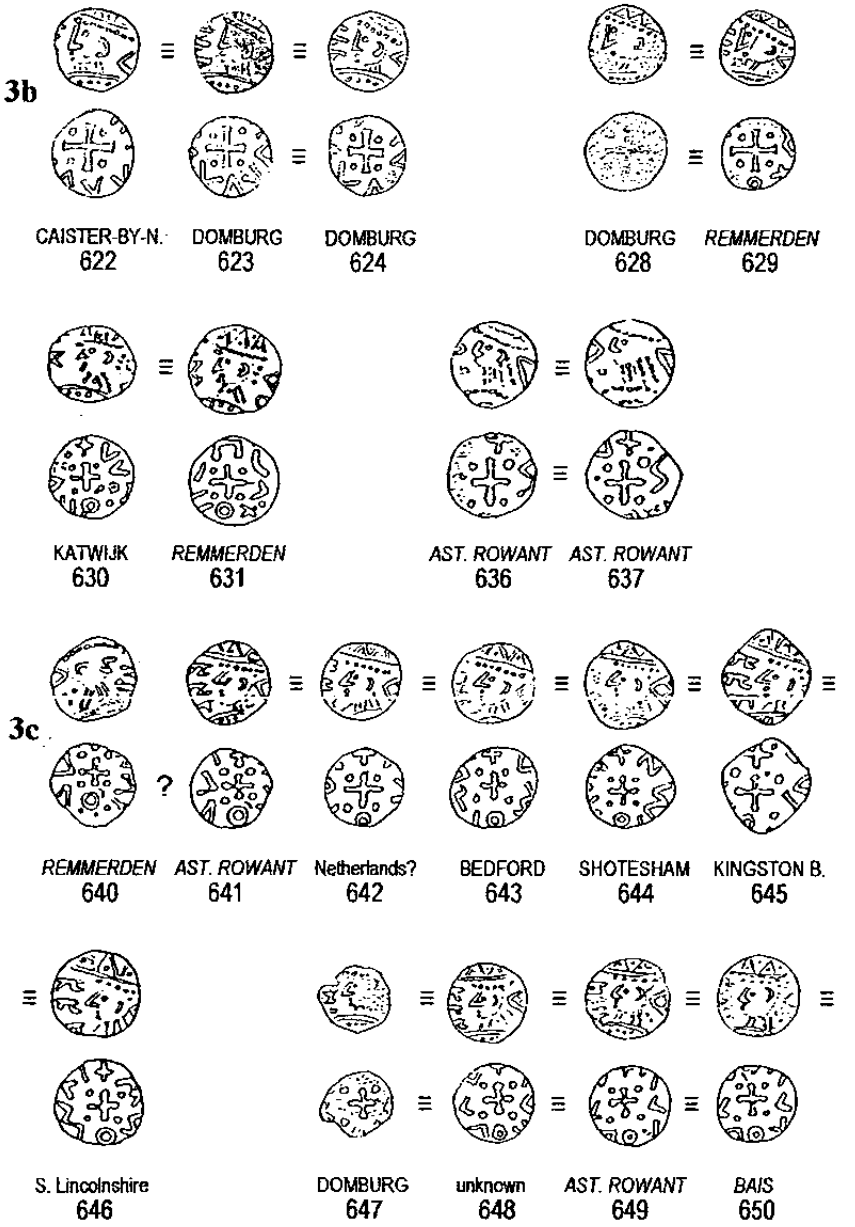
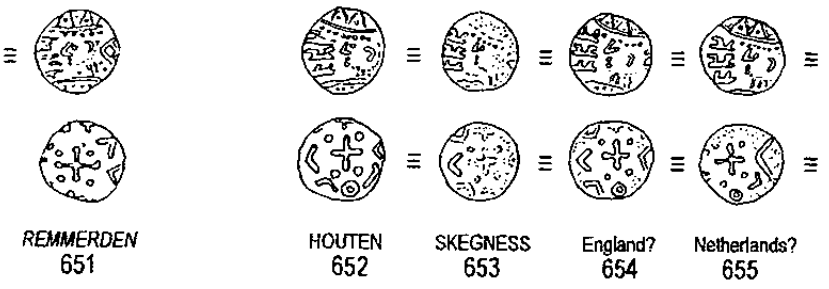
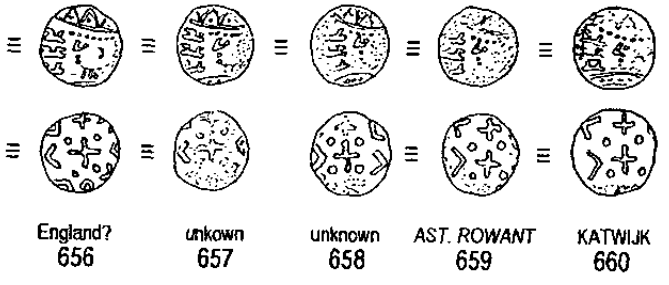


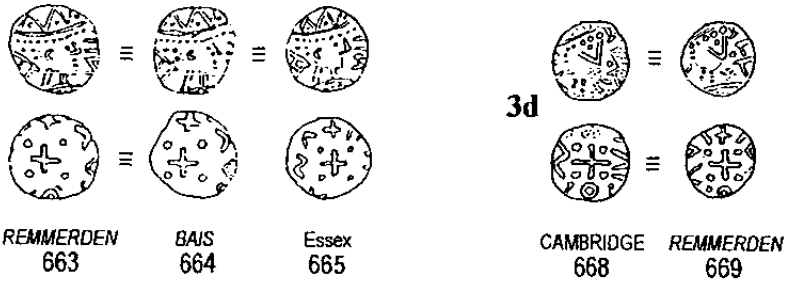
Plate 24. Die-linked coins of Series D, Type 2c



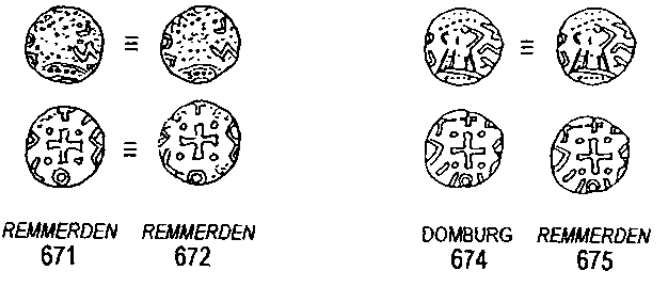
REMMERDEN 651 | HOUTEN 652 | SKEGNESS 653 | England? 654 | Netherlands? 655



England? 656 | unkown 657 | unknown 658 | *AST. ROWANT* 659 | KATWIJK 660

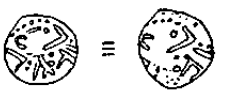


REMMERDEN 663 | *BAIS* 664 | Essex 665 | **3d** CAMBRIDGE 668 | *REMMERDEN* 669

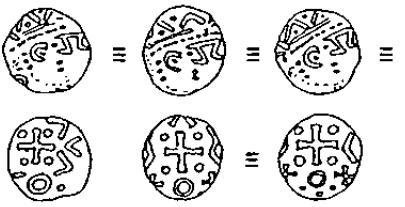


REMMERDEN 671 | *REMMERDEN* 672 | DOMBURG 674 | *REMMERDEN* 675

Plate 25. Die-linked coins of Series D, Type 2c

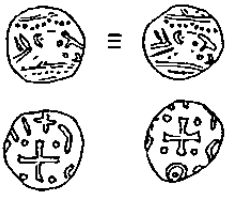


REMMERDEN 677 — unknown 678

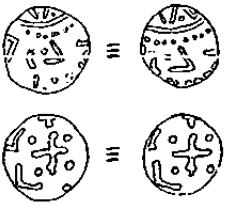


REMMERDEN 680 — *REMMERDEN* 681 — *REMMERDEN* 682

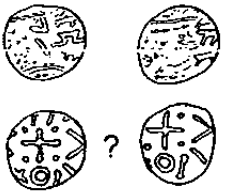
REMMERDEN 683 — GR. DUNMOW 684



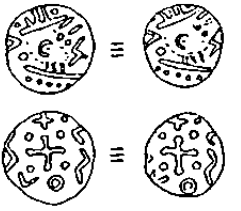
Hampshire 693 — *AST. ROWANT* 694



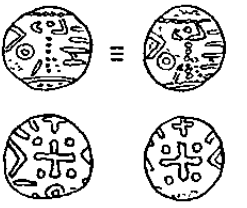
Friesland 702 — unknown 703



unknown 707 — De MEERN 708

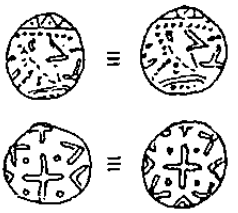


REMMERDEN 712 — *REMMERDEN* 713

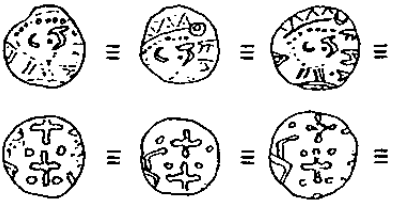


SOUTHAMPTON 722 — unknown 723

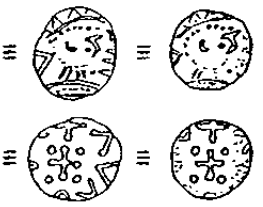
Plate 26. Die-linked coins of Series D, Type 2c



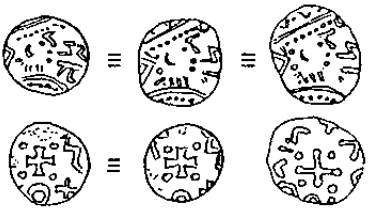
DOMBURG 726 — *AST. ROWANT* 727



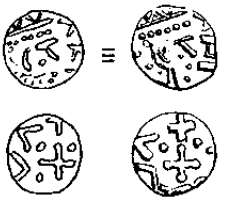
WIJNALDUM 730 — CONGHAM 731 — *REMMERDEN* 732



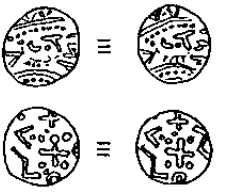
REMMERDEN 733 — DOMBURG 734



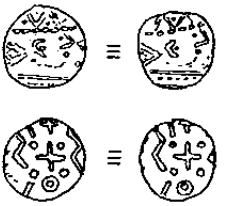
England? 738 — *REMMERDEN* 739 — *REMMERDEN* 740



AST. ROWANT 742 — KINGS LYNN 743

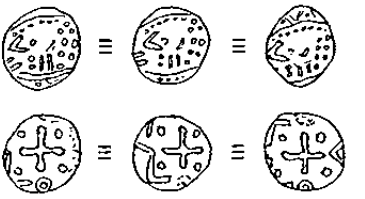


WIJK-BIJ-DUU. 749 — *REMMERDEN* 750



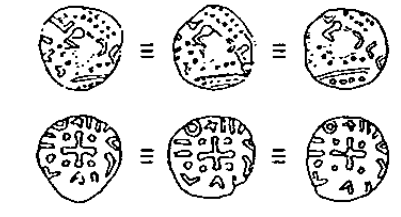
De MEERN 777 — I. OF WIGHT 778

3e

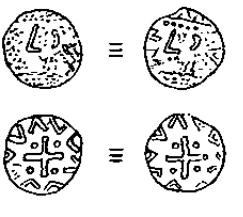


BIDFORD-ON-A. 779 — WIJNALDUM 780 — WIJNALDUM 781

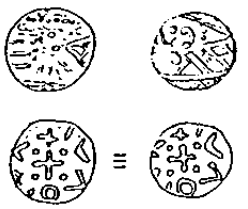
Plate 27. Die-linked coins of Series D, Type 2c



REMMERDEN 785 | England? 786 | Netherlands 787

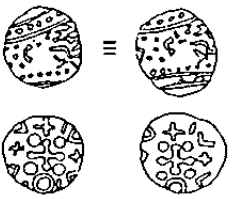


COVEHITE 810 | DOMBURG 811

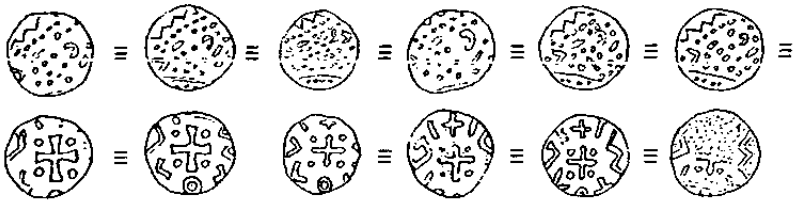


DOMBURG 812 | DOMBURG 813

3f

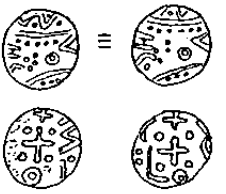


REMMERDEN 835 | *REMMERDEN* 836



DOMBURG 839 | BEDFORD 840 | DEBDEN 841 | DOMBURG 842 | S. Lincolnshire 843 | S. Lincolnshire 844

AST. ROWANT 845



AST. ROWANT 847 | S. Lincolnshire 848

Plate 28. Die-linked coins of Series D, Type 2c

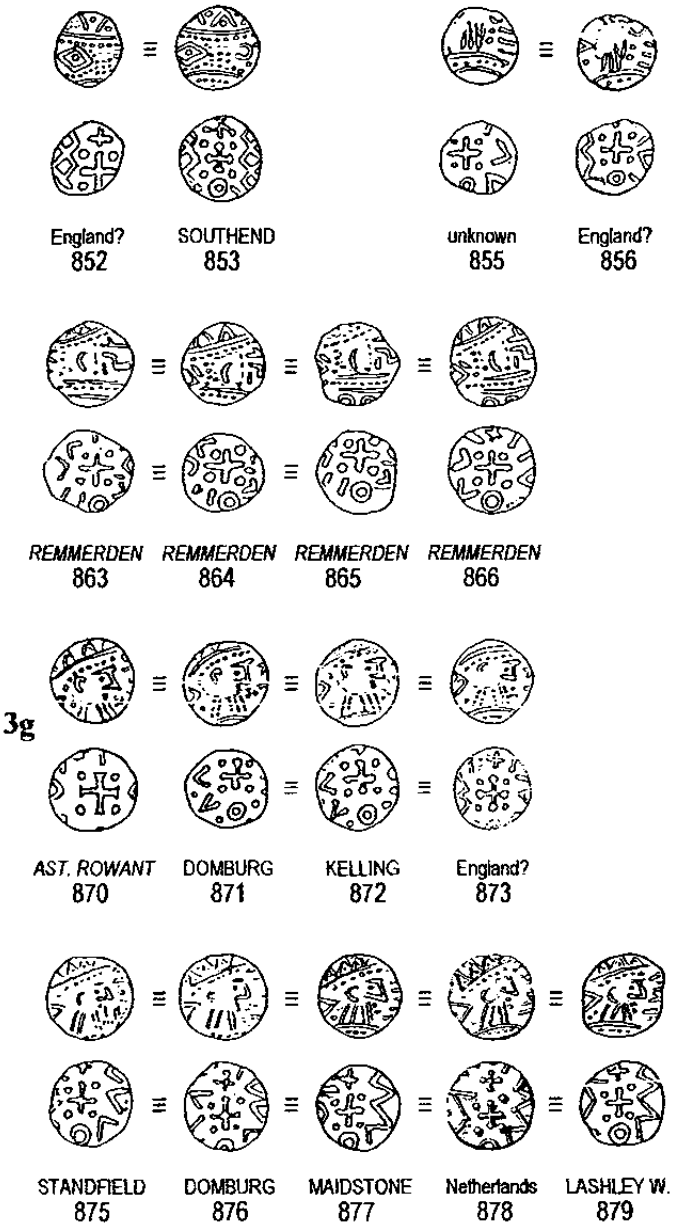


Plate 29. Die-linked coins of Series D, Type 2c

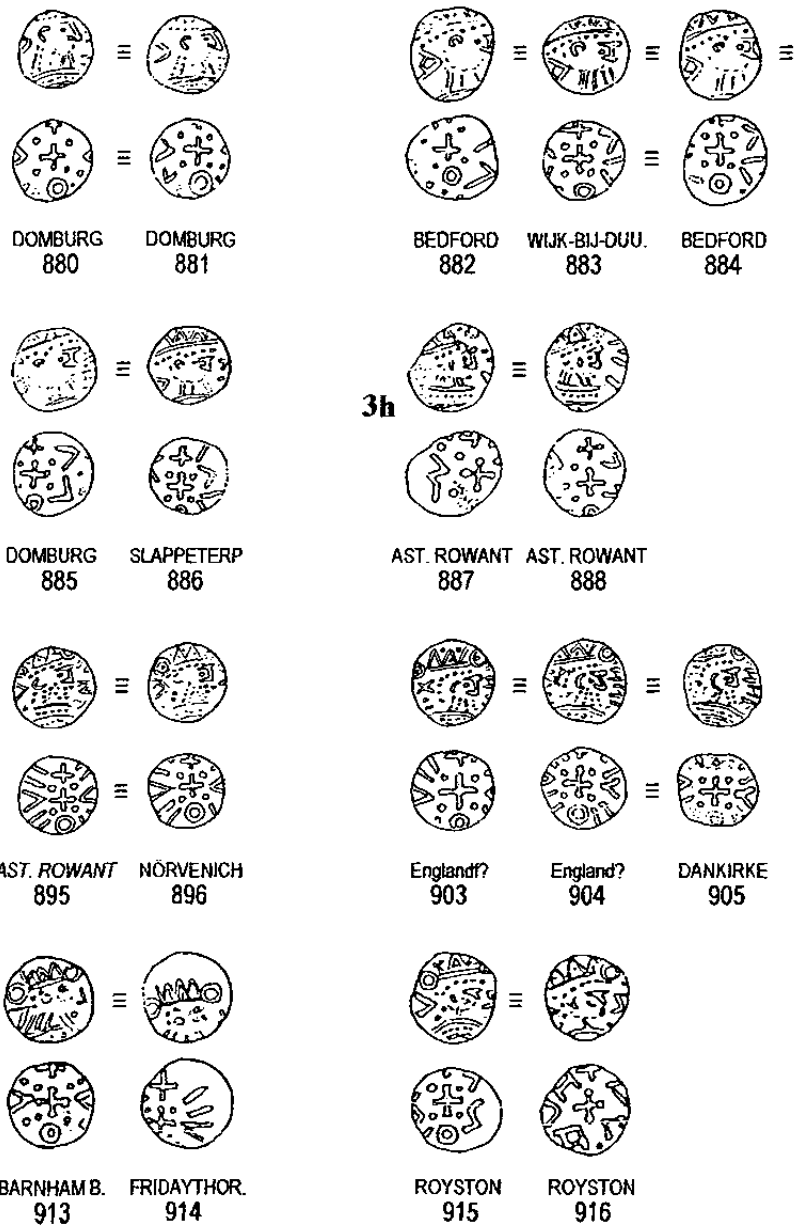


Plate 30. Die-linked coins of Series D, Type 2c

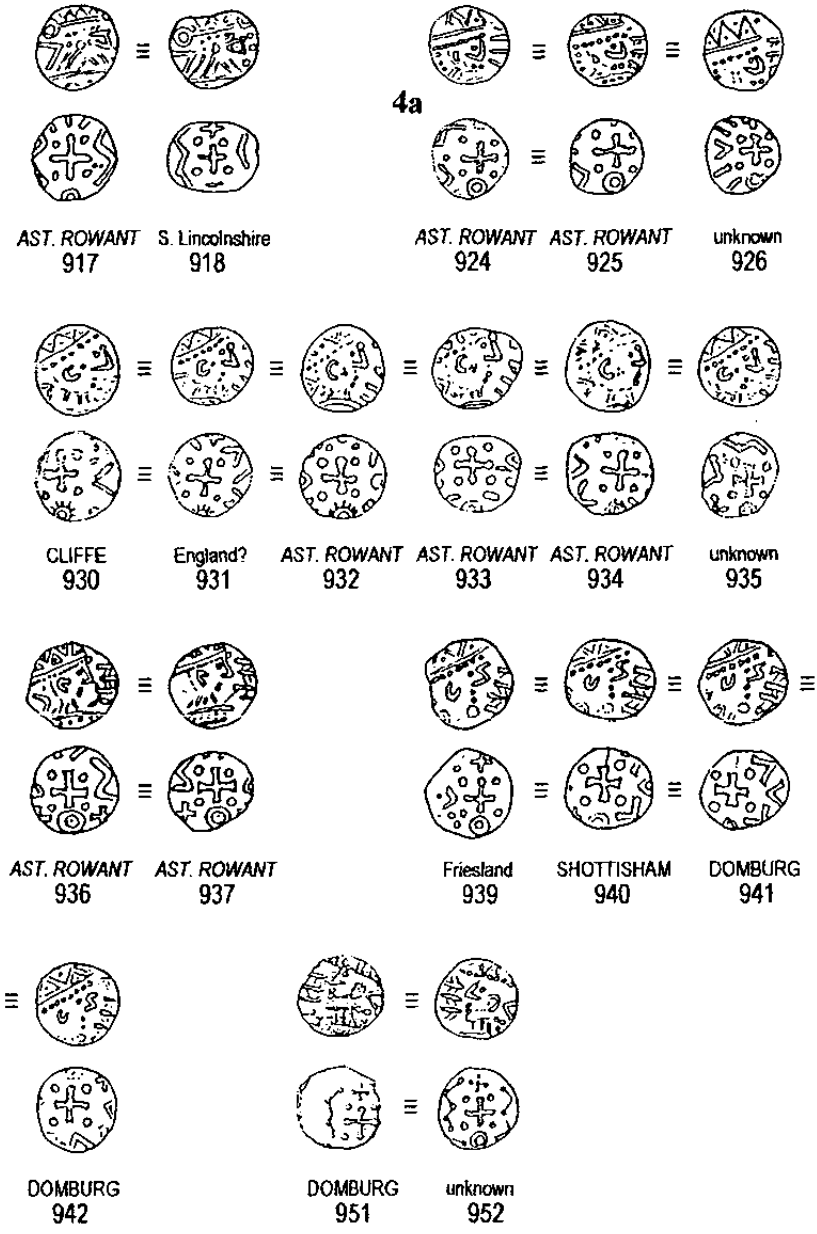
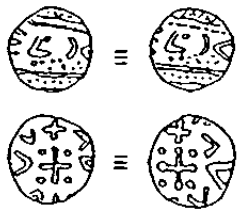
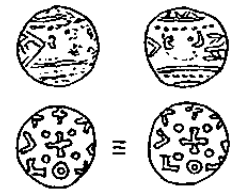


Plate 31. Die-linked coins of Series D, Type 2c



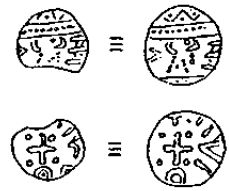
AST. ROWANT 957 *AST. ROWANT* 958

4b

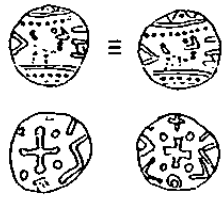


Oxfordshire 964 S. Lincolnshire 965

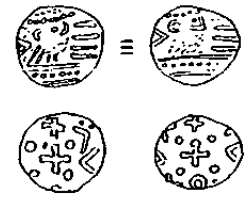
XANTEN 976 DOMBURG 977



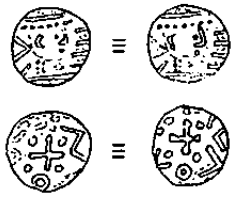
DOMBURG 978 NIJMEGEN 979



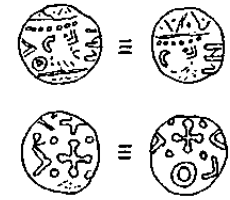
S. Lincolnshire 980 BIRCHINGTON 981



DANKIRKE 983 BONN 984

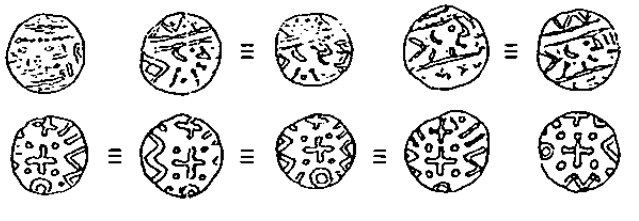


England? 986 NORTH ELHAM 987

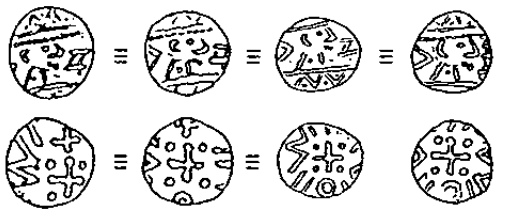


AST. ROWANT 988 *AST. ROWANT* 989

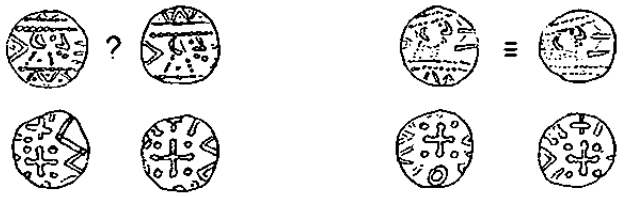
Plate 33. Die-linked coins of Series D, Type 2c



AST. ROWANT 1047 | unknown 1048 | unknown 1049 | *AST. ROWANT* 1050 | *AST. ROWANT* 1051



AST. ROWANT 1053 | *AST. ROWANT* 1054 | England? 1055 | S. Lincolnshire 1056



AST. ROWANT 1059 | England? 1060 | THETFORD 1061 | *AST. ROWANT* 1062

DOMBURG 1063 | *AST. ROWANT* 1064

Plate 32. Die-linked coins of Series D, Type 2c

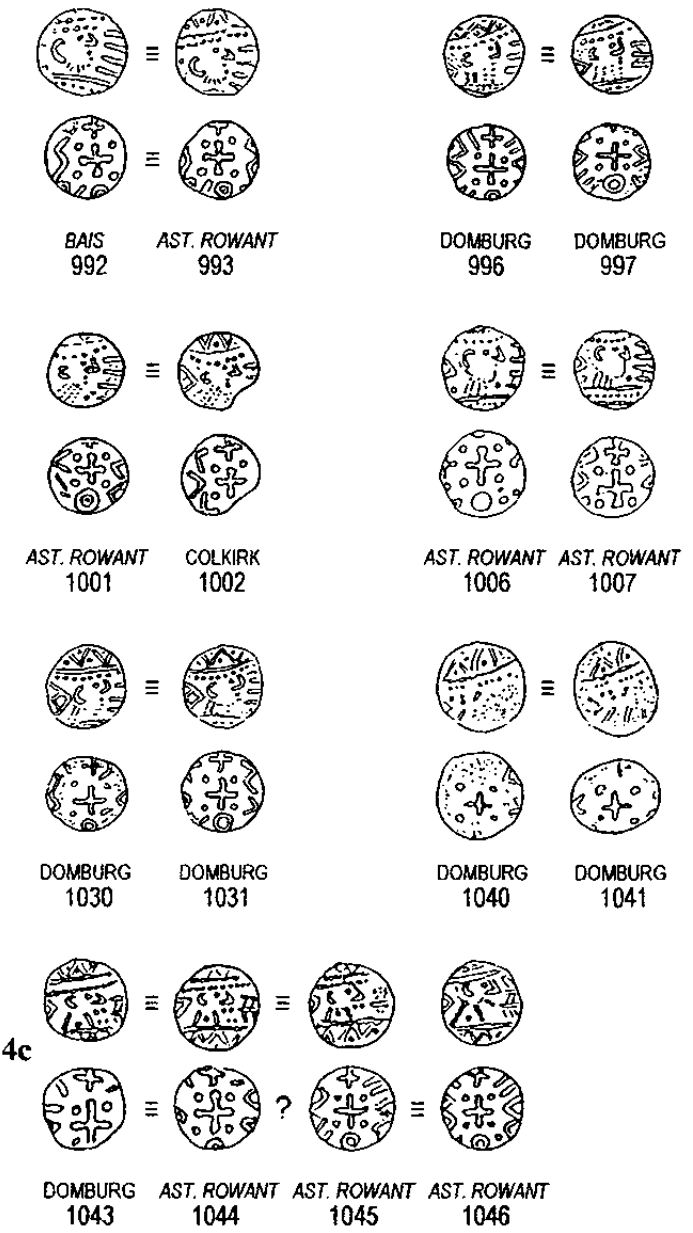


Plate 34. Series D sceattas from the Remmerden hoard I.

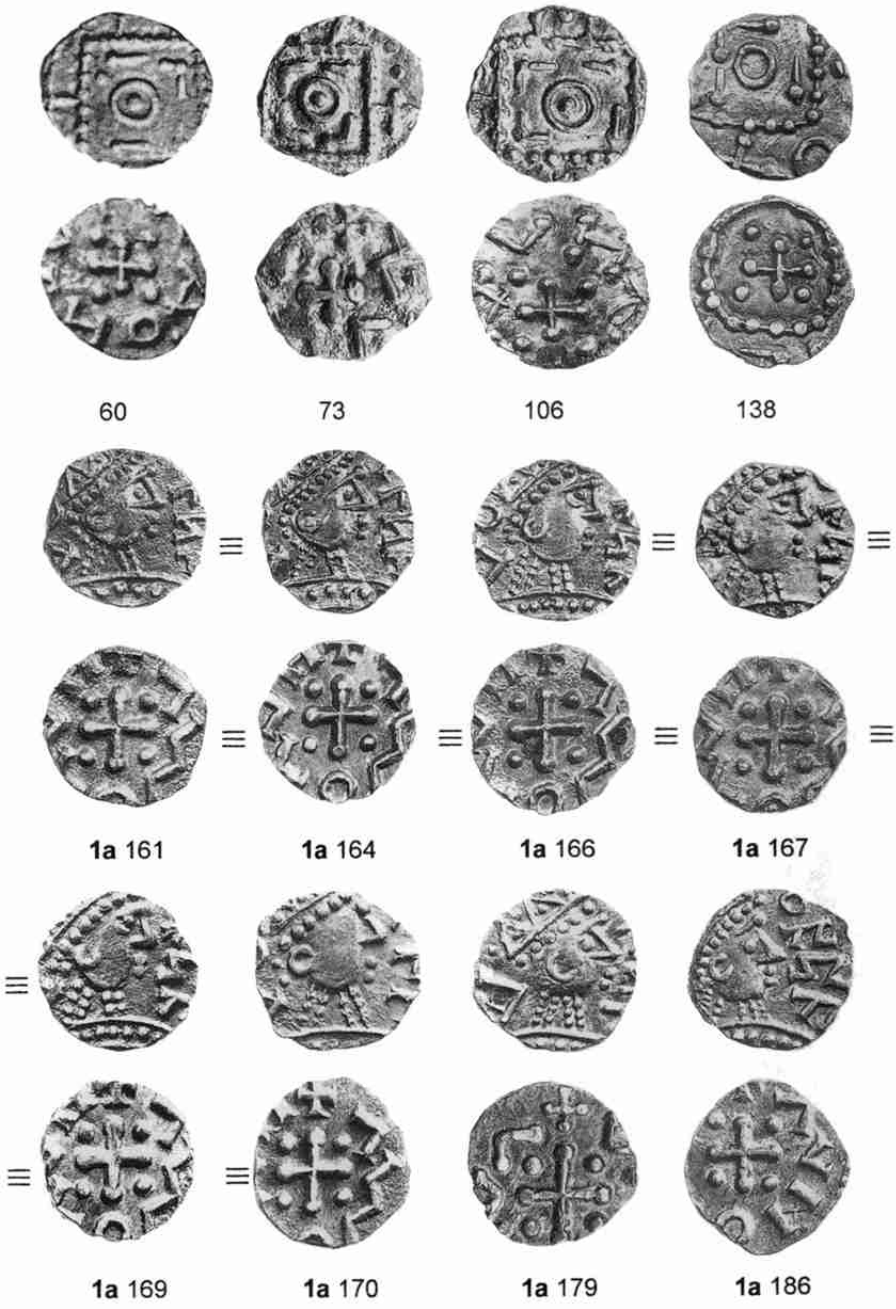


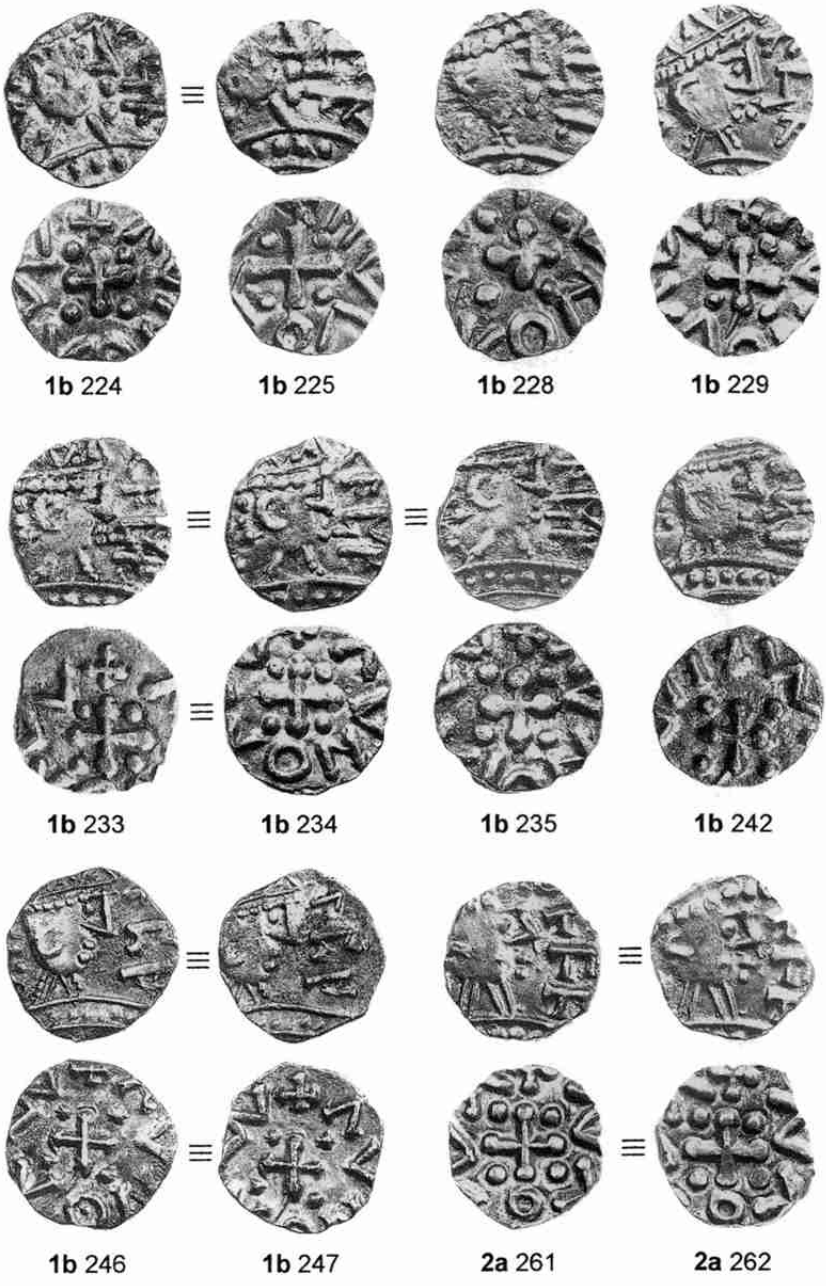
Plate 35. Series D sceattas from the Remmerden hoard II.

1a 189 **1a** 192 **1a** 196 **1a** 197

1b 204 **1b** 208 **1b** 211 **1b** 213

1b 215 **1b** 216 **1b** 217 **1b** 219

Plate 36. Series D sceattas from the Remmerden hoard III.



1b 224 **1b** 225 **1b** 228 **1b** 229

1b 233 **1b** 234 **1b** 235 **1b** 242

1b 246 **1b** 247 **2a** 261 **2a** 262

Plate 37. Series D sceattas from the Remmerden hoard IV.

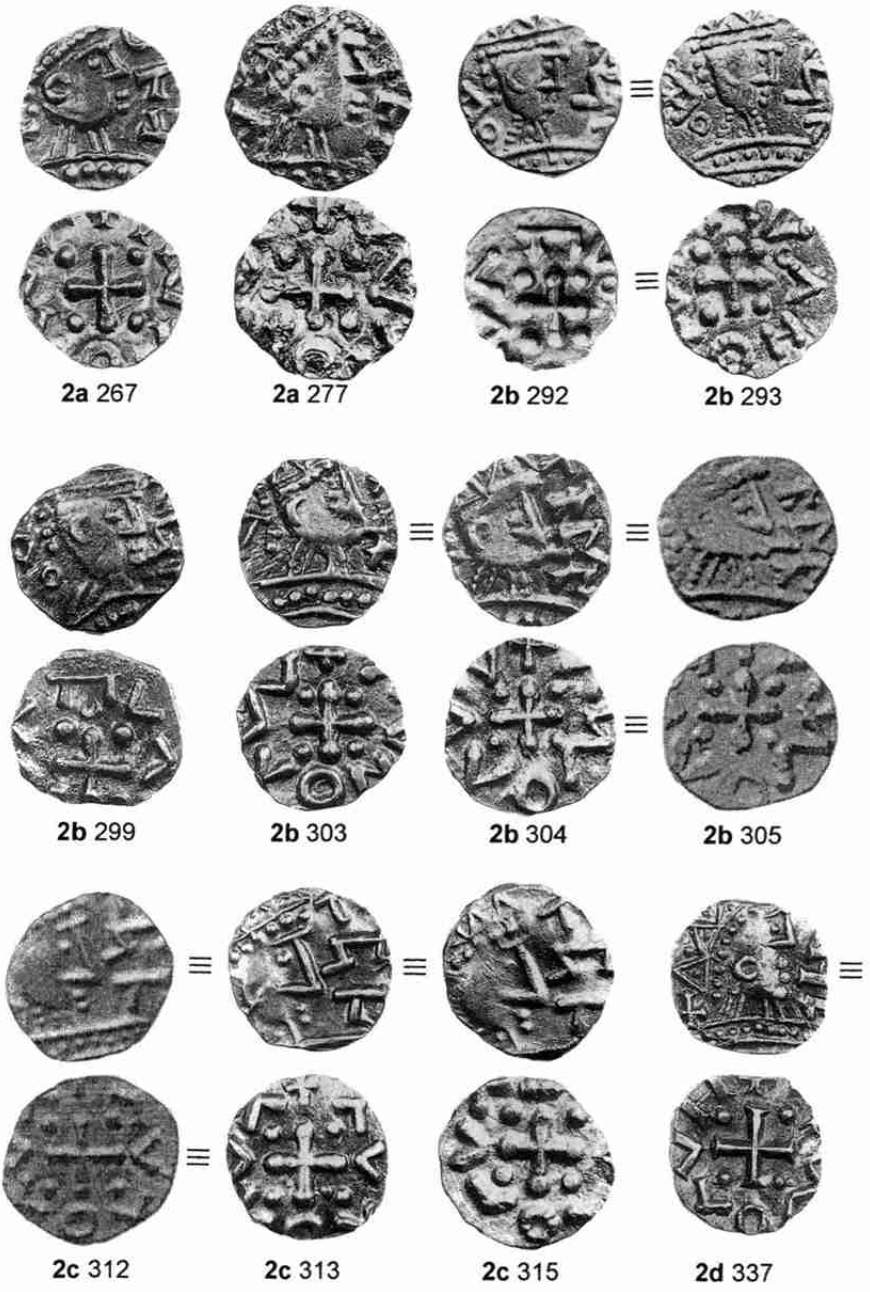
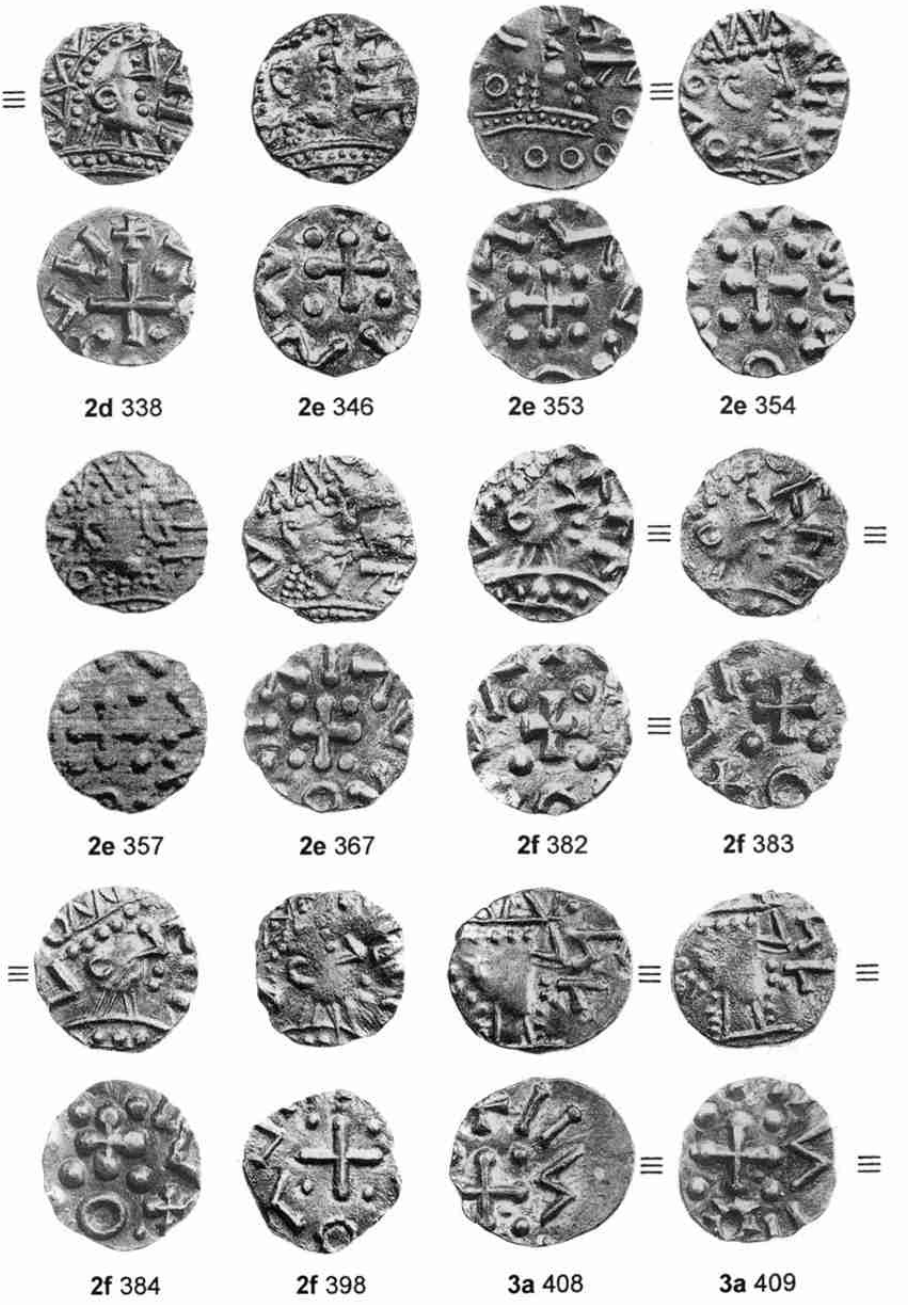


Plate 38. Series D sceattas from the Remmerden hoard V.



2d 338 **2e** 346 **2e** 353 **2e** 354

2e 357 **2e** 367 **2f** 382 **2f** 383

2f 384 **2f** 398 **3a** 408 **3a** 409

Plate 39. Series D sceattas from the Remmerden hoard VI.

3a 410 **3a** 427 **3a** 428 **3a** 429

3a 430 **3a** 431 **3a** 433 **3a** 434

3a 436 **3a** 437 **3a** 439 **3a** 441

Plate 40. Series D sceattas from the Remmerden hoard VII.

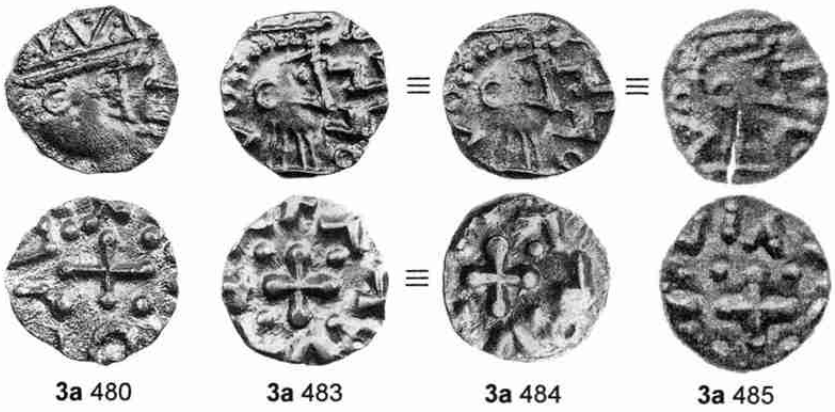
3a 442 **3a** 448 **3a** 449 **3a** 450

3a 451 **3a** 452 **3a** 455 **3a** 456

3a 457 **3a** 461 **3a** 462 **3a** 463

Plate 41. Series D sceattas from the Remmerden hoard VIII.

3a 464 **3a** 465 **3a** 468 **3a** 469



3a 480 **3a** 483 **3a** 484 **3a** 485

3a 491 **3a** 494 **3a** 526 **3a** 527

Plate 42. Series D sceattas from the Remmerden hoard IX.

3a 535 **3a** 537 **3a** 540 **3a** 541

3a 564 **3a** 574 **3a** 575 **3a** 576

3a 578 **3a** 584 **3a** 587 **3a** 592

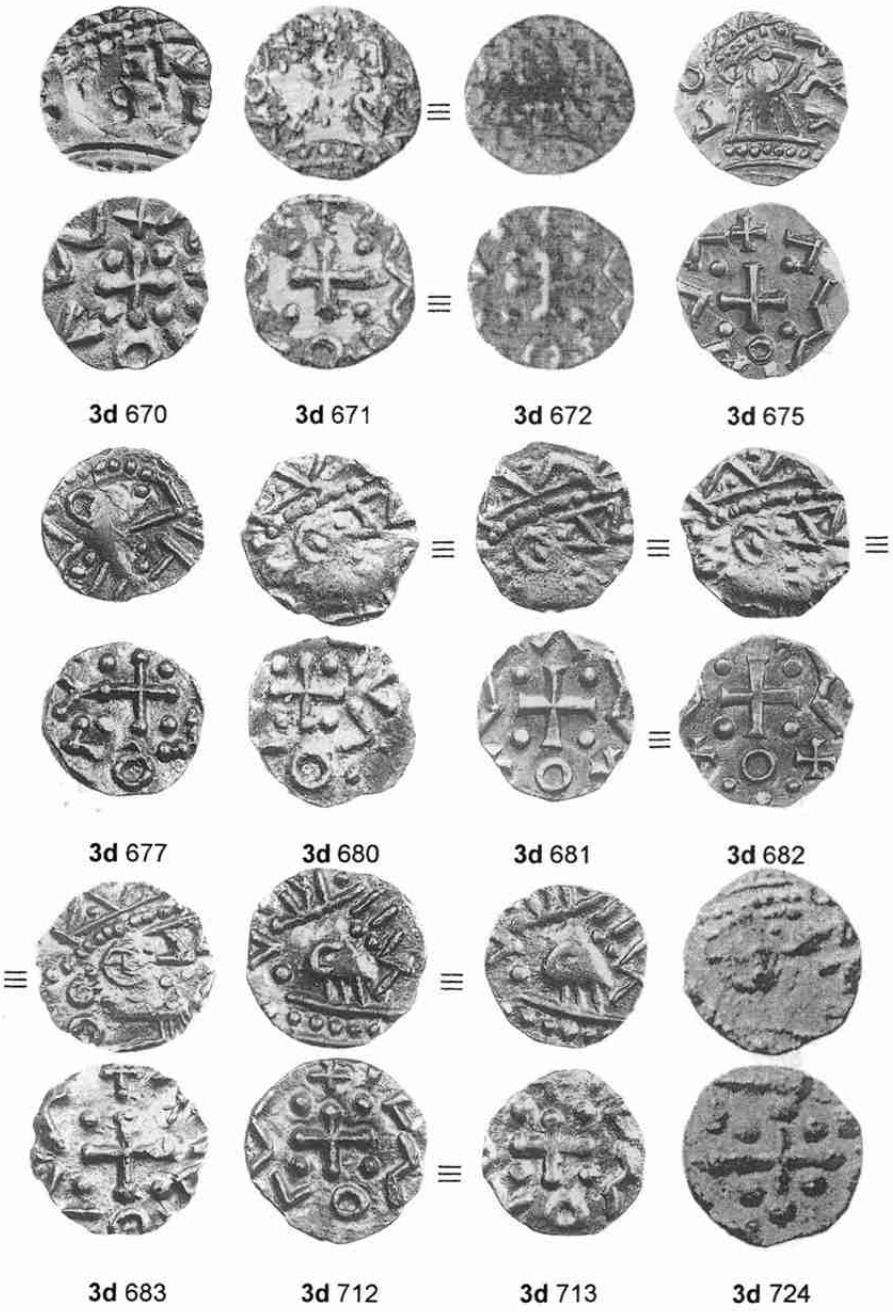
Plate 43. Series D sceattas from the Remmerden hoard X.

3a 593 **3a** 606 **3a** 608 **3a** 610

3b 629 **3b** 631 **3b** 632 **3b** 638

3c 640 **3c** 651 **3c** 663 **3d** 669

Plate 44. Series D sceattas from the Remmerden hoard XI.

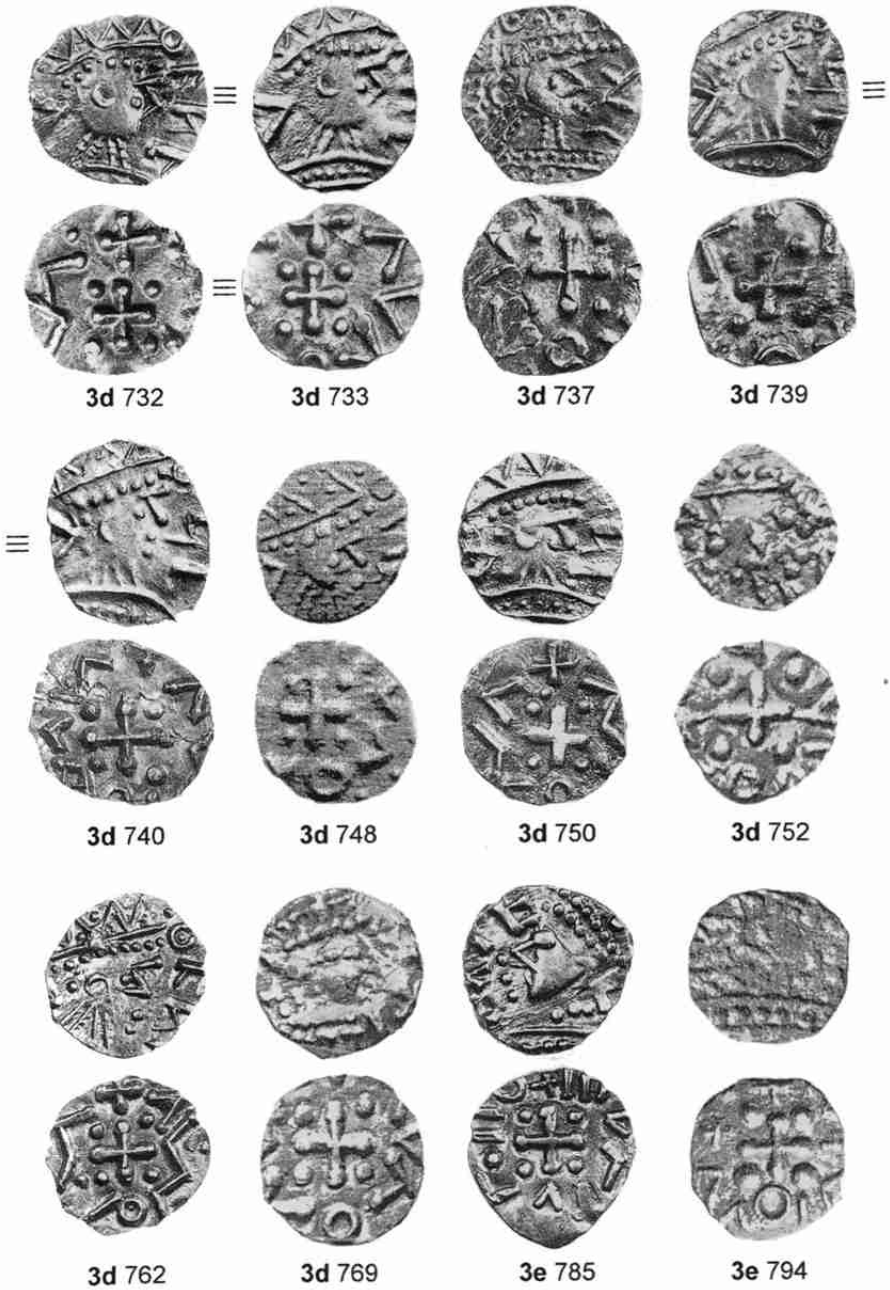


3d 670 **3d** 671 **3d** 672 **3d** 675

3d 677 **3d** 680 **3d** 681 **3d** 682

3d 683 **3d** 712 **3d** 713 **3d** 724

Plate 45. Series D sceattas from the Remmerden hoard XII.



3d 732 **3d** 733 **3d** 737 **3d** 739

3d 740 **3d** 748 **3d** 750 **3d** 752

3d 762 **3d** 769 **3e** 785 **3e** 794

Plate 46. Series D sceattas from the Remmerden hoard XIII.

3e 796 **3e** 797 **3e** 805 **3f** 832

3f 835 **3f** 836 **3f** 837 **3f** 838

3f 863 **3f** 864 **3f** 865 **3f** 866

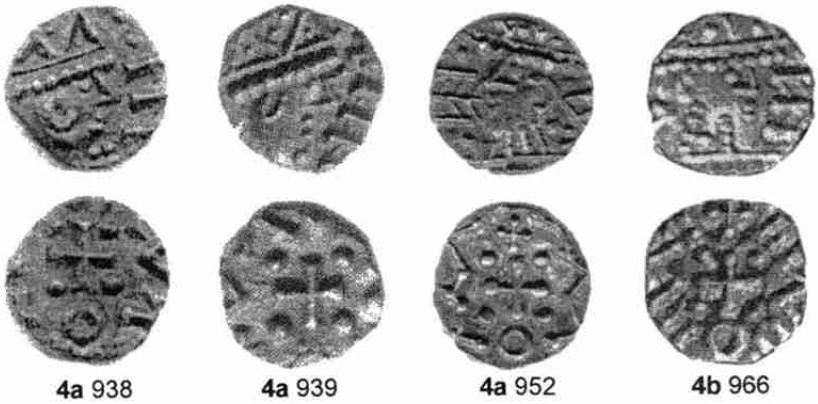
Plate 47. Series D sceattas of sub-varieties 3g, 3h, and 4a.

3g 871 **3g** 876 **3g** 877 **3g** 883

3h 890 **3h** 901 **3h** 903 **3h** 904

3h 907 **4a** 927 **4a** 931 **4a** 935

Plate 48. Series D sceattas of sub-varieties 4a, 4b, and 4c.



4a 938 **4a** 939 **4a** 952 **4b** 966

4b 988 **4b** 991 **4b** 1013 **4c** 1050

4c 1051 **4c** 1055 **4c** 1065 **4c** 1067